Eric R. Binnendyk

PhD student in computer science
Jacobs School of Engineering
UC San Diego

(575) 312-5116   3869 Miramar Street #4211
ericABQ@gmail.com   La Jolla, CA 92092

Personal statement

I have always had a deep passion for mathematics and am particularly drawn to formal logic, set theory, and complexity theory. I am currently pursuing a PhD in theoretical computer science at UC San Diego studying complexity theory and its applications to machine learning and cryptography. I am deeply interested in the limits of different computational models as well as the conditions sufficient to prove a complexity class can be learned or contains pseudorandomness. My long term goal is to work at a university or a research lab making significant contributions to the areas of complexity theory and algorithm design.

Education

University of California at San Diego
- June 2027   PhD in Computer Science (expected)

New Mexico Institute of Mining and Technology
- June 2022   MS in Computer Science
- May 2021   BS in Computer Science with highest honors
- May 2021   BS in Mathematics with highest honors

Research experience and publications

- Binnendyk, Eric R. A Summary of Molloy and Reed's Theorem of Graph Percolation. 2022. Presented at the ETH social lab. Link.
- "An intelligent token bucket-based queue management strategy for QoS of named-data networking." 2022. Independent study for MS degree. Committee: Jun Zheng (advisor), Hamdy Soliman, Sihua Shao. Link.
- Marco Carmosino, R. Ramyaa, Antonina Kolokolova, Manuel Sabin, Eric Binnendyk. Learning with distributional inverters. Presented at the *33rd International Conference on Algorithmic Learning Theory, 2022*. Paper.
- Binnendyk, Eric R. Pseudo-random functions and uniform learnability. *Electronic Colloquium on Computational Complexity*. October 2021. Link.
- Binnendyk, Eric R. Pseudo-random functions and uniform learnability. 2021. Senior honors thesis. Committee: R. Ramyaa (advisor), Marco Carmosino, Antonina Kolokova, Subhasish Mazumdar, Jun Zheng. Link.
- Binnendyk, Eric R. A uniform dichotomy between pseudorandom functions and learnability. 2021. Department Showcase presentation at the NMT Student Research Symposium. Advisor: R. Ramyaa. Slides.
- Binnendyk, Eric R. A New Method for Finding Roots of Unity by Finding Radical Expressions For Arbitrary Members Of The Cyclotomic Field and Its Extensions. 2020. Poster presentation at the NMT Student Research Symposium. Advisor: Mingji Zhang. Paper, poster.

- Binnendyk, Eric R. Exploration of Stable Cycles in Dynamical Systems. 2019. Oral/slide presentation at the NMT Student Research Symposium. Advisor: R. Ramyaa. [Paper](#), [slides](#).

Awards and distinctions

- 2021 NMT Alumni Award - Top Computer Science graduate
- 2021 NMT Computer Science & Engineering Department High Achievement Award
- 2018-2021 NMT Tech Scholar (honors) - 3.96/4.0 GPA
- 2021 John W. Shipman Award, endowed scholarship
- 2020 Goldwater Scholarship nominee
- 2019 NMT math department slide rule competition winner
- 167 Quantitative/165 Verbal GRE
- 2016 National Merit Finalist

Employment

Summer intern - Sandia National Labs - Participate in research and development with the TITANS software engineering team and with the CCD cybersecurity team to advance national security, including work on program analysis and assessing the severity of network attack scenarios. (2022 - 2023)

Research assistant - NMT Human Centered Computing and Security Lab - Conducted research into named-data networking and smart grid security under the guidance of Prof. Jun Zheng as part of the NM EPSCoR program funded by an NSF grant. Researched reinforcement learning as a possible tool for active queue management. Coded network simulations and surveyed previous research in this area. (2020 - 2022)

Teaching assistant - NMT Computer Science and Engineering department - Graded assignments, maintained records, and tutored students for the NMT courses Design and Analysis of Algorithms taught by Dr. Subhasish Mazumdar and Formal Languages and Automata taught by Dr. R. Ramyaa. (Fall 2021 - Spring 2022)

Tutor - NMT Office for Student Learning - Tutored students on mathematics and computer science and oversaw test corrections. Completed extensive training to be certified by the College Reading & Learning Association. (2019 - 2020)

Grader - NMT Computer Science and Engineering department - Graded assignments and tests for the NMT course Foundations of Computer Science taught by Dr. Ramyaa. Maintained student records on Canvas. (Fall 2019)

Webmaster - NMT Department of Academic Affairs - Coordinated the migration of web pages from old templates to a new standard. Edited HTML/CSS and dealt with version control using OmniUpdate. (2018)

Other activities

Research lab participant - Am a regular participant in Prof. Russell Impagliazzo's weekly lab meetings on theoretical computer science. Present my own research and discuss recent advancements in the field. (2022 - 2023)

NMT Cybersecurity Club - Participate in hands-on activities in computer security, networking, and other activities while learning about the role of cybersecurity in the modern world. (2019 - 2020)

Competition judge/supervisor - Volunteered at the New Mexico State science fair and the State Science Olympiad. Assessed middle and high school projects. (2018)

In my spare time I enjoy making models of polytopes using zome tools and origami and interacting with other hobbyists in online discussion forums about higher-dimensional geometry and cellular automata.