

Brett Saiki

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<https://bsaiki.com>

Education

University of Washington, 2023 – 2024

M.S. Computer Science and Engineering

University of Washington, 2019 – 2023

B.S. Computer Engineering

B.A. Mathematics

GPA: 3.48

Employment

University of Washington | Seattle, WA

Paul G. Allen School of Computer Science & Engineering

Undergraduate Research Assistant

December 2019 – June 2022, September 2022 - Present

- Developing tools and libraries for floating-point accuracy optimization and term rewriting
- Working on the FPBench, Herbie, and Ruler projects
- Attending weekly meetings with professor and graduate students
- Collaborating with other research or industry groups
- Advised by Zachary Tatlock (UW), Pavel Panchekha (Utah)

Intel Corporation | Folsom, CA

Accelerated Computing Systems and Graphics Group (AXG)

Mathematical Hardware Intern

June 2022 – September 2022

- Performed high-level algorithm optimization for graphics hardware
- Developed compilers for translating numerical specifications to formats used by formal verification and simulation tools
- Created visualization tools for comparing and validating texture sampling algorithms
- Collaborated with architects and research groups in graphics and CPU divisions

University Enterprises Inc. | Santa Ana, CA

Contracted by 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 2023 – September 2023

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
- Published 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)