

Alaia Solko-Breslin

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EDUCATION

University of Pennsylvania Ph.D. in Computer and Information Science Advisor: Rajeev Alur	Fall 2022 - Present
Cornell University M.Eng. in Computer Science GPA: 4.08	Fall 2021 - Spring 2022
Cornell University B.S. in Computer Science Minor in Applied Mathematics GPA: 3.81	Fall 2018 - Spring 2021

RESEARCH INTERESTS

My research interests involve machine learning, programming languages, and formal methods. My research focuses on neurosymbolic learning, a paradigm that combines neural and symbolic approaches to improve the accuracy and interpretability of machine learning models. I am currently working on the problem of approximating gradients of black-box functions with the goal of making neurosymbolic learning possible with non-differentiable programs.

RESEARCH EXPERIENCE

Neurosymbolic Learning with Black-Box Programs <i>University of Pennsylvania</i>	Fall 2022 - Present
<ul style="list-style-type: none">· Designing and implementing an algorithm for neurosymbolic learning with non-differentiable programs.· Testing our algorithm on an extensive benchmark suite, which includes synthetic and real-world tasks.· Working with Rajeev Alur, Mayur Naik, and Eric Wong.	
L* + Blanks (L_□[*]) and Petr4 <i>Cornell University</i>	Spring 2020 - Spring 2022
<ul style="list-style-type: none">· Contributed to the development of the L_□[*] algorithm, inspired by the Maler-Pnueli version of L*, that learns finite automata from a set of example strings. Worked under Nate Foster and Alexandra Silva.· Developed a framework for testing the semantics of the Petr4 interpreter. Worked under Nate Foster.	

PUBLICATIONS

Refereed Publications

- *Data-Efficient Learning with Neural Programs* [[paper](#)] NeurIPS 2024
Alaia Solko-Breslin, Seewon Choi, Ziyang Li, Neelay Velingker, Rajeev Alur, Mayur Naik, Eric Wong
- *Automata Learning with an Incomplete Teacher* [[paper](#)] ECOOP 2023
Mark Moeller, Thomas Wiener, **Alaia Solko-Breslin**, Caleb Koch, Nate Foster, Alexandra Silva.
- *Petr4: Formal Foundations for P4 Data Planes* [[paper](#)] POPL 2021
Ryan Doenges, Mina Tahmasbi Arashloo, Santiago Bautista, Alexander Chang, Newton Ni, Samwise Parkinson, Rudy Peterson, **Alaia Solko-Breslin**, Amanda Xu, Nate Foster.

Preprints

- *Understanding the Effectiveness of Large Language Models in Detecting Security Vulnerabilities* [paper]
Avishree Khare*, Saikat Dutta*, Ziyang Li, **Alaia Solko-Breslin**, Rajeev Alur, Mayur Naik

WORK EXPERIENCE

Amazon Web Services

Summer 2021

Software Development Engineer Intern

- Implemented an API that performs a deep health check of our authentication service.
- Implemented canaries that would continuously make requests to this health check and our service and report metrics.

Amazon Web Services

Summer 2020

Software Development Engineer Intern

- Designed and implemented an API that allows test fleets to obtain the posture that is necessary for them to reach services in Native AWS.

TEACHING

University of Pennsylvania

Teaching Assistant

- CIS 7000: Special Topics: Trustworthy Machine Learning Spring 2024
Instructors: **Rajeev Alur** and **Osbert Bastani**
- CIS 5000: Software Foundations Fall 2023
Instructor: **Benjamin Pierce**
Lectures taught: “Induction and data structures”

Cornell University

Teaching Assistant

- CS 4160/5160: Formal Verification Spring 2022
Instructor: **Michael Clarkson**
- CS 3110: Data Structures and Functional Programming Fall 2021
Instructor: **Michael Clarkson**
- CS 4820: Introduction to Analysis of Algorithms Spring 2021
Instructor: **Robert Kleinberg**
- CS 4820: Introduction to Analysis of Algorithms Fall 2020
Instructor: **Dexter Kozen**
- CS 3110: Data Structures and Functional Programming Spring 2020
Instructor: **Nate Foster**
- CS 3110: Data Structures and Functional Programming Fall 2019
Instructor: **Michael Clarkson**

AWARDS

AWS-AI ASSET Fellow

2024

Funding to support research on safe, explainable, and trustworthy AI-enabled systems.

John Grist Brainerd Doctoral Fellowship (UPenn)

2022

SERVICE

PLDI Student Volunteer

June 2023

LEADERSHIP AND MENTORSHIP

CIS Mentorship Program Mentor

August 2023 - Present

CIS Mentorship Program Volunteer

August 2023 - Present

Organize social events for CIS Ph.D. students participating in our mentorship program.

CIS TGIF Event Coordinator

June 2023 - Present

Organize weekly social dinners for CIS Ph.D. students, postdocs, and faculty.

CIS Office Committee Member

May 2023 - Present

Coordinate office assignments for CIS Ph.D. students and postdocs.

TRAVEL FUNDING

Summer School on Formal Techniques Funding

2023

Programming Languages Mentoring Workshop at PLDI Funding

2022

TECHNICAL SKILLS

**Programming Languages
Tools**

Python, Java, OCaml, Rust, Coq, Ruby, Racket, Dafny, C
Pytorch, Git, L^AT_EX

REFERENCES

Rajeev Alur

Professor

University of Pennsylvania, Department of Computer and Information Science

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