Brett Saiki

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https://bsaiki.com

Education

University of Washington
B.S. Computer Engineering, 2019 – 2023
B.A. Mathematics, 2019 – 2023

Capistrano Valley High School
High School, 2015 – 2019

Employment

University of Washington | Seattle, WA
Paul G. Allen School of Computer Science & Engineering
Undergraduate Research Assistant, December 2019 – Present
Advisors: Zachary Tatlock, Pavel Panchekha

- Developer for the FPBench, Herbie, and Ruler projects
- Attend weekly meetings with professor and graduate students
- Publish papers and give talks at conferences and workshops
- Collaborate with other research or industry groups

University Enterprises Inc. | Santa Ana, CA
Contracted to State Compensation Insurance Fund (SCIF)
Summer Intern, June 2019 – August 2019

- Learned the lifecycle of an insurance claim
- Indexed digital documents and digitized physical claims
- Compiled unpaid bills from medical providers for litigation
- Contacted medical providers of injured workers to obtain work status updates

Future Employment

Intel Corporation | Folsom, CA
Accelerated Computing Systems and Graphics Group (AXG)
Mathematical Hardware Intern, June 2022 – September 2022
Mentor: Bill Zorn

Publications

Rewrite Rule Inference Using Equality Saturation
Chandrakana Nandi, Max Willsey, Amy Zhu, Brett Saiki, Yisu Wang, Adam Anderson, Adriana Schulz, Dan Grossman, Zachary Tatlock
Object-Oriented Programming, Systems, Languages & Applications (OOPSLA) 2021
Distinguished Paper Award

Combining Precision Tuning and Rewriting
Brett Saiki, Oliver Flatt, Chandrakana Nandi, Pavel Panchekha, Zachary Tatlock
IEEE Symposium on Computer Arithmetic (ARITH) 2021

Projects

FPBench (December 2019 – Present)
- Community repository of floating-point benchmarks, tools, and compilers from FPCore, a benchmark format, to other common languages like C, Java, etc. (NSV '16)
- Created a unified framework for making and testing FPCore compilers to other languages
- Added support for compiling to languages like Python, Java, OCaml, Haskell, and more
- Added features for industry groups (Intel) and other research institutions (Max Planck Institute)
- Supervised by Bill Zorn and Zachary Tatlock

Herbie (June 2020 – Present)
- Tool that automatically improves the accuracy of floating-point expressions (PLDI '15)
- Added support for multi-precision optimization, precision tuning techniques, and searching for better expressions by both accuracy and execution time
- Accepted paper at ARITH 2021
- Gave talk at ARITH 2021 and FPTalks 2021
- Participated in 2 (soon to be 3) yearly releases
- Supervised by Pavel Panchekha and Zachary Tatlock

Ruler (November 2020 – Present)
- Tool that automatically synthesizes rewrite rules for a particular domain (OOPSLA '21)
- Evaluated the tool on Herbie for the paper
- Currently expanding Ruler's capabilities to synthesize rules for arithmetic and trigonometry
- Supervised by Chandrakana Nandi and Zachary Tatlock

Talks

Combining and Precision and Rewriting
ARITH 2021 – Virtual, June 2021
FPTalks 2021 – Virtual, July 2021

Activities

Race Condition Running (September 2021 – Present)
Campus Philharmonia Orchestra (September 2019 – March 2020)