Calvin Smith

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Software enables new ways to interact with and understand the world; as a tool for empowerment, it should be as widely-available as possible. My mission is to make code trustworthy, interpretable, and accessible through a neuro-symbolic combination of machine learning and formal methods.

Education

2014 - 2020 *PhD and Masters in Computer Sciences*, University of Wisconsin - Madison
Thesis: *Program Synthesis for Data Analysis: Scalability and Privacy*

2010 - 2014 *BS in Applied Mathematics*, Texas A&M University

Professional Experience

2022 - 2024 **Applied Scientist**, Durable (*Louisville, CO*)
- Implemented custom type inference, compilation, and deployment infrastructure for executing reactive programs synthesized from natural language specifications
- Built infrastructure to orchestrate, display, and reason about interactions between symbolic reasoners and transformer-based code prediction models
- Developed novel static analyses to ensure correctness of synthesized programs

2020 - 2022 **Post-Doctoral Research Associate**, University of Texas - Austin (*Austin, TX*)
- Designed core semantics and inference algorithms for a generative probabilistic logic programming language to explain structural and quantitative scientific data

2017 **Research Intern**, Microsoft Research (*Cambridge, UK*)
- Explored the use of counterfactual reasoning in understanding the relationship between the training data and outputs of large-scale machine learning models

2014 **Director's Summer Program**, National Security Agency (*Ft. Meade, MD*)
- Designed sophisticated natural-language processing tools, including machine learning algorithms, to automate language classification of non-standard text
- Briefed Richard H. Ledgett, Deputy Director of the National Security Agency, and researchers at IDA-CCR Princeton

Select Publications

ICFP19 *Synthesizing Differentially Private Programs*
Calvin Smith, Aws Albarghouthi

POPL19 *Trace Abstraction Modulo Probability*
Calvin Smith, Justin Hsu, Aws Albarghouthi

FSE17 *Discovering Relational Specifications*
Calvin Smith, Gabriel Ferns, Aws Albarghouthi
Best Paper Award

Skills Python, functional programming, program synthesis, neurosymbolic reasoning, artificial intelligence, type theory, formal logic, static analysis, analog IR photography

Service PLDI 2022 PC, OOPSLA 2022 AEC, POPL 2020 AEC, CAV 2019 AEC