

EDUCATION

Stanford University

PHD ELECTRICAL ENGINEERING

09/2024 - Present

- Research Interests: Computer Architecture, Compilers, Formal Methods, Systems
- Rotation Advisor: Prof. Thierry Tamba

University of Washington

B.S. COMPUTER SCIENCE

09/2020 - 06/2024

GPA: 3.9 / 4.0

- Advisor: Prof. Zachary Tatlock

CONFERENCE AND JOURNAL PUBLICATIONS

FPGA Technology Mapping Using Sketch-Guided Program Synthesis

ASPLOS 2024

Gus Henry Smith, Ben Kushigian, **Vishal Canumalla**, Andrew Cheung, Steven Lyubomirsky, Sorawee Porncharoenwase, René Just, Gilbert Louis Bernstein, Zachary Tatlock.

Application-Level Validation of Accelerator Designs Using a Formal Software/Hardware Interface

TODAES 2023

Bo-Yuan Huang, Steven Lyubomirsky, Yi Li, Mike He, Thierry Tamba, Gus Henry Smith, Akash Gaonkar, **Vishal Canumalla**, Andrew Cheung, Gu-Yeon Wei, Aarti Gupta, Zachary Tatlock, Sharad Malik.

WORKSHOP AND SHORT PAPERS

There and Back Again: A Netlist's Tale with Much Egraphin'

LATTE 2024

Gus Henry Smith, Zachary D. Sisco, Thanawat Techaumnawit, Jingtao Xia, **Vishal Canumalla**, Andrew Cheung, Zachary Tatlock, Chandrakana Nandi, Jonathan Balkind.

Generate Compilers from Hardware Models!

PLARCH 2023

Gus Henry Smith, Ben Kushigian, **Vishal Canumalla**, Andrew Cheung, René Just, Zachary Tatlock.

EXPERIENCE

Adobe Research

RESEARCH SCIENTIST INTERN

06/2024 - 09/2024

- Prototyped a performance analysis compiler pass for Halide pipelines.
- Advised by Dr. Derek Gerstmann.

UW Programming Languages & Software Engineering Group

RESEARCH ASSISTANT

05/2023 - 06/2024

- Researched applications of program synthesis in hardware compilers for FPGAs.
- Developing tools for porting and compiling hardware designs to diverse backends.

UW Systems, Machine Learning, and Architecture Lab

RESEARCH ASSISTANT

05/2021 - 05/2023

- Researched efficient compilation techniques to specialized accelerators, including hardware/software interfaces, verified operator mapping, and compiler optimizations.

Certora

RESEARCH INTERN

03/2022 - 06/2022

- Prototyped mutation testing techniques for smart contract verification.
- Advised by Dr. Chandrakana Nandi.

POSTERS AND PRESENTATIONS

October 2023. FPGA Technology Mapping Using Sketch-Guided Program Synthesis. *Allen School Annual Affiliate Research Showcase*, Seattle WA.

September 2023. Application of Sketch Guided Synthesis to Runtime Reconfigurable FPGA Primitives. *ICFP Student Research Competition*, Seattle WA.

May 2023. FPGA Synthesis via Program Synthesis. *Allen School Undergraduate Research Showcase*, Seattle WA.

November 2022. Specialized Accelerators: Addressing the Mapping Gap. *Allen School Annual Affiliate Research Showcase*, Seattle WA.

HONORS, AWARDS, AND FELLOWSHIPS

- NSF Graduate Research Fellowship (Honorable Mention) (2024)
- ICFP Student Research Competition 3rd Place Winner (2023)

INVITED TALKS

April 2023. Replacing Accelerator APIs with a Formal Software/Hardware Interface. *UW PLSE Lunch Seminar*

SKILLS

Languages: C++, Racket, Java, Rust, OCaml, Coq

Technologies: TVM, Rosette, Spring, Git, CircleCI