

Paul Krogmeier

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<https://paulkrog.github.io>

EDUCATION

University of Illinois Urbana-Champaign

Ph.D. in Computer Science (advisor: Madhusudan Parthasarathy).
Ph.D. Thesis: Theory and Algorithms for Symbolic Learning.

Expected
Spring 2024

Purdue University

M.S. in Computer Engineering (advisor: Benjamin Delaware).
M.S. Thesis: A Core Calculus for Data Refinement.
B.S. in Computer Engineering (with highest distinction).

2016–2018

2012–2016

RESEARCH INTERESTS

My interests are in the foundations of **symbolic learning and reasoning**, with a focus on the algorithmic problem of how to learn logical concepts over **structured data** like sequences, trees, graphs, or even encodings of the states of computer programs. This encompasses program synthesis from examples as well as learning logical classifiers over mathematical structures. Recently, I have been exploring how to **synthesize domain-specific languages** to support efficient few-shot learning.

AWARDS

ACM SIGPLAN Distinguished Paper Award at OOPSLA	2023
ACM SIGPLAN Distinguished Paper Award at POPL	2022
Illinois Wing Kai Cheng Fellowship	2018
Purdue Ross Fellowship	2016

REFEREED CONFERENCE PUBLICATIONS

Paul Krogmeier and P. Madhusudan. 2023. Languages with Decidable Learning: A Meta-theorem. Proc. ACM Program. Lang. 7, OOPSLA1, Article 80 (April 2023), 29 pages. <https://doi.org/10.1145/3586032>
ACM SIGPLAN Distinguished Paper Award.

Paul Krogmeier*, Zhengyao Lin*, Adithya Murali*, and P. Madhusudan. 2022. Synthesizing axiomatizations using logic learning. Proc. ACM Program. Lang. 6, OOPSLA2, Article 185 (October 2022), 29 pages. <https://doi.org/10.1145/3563348>

Adithya Murali, Atharva Sehgal, Paul Krogmeier, P. Madhusudan. Composing Neural Learning and Symbolic Reasoning with an Application to Visual Discrimination. Proceedings of the Thirty-First

International Joint Conference on Artificial Intelligence Main Track (IJCAI). Pages 3358-3365.
<https://doi.org/10.24963/ijcai.2022/466>

Paul Krogmeier and P. Madhusudan. 2022. Learning formulas in finite variable logics. Proc. ACM Program. Lang. 6, POPL, Article 10 (January 2022), 28 pages. <https://doi.org/10.1145/3498671>
ACM SIGPLAN Distinguished Paper Award.

Gilles Barthe, Rohit Chadha, Paul Krogmeier, A. Prasad Sistla, and Mahesh Viswanathan. 2021. Deciding accuracy of differential privacy schemes. Proc. ACM Program. Lang. 5, POPL, Article 8 (January 2021), 30 pages. <https://doi.org/10.1145/3434289>

Krogmeier, P., Mathur, U., Murali, A., Madhusudan, P., Viswanathan, M. (2020). Decidable Synthesis of Programs with Uninterpreted Functions. In: Lahiri, S., Wang, C. (eds) Computer Aided Verification. CAV 2020. Lecture Notes in Computer Science(), vol 12225. Springer, Cham.
https://doi.org/10.1007/978-3-030-53291-8_32

Umang Mathur, Adithya Murali, Paul Krogmeier, P. Madhusudan, and Mahesh Viswanathan. 2019. Deciding memory safety for single-pass heap-manipulating programs. Proc. ACM Program. Lang. 4, POPL, Article 35 (January 2020), 29 pages. <https://doi.org/10.1145/3371103>

WORKSHOP PUBLICATIONS

Paul Krogmeier, Steven Kidd, Benjamin Delaware.
Towards Context-Aware Data Refinement.
CoqPL 2018

WORK IN PROGRESS

Paul Krogmeier and P. Madhusudan.
Synthesizing DSLs for Few-Shot Learning.
Algorithms for synthesizing domain-specific languages that can be learned efficiently from few examples.
In preparation.

Paul Krogmeier.
Computing with Abstractions.
A new model of computation to study how abstractions emerge in an evolving computation.
In preparation.

INVITED TALKS

Languages with Decidable Learning: a Meta-theorem.
Boston University, Mar 2023.

Learning Formulas in Finite-Variable Logics.
Department of Software Engineering, St. Petersburg State University, Mar 2022.

INVITED WORKSHOPS

Dagstuhl seminar
Logic and Learning

Fall 2019

TEACHING

CS 421: Programming Languages and Compilers

University of Illinois
Fall 2019, Fall 2020,
Spring 2021, Fall 2021
Spring 2022, Fall 2022,
Spring 2023, Fall 2023

ECE 369: Discrete Mathematics for Computer Engineering

Purdue University
Fall 2017

SERVICE

Conference Reviewer

Formal Methods in System Design (FMSD)

2023

International Colloquium on Automata, Languages and Programming (ICALP)

2023

Logic in Computer Science (LICS)

2022

MENTORING

SIGPLAN-M Graduate Student Mentor

2023 – Present

STUDENT WORKSHOPS

VMCAI Formal Methods Winter School

New Orleans, LA
Jan 2020

SRI Formal Methods Summer School

Atherton, CA
May 2019

Oregon Programming Languages Summer School

Eugene, OR
Jun 2017

MISCELLANY

Native English speaker, fluent in Spanish, conversational in German.

Jazz alto saxophonist with substantial performance and teaching experience.

Lover of snow, mountains, and skiing.