Zhengyao Lin

zhengyao.page | github.com/rod-lin

Education

Carnegie Mellon University — Pittsburgh, PA, USA
Ph.D. in Computer Science — Aug. 2022 - Present

University of Illinois at Urbana-Champaign — Champaign, IL, USA
B.S. in Mathematics and Computer Science — Aug. 2018 - May. 2022
GPA: 3.99/4.0

Publications

[1] Xiaohong Chen, **Zhengyao Lin**, Minh-Thai Trinh, and Grigore Roşu. Towards a Trustworthy Semantics-Based Language Framework via Proof Generation. *Proceedings of the 33rd International Conference on Computer-Aided Verification* (CAV 2021), July 2021. https://doi.org/10.1007/978-3-030-81688-9_23

[2] Theodoros Kasampalis, Daejun Park, **Zhengyao Lin**, Vikram Adve, and Grigore Roşu. Language-Parametric Compiler Validation with Application to LLVM. *Proceedings of the 26th International Conference on Architectural Support for Programming Languages and Operating Systems* (ASPLOS 2021), April 2021. https://doi.org/10.1145/3445814.3446751

[3] Reed Oei, Dun Ma, **Zhengyao Lin**, Yikai Teng, and Pavle Vuksanovic. Pecan: An Automated Theorem Prover. *MAA Student Poster Session, Joint Mathematics Meetings* (JMM 2021), Jan 2021.

Preprints

[4] **Zhengyao Lin**, Xiaohong Chen, Minh-Thai Trinh, John Wang, and Grigore Roşu. Making Formal Verification Trustworthy via Proof Generation. In submission. http://hdl.handle.net/2142/112785

[5] **Zhengyao Lin**, Theodoros Kasampalis, and Vikram Adve. A Translation Validation Algorithm for LLVM Register Allocators. http://hdl.handle.net/2142/112734

[6] **Zhengyao Lin**, Xiaohong Chen, and Grigore Roşu. An Interactive Theorem Prover for Matching Logic with Proof Object Generation. http://hdl.handle.net/2142/111650

Research Experience

University of Illinois, Research Assistant — Jun. 2021 - Present

Advised by Prof. Madhusudan Parthasarathy.

Topic: Lemma and axiom synthesis for first-order logic with least fixpoints and modal logics.

Formal Systems Lab at UIUC, Research Assistant — Aug. 2020 - Present

Advised by Xiaohong Chen and Prof. Grigore Roşu.

Topic: Proof object generation for the $\mathbb{K}$ framework in matching logic.

LLVM Group at UIUC, Research Assistant — Jan. 2020 - Aug. 2021

Advised by Prof. Vikram Adve.

Topic: Translation validation of LLVM backend passes using the $\mathbb{K}$ framework.

Illinois Geometry Lab at UIUC, Research Assistant — Aug. 2020 - Dec. 2020

Advised by Prof. Philipp Hieronymi.

Topic: Exploring Büchi-automatic fractals and implementing a known decision procedure for Presburger arithmetic with quadratic irrational coefficients.

Teaching Experience

CS 426 Compiler Construction, Course Assistant at UIUC — Aug. 2021 - Dec. 2021

Maintained programming assignments and answered students' questions on an online forum.

CS 473 Algorithms, Course Assistant at UIUC — Jan. 2020 - May. 2020

Graded assignments and answered students' questions on an online forum.

CS 241 System Programming, Course Assistant at UIUC — Jan. 2019 - May. 2020

Led the infrastructure team and maintained a distributed auto-grader.

Professional and Volunteering Experience

CAV 2021, Student Volunteer — Jul. 2021

At the 33rd International Conference on Computer-Aided Verification.

Runtime Verification, Software Engineering Intern — Jun. 2021 - Aug. 2021

Worked on matching logic proof objects for deductive program verification in $\mathbb{K}$.

Facebook, Software Engineering Intern, Reliability Team — May. 2020 - Aug. 2020

Developed templating tools for an error monitoring system.

Runtime Verification, Software Engineering Intern — Nov. 2019 - Dec. 2019

Prototyped an interface for verification of ERC20 contracts using the $\mathbb{K}$ framework.

Cloudflare, Software Engineering Intern — May. 2019 - Aug. 2019

Developed and shipped a customer-facing origin server monitoring product.

Awards

CRA Outstanding Undergraduate Researcher Award, Honorable Mention — Jan. 2022

Most Outstanding Major Award in Mathematics and Computer Science (UIUC) — Feb. 2020

Dean's List (UIUC) — 2018 - 2021