

Thomas Shull

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RESEARCH INTERESTS Hardware and software designs to improve the execution of managed languages. Profiling-based compiler optimizations. Techniques to reduce the overhead of automatic memory management. Interprocedural analysis. Techniques for code-size reductions.

EDUCATION **University of Illinois at Urbana-Champaign** August 2012 - August 2020
Ph.D. in Computer Science
Advisor: Prof. Josep Torrellas
Thesis: *Making Non-Volatile Memory Programmable*
Committee: Prof. Josep Torrellas, Prof. Jian Huang, Prof. David Padua, Prof. James Larus, and Prof. Steven Swanson

Washington University of St. Louis June 2008 - May 2012
B.Sc. in Computer Science and B.Sc. in Computer Engineering
Summa Cum Laude

PROFESSIONAL EXPERIENCE **Oracle Labs** June 2020 – Present
Principal Researcher on GraalVM Project
Core developer on GraalVM Native Image team. Also primary maintainer of GraalVM's AArch64 backend. GraalVM Native Image is a framework and runtime environment for the ahead-of-time compilation of Java applications. GraalVM is Oracle's next generation compiler, runtime, and language development environment to improve both the developer experience and performance.

Arm Ltd. July 2019 – April 2020
Open Source Software
Worked on AArch64 port of GraalVM. Made multiple bug fixes and performance improvements, including adding support for AArch64 runtime code installation.

Non-Volatile Memory Research
Proposed ISA extensions to improve crash-consistent application performance by enabling more aggressive instruction reordering; implemented extensions within gem5 simulator. Also improved and fixed the AArch64 port of the Persistent Memory Development Kit.

SELECTED PUBLICATIONS **Execution Dependence Extension (EDE): ISA Support for Eliminating Fences** (ISCA 2021), *Thomas Shull, Ilias Vougioukas, Nikos Nikoleris, Wendy Elsasser, and Josep Torrellas*

AutoPersist: An Easy-To-Use Java NVM Framework Based on Reachability (PLDI 2019), *Thomas Shull, Jian Huang, and Josep Torrellas*

Reusable Inline Caching for JavaScript Performance (PLDI 2019), *Jiho Choi, Thomas Shull, and Josep Torrellas*

QuickCheck: Using Speculation to Reduce the Overhead of Checks in NVM Frameworks (VEE 2019), *Thomas Shull, Jian Huang, and Josep Torrellas*

NoMap: Speeding-Up JavaScript Using Hardware Transactional Memory (HPCA 2019), *Thomas Shull, Jiho Choi, María J. Garzarán, and Josep Torrellas*

Biased Reference Counting: Minimizing Atomic Operations in Garbage Collection (PACT 2018), *Jiho Choi, Thomas Shull, and Josep Torrellas*

Defining a High-level Programming Model for Emerging NVRAM Technologies (ManLang 2018), *Thomas Shull, Jian Huang, and Josep Torrellas*

ShortCut: Architectural Support for Fast Object Access in Scripting Languages (ISCA 2017), *Jiho Choi, Thomas Shull, and Josep Torrellas*

Improving JavaScript Performance by Deconstructing the Type System (PLDI 2014), *Wonsun Ahn, Jiho Choi, Thomas Shull, María J. Garzarán, and Josep Torrellas*

TECHNICAL SKILLS *Programming Skills:* C/C++, Java, Python.
Managed Language Implementations: GraalVM Native Image, OpenJDK
Compiler Implementations: Graal, HotSpot (C1 & C2), LLVM

REFERENCES Christian Wimmer, christian.wimmer.priv@gmail.com formerly GraalVM technical lead
Josep Torrellas, torrella@illinois.edu University of Illinois at Urbana-Champaign
Stuart Monteith, stuart.monteith@arm.com Arm Ltd.
Additional references available upon request