

Alaia Solko-Breslin

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Levine 575, 3330 Walnut St \diamond Philadelphia, PA 19104

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 under Rajeev Alur and Mayur Naik.	
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

Under Review

- *Beyond Differentiability: Neurosymbolic Learning with Black-Box Programs*
Alaia Solko-Breslin, Ziyang Li, Neelay Velingker, Rajeev Alur, Mayur Naik
- *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

Refereed Publications

- *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.

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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