Curriculum Vitae

Cassidy Waldrip

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RESEARCH OBJECTIVE

I am a computer scientist, mainly trained in program verification and formal methods, looking to enter the world of network science. I have a strong computational foundation, I want to apply my skills to better understand the divisions and opinions we see in the world today. I am particularly interested in studying human contagions and the development of biases in large networks.

EDUCATION

PhD in Computer Science (in progress) *September 2023 - Present*
Northeastern University GPA: 4.00
Advisors: Pete Manolios and William Robertson

MS in Computer Science *January 2022 - April 2024*
Brigham Young University GPA: 3.97
Advisor: Eric Mercer

BS in Computer Science *September 2016 - December 2021*
Brigham Young University GPA: 3.60
Minor: Mathematics

WORK AND RESEARCH

TA for Logic and Computation | Khoury College *September 2023 - December 2024*
Worked as a TA for an accelerated version of the class. Held regular office hours, managed grading and student communication, and assisted in the review process for creating new assignments.

Research Assistant | Khoury Formal Methods Group *September 2023 - September 2024*
Worked on developing a new method for vigorously testing Python programs that have type annotations. The method involves calls to a theorem prover as well as a fuzzer in order to cover a maximal amount of code. Also experimented with forced execution of blocks of code in order to cover and detect errors in previously unreachable code

Applied Scientist Intern | Amazon Web Services *June 2023 - September 2023*
Continued previous summer's work on modeling AWS user authentication software. Completed end-to-end models and proofs for several critical APIs.

Research Assistant | BYU Verification Lab *September 2021 - September 2023*
Researcher in Eric Mercer's group, working on automatic test generation from Dafny counterexamples and from program specifications. I also did work on automatically checking Dafny contracts for common errors, and presented my work at a top conference. I led a group of undergraduate student researchers in lab efforts.

Applied Scientist Intern | Amazon Web Services *June 2022 - September 2022*
Worked on specifying, modeling, and proving key properties of AWS user authentication software using Dafny and Z3. Performed differential testing between source code and verified models.

Undergraduate Research Intern | Sandia National Labs *May 2021 - January 2022*
Intern at the Sandia Center for Cyber Defenders. Projects focused on malware unpacking using virtual machine introspection, and extracting stack and heap information at varying points of program execution.

TA for Computer Systems | BYU CS Department *September 2020 - April 2021*
Assisted in the instruction of over 200 computer systems students, focusing on low-level systems, assembly code and memory hierarchy. Taught weekly recitation sessions, met one-on-one with students, and graded assignments.

Web Developer | BYU McKay School of Education *March 2020 - December 2020*
Maintained and developed the McKay School website. Fixed bugs and made content changes as they were requested by professors and staff of the school.

CONFERENCES

Symposium on Principles of Programming Languages *January 2024*
Presented my workshop paper "Verifying Dafny Contract Integrity" at POPL 2024 in London.

AWS Identity Science Fair *July 2022*
Presented poster on differential testing and formal verification of AWS APIs.

PUBLICATIONS

[Submitting December 13th, 2024] Andrew T. Walter, Ankit Kumar, Cassidy Waldrip, and Panagiotis Manolios. "**Calculational Proofs in ACL2s**." NASA Formal Methods Symposium 2025 *(if accepted)*

[Workshop paper] Cassidy Waldrip and Eric Mercer. "**Verifying Dafny Contract Integrity**." Symposium on Principles of Programming Languages: Dafny Workshop 2024

Aleksandr Fedchin, Tyler Dean, Jeffrey Foster, Eric Mercer, Zvonimir Rakamarić, Giles Reger, Neha Rungta, Robin Salkeld, Lucas Wagner and Cassidy Waldrip. "**A Toolkit for Automated Testing of Dafny**." NASA Formal Methods Symposium 2023

OUTREACH ACTIVITIES

BYU CS Inclusion, Diversity and Equity Mentor *January 2022 - April 2023*
Mentor for underrepresented students in the CS program. Social media outreach team lead. Plan and host activities focused on supporting groups such as international students, women, and members of the LGBTQ+ community.

Women in Tech Panelist *February 2023*
Panelist for a Women in Computer Science club event. Answered questions from a large audience about graduate school, internships, and my experiences in computer science.

Graduate Student Panelist *November 2022*
Selected by the BYU CS Department to be a panelist for an event hosting undergraduate students who are considering graduate school.

AWARDS AND FELLOWSHIPS

Khoury Distinguished Fellowship *September 2023 - August 2024*
Awarded prestigious $60k fellowship for outstanding first year CS PhD students at Northeastern University.

Research Fellowship *September 2021 - September 2023*
Full-tuition scholarship and stipend for research in the Verification and Validation Lab.

BYU CPMS Dean's List *January 2020, January 2021*

BYU Full-tuition merit-based scholarship *September 2016 - April 2017*

Freshman Honor Society *December 2016*
Honor awarded to freshmen in the top 20% of their class.

TECHNICAL SKILLS

Network science:

- Programming: NetworkX, Graphtool, Python, PyTorch
- Data and tools: SQL, database design, Git, time/space complexity
- Coursework: Intro to Network Science (BYU), Network Science Data (NEU)

Formal methods and testing:

- Dafny/Boogle IVL: 2 years of experience, used extensively at BYU and at AWS
- SMT/SAT solvers: taught lectures on SMT solvers in graduate course
- Proofs: Coq proof assistant, ACL2s, type proofs
- Testing: test-driven development, input partitioning, coverage metrics

Other:

- Native-level fluency in Spanish, conversational in Portuguese
- Excellent writer and public speaker