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

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
Senior Researcher with GraalVM Team
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.

Arm Ltd. July 2019 – April 2020
Open Source Software
Worked on AArch64 port of Substrate VM (SVM). 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: JavaScript–V8, JavaScriptCore; Swift; Java–HotSpot, Maxine, Substrate VM
Compiler Implementations: Graal, LLVM

REFERENCES

Christian Wimmer, christian.wimmer@oracle.com	Oracle Labs
Stuart Monteith, stuart.monteith@arm.com	Arm Ltd.
Josep Torrellas, torrella@illinois.edu	University of Illinois at Urbana-Champaign
Additional references available upon request	