

# Paul Krogmeier

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## Education

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### Graduate

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#### University of Illinois at Urbana-Champaign

*PhD Computer Science, GPA: 3.92*

**Urbana**

*expected May 2023*

#### Purdue University

*M.Eng. Computer Engineering, GPA: 3.99*

**West Lafayette**

*2016–2018*

### Undergraduate

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#### Purdue University

*B.S. Computer Engineering, GPA: 4.0*

**West Lafayette**

*2012–2016*

#### EAFIT University

*Study Abroad, Compilers and Operating Systems courses*

**Medellín, Colombia**

*Spring 2015*

## Publications

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- *Deciding Accuracy of Differential Privacy Schemes*. Gilles Barthe, Rohit Chadha, Paul Krogmeier, Aravinda Sistla, Mahesh Viswanathan. POPL 2021. [Paper](#).
- *Decidable Synthesis of Programs with Uninterpreted Functions*. Paul Krogmeier, P. Madhusudan, Umang Mathur, Adithya Murali, Mahesh Viswanathan. CAV 2020. [Paper](#).
- *Deciding Memory Safety for Single-pass Heap-manipulating Programs*. Umang Mathur, Adithya Murali, Paul Krogmeier, P. Madhusudan, and Mahesh Viswanathan. POPL 2019. [Paper](#).
- *Towards Context-Aware Data Refinement*. Paul Krogmeier, Steven Kidd, Benjamin Delaware. Fourth International Workshop on Coq for Programming Languages, January 2018. [Paper](#).

## Teaching

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#### Programming Languages and Compilers (CS 421)

*Teaching Assistant*

**Urbana, IL**

*'21, '20, '19*

Duties:

- Debugging student code in biweekly office hours
- Answering piazza questions
- Maintaining and releasing Ocaml/Haskell assignments

## Discrete Math (ECE 369)

Teaching Assistant

West Lafayette, IN

Fall 2015

Duties:

- Answering questions in biweekly office hours
- Manage preparation and release of written math assignments
- Grading written exams

## Research Positions

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### Illinois Programming Languages and Formal Methods

Research Assistant (advisor: Madhusudan Parthasarathy)

Urbana, IL

Aug 2018–present

- Thesis: Algorithms for learning first-order logic formulae from data

### Purdue Programming Languages Group

Research Assistant (advised by Benjamin Delaware)

West Lafayette, IN

Aug 2017–Jul 2018

- Modeled the syntax and semantics of the Fiat specification language with a deep embedding in the Coq proof assistant.
- Developed a mechanized proof of Fiat's type safety.
- Formalized a logical relations proof strategy for validity of refinement from Fiat specifications to implementations.

### Purdue University – Machine Learning for SAT

Research Assistant

West Lafayette, IN

Jan 2017–May 2017

- Studied the source code for the MiniSat SAT solver.
- Implemented online thompson sampling algorithm to learn reward function over SAT variables.
- Tested usefulness of the extension against plain MiniSat.

### Purdue University – E-Lab

Student Programmer

West Lafayette

Sep 2016–Dec 2016

- Programmed Torch7 CNNs to solve image classification problems.
- Experimented with RNNs to study problems in speech recognition.

### APOLO Scientific Computing Center

Programming Internship

Medellín, Colombia

May 2016–Jul 2016

- Developed software to produce client usage reports for a Linux Rocks cluster administrative team.
- Wrote and debugged Python scripts to generate reports on cluster load and usage characteristics. This involved learning the APIs for the TORQUE and SLURM resource management tools.
- Met weekly with development team to discuss progress.

### Purdue University – Open Ag Data Alliance

Embedded Systems Programmer

West Lafayette

May 2014–Jul 2014

- Developed C code for a wireless, embedded semi-truck weight sensing application.
- Interfaced Nordic system-on-chip to air pressure sensor over I<sup>2</sup>C.
- Programmed communication between Android app and system-on-chip using Bluetooth Low Energy stack.

## Invited Workshops and Schools

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### 2nd VMCAI Winter School

*Student Participant*

**New Orleans, LA**

*Jan 2020*

### Dagstuhl Seminar on Logic and Learning

*Invited Junior Researcher*

**Schloss Dagstuhl, Germany**

*Sep 2019*

The goal of this seminar was to explore ways of combining logical knowledge with learning systems like neural networks.

### SRI Formal Methods Summer School

*Student Participant*

**Atherton, California**

*May 2019*

- Experimented with EasyCrypt for Coq proofs security for cryptographic protocols.
- Experimented with the Viper verification language for proving properties of heap-manipulating programs.

### Oregon Programming Languages Summer School

*Student Participant*

**Eugene, Oregon**

*Jun 2017*

- Experimented with dependently-typed Idris and with programming language semantics modelling in PLT Redex.
- Attended research lectures from experts in programming languages and formal methods.

## Coursework.....

### Graduate

CS 598 – Algorithmic Game Theory  
MA 570 – Mathematical Logic  
MA 511 – Linear Algebra with Applications  
CS 477 – Formal Software Development  
CE 642 – Information Theory and Source Coding  
CE 573 – Compilers and Translator Systems  
CE 608 – Computational Models and Methods  
CE 600 – Probabilities and Random Processes  
CS 565 – Programming Languages  
CS 590 – Artificial Intelligence and Causal Inference  
CS 584 – Theory of Computation and Complexity  
CS 573 – Data Mining

### Undergraduate

CE 368 – Algorithms and Data Structures  
CE 369 – Discrete Math  
CE 364 – Python and Bash Scripting Lab  
CE 337 – ASIC Design Laboratory  
CE 437 – Computer Architecture  
CE 477 – Digital Systems Senior Design

## Skills

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### ◦ Programming Languages and Tools:

High proficiency: Ocaml, C/C++, Python

Medium proficiency: Haskell, Prolog, Java, Matlab, Verilog, Emacs

Familiarity: Coq, Racket, Rosette, Idris, Lisp, x86, MIPS, Jekyll/HTML/CSS

### ◦ Natural Languages: Fluent in Spanish, German, and English (native)

## Awards, Honors, Grants

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- **ACM SIGPLAN PAC Travel Grant:** January 2020
- **UIUC Wing Kai Cheng Fellowship:** August 2018
- **Purdue Ross Fellowship:** May 2016
- **Phi Beta Kappa:** May 2016
- **Graduated “with highest distinction” (top in class, Purdue ECE):** May 2016
- **100K Strong in the Americas Scholarship:** August 2014