Zachary D. Sisco

+1 [redacted] zsisco@ucsb.edu www.zsisco.net

I conduct research at the intersection of Programming Languages and Computer Architecture. My research integrates formal methods into open-source languages for chip design based around increasing developer agility with correctness guarantees.

I have published this work in top venues such as PLDI and ASPLOS while mentoring more than 20 students in research, 11 of which are co-authors on 4 published conference and workshop papers and 3 manuscripts that are currently under review.

Education

University of California, Santa Barbara — Santa Barbara, CA
PhD Computer Science — Co-advisors: Jonathan Balkind & Ben Hardekopf — 2019 – Present

Wright State University — Dayton, OH
MS Computer Science — Co-advisors: Adam Bryant & John M. Emmert — 2018
Thesis: *Verifying Data-Oriented Gadgets in Binary Programs to Build Data-Only Exploits*

Ohio University — Athens, OH
BS Mathematics — 2014

Experience

Computing Community Fellow, College of Creative Studies, UCSB — 2024 – 2025
Research Mentor, Research Mentorship Program, UCSB — Summer 2024
Intern, Galois, Inc. — Summer 2023
Graduate Student Researcher, UCSB — 2020 – 2023
Graduate Research Assistant, Wright State University — 2016 – 2018
Programmer Analyst, Motorists Insurance Group — 2013 – 2016

Fellowships & Awards

PhD Student of the Year, UCSB Computer Science — 2024
Neal Fenzi – Resonant Founder Fellowship, Resonant, Inc. — 2024
2nd Place Award, ACM SIGPLAN PLDI Student Research Competition — 2022

Refereed Publications

Conference and Journal Papers

Control Logic Synthesis: Drawing the Rest of the OWL
Zachary D. Sisco, Andrew David Alex, Zechen Ma, Yeganeh Aghamohammadi, Boming Kong, Benjamin Darnell, Timothy Sherwood, Ben Hardekopf, Jonathan Balkind
Architectural Support for Programming Languages and Operating Systems, Volume 4 (ASPLOS), 2024

Loop Rerolling For Hardware Decompilation
Zachary D. Sisco, Jonathan Balkind, Timothy Sherwood, Ben Hardekopf
Programming Language Design and Implementation (PLDI) 2023

A Semantics-Based Approach to Concept Assignment in Assembly Code
Zachary D. Sisco, Adam R. Bryant
International Conference on Cyber Warfare and Security (ICCWS) 2017

Modeling Information Flow for an Autonomous Agent to Support Reverse Engineering Work
Zachary D. Sisco, Patrick P. Dudenhofer, Adam R. Bryant
Journal of Defense Modeling and Simulation, 2017

Workshop Papers

There and Back Again: A Netlist's Tale With Much Egraphin'
Gus Henry Smith, **Zachary D. Sisco**, Thanawat Techaumnuaiwit, Jingtao Xia, Vishal Canumalla, Andrew Cheung, Zachary Tatlock, Chandrakana Nandi, Jonathan Balkind
Workshop on Languages, Tools, and Techniques for Accelerator Design (LATTE) 2024

On the Generality of Matrix Multiplication
Andrew Alex, **Zachary D. Sisco**, Jonathan Balkind
Programming Languages for Architecture (PLARCH) 2023

Semi-Automated Translation of a Formal ISA Specification to Hardware
Harlan Kringen, **Zachary Sisco**, Jonathan Balkind, Timothy Sherwood, Ben Hardekopf
Programming Languages for Architecture (PLARCH) 2023

A Position on Program Synthesis for Processor Development
Zachary D. Sisco, Jonathan Balkind, Timothy Sherwood, Ben Hardekopf
Workshop on Languages, Tools, and Techniques for Accelerator Design (LATTE) 2022

Papers Under Review

Mycelium: Module Finding with Functional Netlist Representation
Jingtao Xia, **Zachary D. Sisco**, Harlan Kringen, Skanda Vasishta, Jonathan Balkind, Ben Hardekopf
Under review, 2024. Programming Language Design and Implementation (PLDI)

A Memory Design Language for Automated Memory Technology Mapping
Zachary D. Sisco, Daniel Petrisko, Jingtao Xia, Varun Rao, Spencer Wang, Ben Hardekopf, Jonathan Balkind
Under revision.

Supporting Computer Architecture Ecological Impact Analysis
Pranjali Jain, **Zachary D. Sisco**, Alex Bologna, Dingsheng Li, Jonathan Balkind, Timothy Sherwood
Under revision.

Invited Talks

IEEE/ACM MICRO PhD Forum, MICRO-57, Austin, TX — Nov 2024
IEEE Council on EDA, Guangzhou Chapter, HKUST (Guangzhou), China — August 2024
Languages, Systems, and Data Seminar, UC Santa Cruz — May 2024
CIRCT Group, LLVM — May 2023
PLSE Lab, University of Washington — February 2023

Teaching Experience

Certificates Earned

Certificate in Inclusive Teaching, UCSB Instructional Development — 2024

Instructor of Record

CS 1L: Programming Laboratory, UCSB (College of Creative Studies) — Winter 2025
CS 9: Intermediate Python Programming, UCSB — Summer 2024
CS 32: Object-Oriented Design & Implementation, UCSB — Fall 2022
CS 24: Problem Solving with Computers II, UCSB — Summer 2022
CS 16: Problem Solving with Computers I, UCSB — Summer 2021, Winter 2021
CS 138: Automata & Formal Languages, UCSB — Summer 2020

Lead Teaching Assistant

CS 501: Techniques of Computer Science Teaching, UCSB	Fall 2023, Fall 2022
Tutorial on "Leading Computer-based Labs", UCSB	Fall 2022

Teaching Assistant

CS 1L: Programming Laboratory, UCSB (College of Creative Studies)	Fall 2024
CS 154: Computer Architecture, UCSB	Winter 2023
CS 138: Automata & Formal Languages, UCSB	Spring 2020
CS 156: Advanced Applications Programming, UCSB	Winter 2020, Fall 2019
CS 7830: Machine Learning, Wright State University	Fall 2017
CS 4350: Operating System Internals and Design, Wright State University	Fall 2017

Academic Service

Artifact Evaluation Committee, PLDI	2024
Program Committee, Workshop on Languages, Tools, and Techniques for Accelerator Design	2024
Organizing Committee, Workshop on Languages, Tools, and Techniques for Accelerator Design	2023
Tutorial Organizer, "Creating a Compelling and Sustainable Tutorial", ASPLOS	2023
Student Volunteer, PLDI	2022
Artifact Evaluation Committee, OOPSLA	2020