

# Michael Christensen

[mchristensen@meta.com](mailto:mchristensen@meta.com) ♦ [mdko.github.io](https://mdko.github.io)

## EDUCATION

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**University of California, Santa Barbara**

December 2021

Ph.D., Computer Science

M.S., Computer Science

Dissertation: *Programming Language Techniques for Improving ISA and HDL Design*

Advisor: Ben Hardekopf

Committee: Timothy Sherwood, Jonathan Balkind

**Brigham Young University**

December 2013

B.S., Computer Science

Minor, Mathematics

## PUBLICATIONS

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**Michael Christensen**, Georgios Tzimpragos, Harlan Kringen, Jennifer Volk, Timothy Sherwood, Ben Hardekopf. “PyLSE: A Pulse-Transfer Level Language for Superconductor Electronics,” *Proceedings of the 43rd ACM SIGPLAN International Conference on Programming Language Design and Implementation (PLDI)*, June 2022. San Diego, CA, USA.

**Michael Christensen**, Timothy Sherwood, Jonathan Balkind, Ben Hardekopf. “Wire Sorts: A Language Abstraction for Safe Hardware Composition,” *Proceedings of the 42nd ACM SIGPLAN International Conference on Programming Language Design and Implementation (PLDI)*, June 2021. Virtual, Canada.

**Michael Christensen**, Joseph McMahan, Lawton Nichols, Jared Roesch, Timothy Sherwood, Ben Hardekopf. “Safe Functional Systems through Integrity Types and Verified Assembly,” *Theoretical Computer Science*, 2020.

Joseph McMahan, **Michael Christensen**, Kyle Dewey, Ben Hardekopf, Timothy Sherwood. “Bouncer: Static Program Analysis in Hardware,” *Proceedings of the 2019 ACM/IEEE 46th Annual International Symposium on Computer Architecture (ISCA)*, June 2019. Phoenix, AZ, USA.

Joseph McMahan, **Michael Christensen**, Lawton Nichols, Jared Roesch, Sung-Yee Guo, Ben Hardekopf, and Timothy Sherwood. “An Architecture for Analysis,” *IEEE Micro: Top Picks from the 2017 Computer Architecture Conferences (IEEE Micro - Top Picks)*, vol. 38, no. 3, pp 107-115, May/June 2018.

Joseph McMahan, **Michael Christensen**, Lawton Nichols, Jared Roesch, Sung-Yee Guo, Ben Hardekopf, and Timothy Sherwood. “An Architecture Supporting Formal and Compositional Binary Analysis,” *Proceedings of the Twenty-Second International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, April 2017. Xi’an, China.

## PRESENTATIONS

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“Memory Safety in Systems Languages.” CS Major Area Exam. UC Santa Barbara. June 11, 2018.

“Typed Zarf.” SoCal Programming Languages and Systems Workshop. UC Riverside. September 22, 2017.

## EXPERIENCE

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- Research Scientist** December 2021–Present  
*Meta (HHVM Team)* Menlo Park, CA
- Improving the performance of the HHVM JIT compiler and runtime
- Graduate Student Research Assistant** March 2020–December 2021  
*Lawrence Berkeley National Lab (Computer Architecture Group)* Berkeley, CA
- Developed RTL designs for testing superconductor electronics as part of Super-Tools
  - Implemented RV32I Zicsr core and associated tooling in PyRTL
- Graduate Student Researcher** September 2015–December 2021  
*UC Santa Barbara (Programming Languages Lab)* Santa Barbara, CA
- Research focused on applying principles of programming language theory to make it easier to reason about instruction set architectures and improve the design of hardware description languages
  - Worked closely with the Architecture Lab
- Teaching Assistant** September 2015–March 2020  
*UC Santa Barbara* Santa Barbara, CA
- CS 64: Computer Organization and Design Logic (Fall 2015, Winter 2020)
  - CS 170: Operating Systems (Fall 2019)
  - CS 138: Automata and Formal Languages (Spring 2019)
  - CS 162: Programming Languages (Winter 2016, Winter 2017)
- Software Engineer Intern** June 2020–September 2020  
*Facebook* Menlo Park, CA
- Improved error reporting for the Hack language’s parser, linter, and typechecker
  - Improved soundness of the Hack typechecker
- Software Engineer Intern** June 2019–September 2019  
*Facebook* Seattle, WA
- Improved how runbooks are created for draining/undraining datacenter traffic as part of the Maelstrom disaster recovery framework
- Software Engineer II** March 2014–August 2015  
*Dell EMC* Santa Clara, CA
- Developed core functionality for NetWorker backup and recovery software in C
  - Integrated NetWorker across several platforms (Linux, Windows, AIX, Solaris)
  - Participated in building a multi-threaded, fault-tolerant, server-client system that used RPC, POSIX threads, networking protocols, and various OS-level drivers
- Teaching and Research Assistant** April 2013–December 2013  
*BYU Data Mining Lab* Provo, UT
- Mined social media data (Facebook, Twitter, etc.) to develop algorithms for classifying and predicting suicide and health-related behavior
  - Assisted students and graded projects for CS 478: Machine Learning and Data Mining
- Software Engineer Intern** June 2012–October 2012  
*SerialTek* San Jose, CA

- Developed unit tests for SAS/SATA analyzer traffic in Java/C++ via JNI
- Created user interfaces for analyzer software with Java and MFC
- Debugged/refactored a large repository of code
- Recreated customer environments to duplicate and correct bugs

### **Customer Service Representative**

*BYU Independent Study*

May 2011–May 2012

*Provo, UT*

- Answered policy- and course-related questions via phone and email
- Reviewed and tested both live and unreleased courses
- Implemented a knowledge base and new learning management system
- Helped implement Microsoft Dynamics CRM 2011

## **TECHNICAL STRENGTHS**

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<b>Computer Languages (Proficient)</b>	Haskell, OCaml, Python, C, C++, Scala, HDL (PyRTL, Verilog), RISC-V assembly
<b>Computer Languages (Some Experience)</b>	Rust, Java, Coq, JavaScript, Lua, Racket, Julia, Prolog, C#, PHP, Go, x86 assembly
<b>Operating Systems</b>	Linux, BSD
<b>Tools</b>	Vim, Git, Mercurial, Perforce, Docker, L <sup>A</sup> T <sub>E</sub> X, Bash, AWK
<b>Natural Languages</b>	English (Fluent), Spanish (Professional Proficiency)

## **AWARDS AND PROFESSIONAL SERVICE**

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<b>Outstanding Teaching Assistant</b>	Academic Year 2020–2021
<i>UC Santa Barbara, Computer Science Department</i>	<i>Santa Barbara, CA</i>
<b>Student Volunteer Co-Captain</b>	June 2016
<i>PLDI</i>	<i>Santa Barbara, CA</i>

## **VOLUNTEERING**

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<b>Volunteer Church Representative</b>	December 2008–December 2010
<i>The Church of Jesus Christ of Latter-Day Saints</i>	<i>San José, Costa Rica</i>