Mike (Deyuan) He

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Education

Princeton University, Princeton, NJ 2022 – Est. 2027

Ph.D. in Computer Science
Advisors: Prof. Aarti Gupta
Fields of study: Programming Languages (PL); Term Rewriting; PL Theory

University of Washington, Seattle, WA 2018 – 2022

B.S. in Computer Science, GPA: 3.89/4.0 (Cum Laude)
Advisors: Prof. Zachary Tatlock & Dr. Steven Lybomirsky
Selected Honor: CRA Outstanding Undergraduate Researcher Award, Honorable Mention (2022)

Experience

Intel Labs, Hillsboro, OR Mar. 2022 – June. 2022

Formal Verification Research Intern (Formal Methods/**Python**/**Dafny**)

Developed the **Py***rope* framework for **correct-by-construction** hardware modeling.

- Enabled **proof-driven development** purely in Python
- Encoded the correctness proof of (multi-)montgomery reduction algorithm in Python and verified successfully by compiling to Dafny
- Unified "sources of truth" for correctness proofs and hardware model implementations

UWPLSE, Seattle, WA Oct. 2019 – Sep. 2021

Research Assistant (PL/Compiler)

Responsible for conducting research with Prof. Zachary Tatlock, specifically,

- Implemented evaluations in the Dynamic Tensor Rematerialization project
- Designed a flexible matching algorithm for domain-specific language compilers.
- Led research projects with other undergraduate students
- Attended and presented at reading groups

Publications

- **Mike He**, Haichen Dong, Sharad Malik, and Aarti Gupta. *Improving Term Extraction with Acyclic Constraints*, 2023
- Bo-Yuan Huang*, Steven Lyubomirsky*, Yi Li, **Mike He**, Thierry Tambe, Gus Henry Smith, Akash Gaonkar, Vishal Canumalla, Gu-Yeon Wei, Aarti Gupta, Sharad Malik, and Zachary Tatlock. *Application-Level Validation of Accelerator Designs Using a Formal Software/Hardware Interface*, 2022
- Bo-Yuan Huang*, Steven Lyubomirsky*, Thierry Tambe*, Yi Li, **Mike He**, Gus Smith, Gu-Yeon Wei, Aarti Gupta, Sharad Malik, and Zachary Tatlock. *From DSLs to Accelerator-rich Platform Implementations: Addressing the Mapping Gap*, 2021
- Marisa Kirisame*, Steven Lyubomirsky*, Altan Haan*, Jennifer Brennan, **Mike He**, Jared Roesch, Tianqi Chen, and Zachary Tatlock. *Dynamic Tensor Rematerialization*, 2021

Skills

- **Languages:** C/C++, Python, Rust, OCaml, Coq, Dafny, etc. (Open to other languages)
- **Compiler & Applied PL:** Equality Saturation, Static Analysis, Computer-aided Reasoning, SMT
- **PL Theory:** Formal Verification, Type Theory, Mathematical Logic
- **Others:** Computer Graphics, Design and Implementation of Algorithms and Data Structures