

# Thomas Shull

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RESEARCH INTERESTS	Hardware and software designs to improve the performance of managed languages. Development of new persistent programming frameworks. Virtual Machine modifications to utilize emerging byte-addressable persistent memory technologies. Profiling-based compiler optimizations. Techniques to reduce the overhead of automatic memory management.	
EDUCATION	<b>University of Illinois at Urbana-Champaign</b> Ph.D. in Computer Science <b>Advisor:</b> Prof. Josep Torrellas <b>Thesis:</b> <i>Making Non-Volatile Memory Programmable</i> <b>Committee:</b> Prof. Josep Torrellas, Prof. Jian Huang, Prof. David Padua, Prof. James Larus, and Prof. Steven Swanson	August 2012 - August 2020
	<b>Washington University of St. Louis</b> B.Sc. in Computer Science and B.Sc. in Computer Engineering Summa Cum Laude	June 2008 - May 2012
PROFESSIONAL EXPERIENCE	<b>Oracle Labs</b> <b>Senior Researcher with GraalVM Team</b> Working on performance improvements for Substrate VM (SVM) and enhancing the AArch64 port of GraalVM. SVM is a framework and runtime environment for the ahead-of-time compilation of Java applications and one component of GraalVM. GraalVM is a new compiler, runtime, and language development environment to improve both the developer experience and performance.	June 2020 – Present
	<b>Arm Ltd.</b> <b>Open Source Software</b> Worked on AArch64 port of Substrate VM (SVM). Made multiple bug fixes and performance improvements, including adding support for AArch64 runtime code installation.	July 2019 – April 2020
	<b>Non-Volatile Memory Research</b> 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	<b>Execution Dependence Extension (EDE): ISA Support for Eliminating Fences</b> (ISCA 2021), <i>Thomas Shull, Ilias Vougioukas, Nikos Nikoleris, Wendy Elsasser, and Josep Torrellas</i> <b>AutoPersist: An Easy-To-Use Java NVM Framework Based on Reachability</b> (PLDI 2019), <i>Thomas Shull, Jian Huang, and Josep Torrellas</i> <b>Reusable Inline Caching for JavaScript Performance</b> (PLDI 2019), <i>Jiho Choi, Thomas Shull, and Josep Torrellas</i> <b>QuickCheck: Using Speculation to Reduce the Overhead of Checks in NVM Frameworks</b> (VEE 2019), <i>Thomas Shull, Jian Huang, and Josep Torrellas</i> <b>NoMap: Speeding-Up JavaScript Using Hardware Transactional Memory</b> (HPCA 2019), <i>Thomas Shull, Jiho Choi, María J. Garzarán, and Josep Torrellas</i> <b>Biased Reference Counting: Minimizing Atomic Operations in Garbage Collection</b> (PACT 2018), <i>Jiho Choi, Thomas Shull, and Josep Torrellas</i> <b>Defining a High-level Programming Model for Emerging NVRAM Technologies</b> (ManLang 2018), <i>Thomas Shull, Jian Huang, and Josep Torrellas</i> <b>ShortCut: Architectural Support for Fast Object Access in Scripting Languages</b> (ISCA 2017), <i>Jiho Choi, Thomas Shull, and Josep Torrellas</i> <b>Improving JavaScript Performance by Deconstructing the Type System</b> (PLDI 2014), <i>Wonsun Ahn, Jiho Choi, Thomas Shull, María J. Garzarán, and Josep Torrellas</i>	
TECHNICAL SKILLS	<i>Programming Skills:</i> C/C++, Java, Python. <i>Managed Language Implementations:</i> JavaScript-V8, JavaScriptCore; Swift; Java-HotSpot, Maxine, Substrate VM <i>Compiler Implementations:</i> Graal, LLVM	
REFERENCES	Christian Wimmer, christian.wimmer@oracle.com Stuart Monteith, stuart.monteith@arm.com Josep Torrellas, torrella@illinois.edu Additional references available upon request	Oracle Labs Arm Ltd. University of Illinois at Urbana-Champaign