Nadav Rotem

Permanent U.S. Resident (Green Card)
Ph.D. Computer Science

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Experience

Apple Manager, Swift Performance Team 2014-Present

Manage the Swift performance team, which is responsible for developing the Swift optimizer, tracking the performance of the language, and working with the language- and runtime-teams on performance features. Personally implemented many of the optimizations, and participated in the initial Swift bringup.
Skills/Tools: Management, Swift, LLVM, Compiler Development

Apple Manager, Compiler Performance Team 2012-2014

Managed the compiler-performance team responsible for developing major components of the LLVM compiler, such as the vectorizer and the scheduler. Developed parts of the LLVM-based Webkit JavaScript JIT, and improved the performance of the LLVM compiler on programs central to Apple. Served as the lead developer of the LLVM vectorizer and the LLVM x86 backend code owner. The team shifted focus from general compiler optimizations to Swift in late 2014.
Skills/Tools: Management, LLVM, Compiler Development, Performance Analysis

Intel Compiler Developer 2010-2012

Worked as part of the Intel OpenCL compiler team on auto-vectorization and LLVM compiler improvements. Developed the OpenCL Vectorizer (central component of the OpenCL SDK) for Xeon Phi (previously Larrabee). Worked with the open source community on improving the LLVM compiler for Intel Architectures: code generator vector improvements, changes to the LLVM intermediate representation (IR), additional instruction set support, and general compiler optimizations.
Skills/Tools: C++, OpenCL, Xeon Phi, LLVM, Compiler Development

Israeli Military Intelligence Technical Lead in HPC 2004 - 2010

Worked as part of a team that was responsible for solving problems that require lots of compute power. Wrote compute intensive distributed programs for a very large cluster. Led the evaluation process of HPC clusters by different vendors. Optimized code in assembly for a large-scale cluster. Developed the software for FPGA acceleration systems in a large-scale cluster. Led a team of embedded software developers. Wrote Linux kernel drivers for embedded systems.
Skills/Tools: C/C++, HPC, Python, Linux Kernel, Assembly, Verilog, FPGA

Siftology Inc. Intern 2002

Worked as an intern in the field of natural language processing (NLP). Developed the Open Text Summarizer (http://libots.sf.net), a library that is now included in major Linux distributions.
Skills/Tools: Perl, C, XML

Education

Haifa University, Israel	M.Sc. and Ph.D.	Computer Science	2006 – 2012
Tel Hai College, Israel	B.Sc.	Computer Science	2002 – 2003
California State University Sacramento	B.Sc. Studies	Computer Science	2000 – 2002

Academic Publications

1. Hybrid Type-Legalization for a Sparse SIMD Instruction Set (ACM TACO), April 2013.
2. The benefits of Using Variable-Length Pipelined Operations in HLS (TECS) , Oct 2012.
3. Block Unification IF-conversion for High Performance Architectures (IEEE CAL) , Oct 2012.
4. Using Memory Profile Analysis for Automatic Synthesis of Pointer Code (TECS), Oct 2011.
5. Optimizing Wait-States in the Synthesis of Memory References with Unpredictable Latencies (SAMOS), May 2011.
6. Combining Static and Dynamic Array Detection Methods for Binary Synthesis (JDAES), Jan 2011.
7. Automatic Memory Partitioning: Memory Parallelism via Data Structure Partitioning (CODES+ISSS), Oct 2010.
8. Reducing Memory Constraints in Modulo Scheduling Synthesis for FPGAs (TRETS), Sep 2010.
9. Finding the Best Compromise in Compiling Compound Loops to Verilog (JSA), Sep 2010.
10. Binary Synthesis with Multiple Memory Banks Targeting Array References (FPL), Aug 2009.
11. The Effect of Unrolling and Inlining for Python Bytecode Optimizations (SYSTOR), May 2009.
12. Synthesis for Variable Pipelined Function Units (SOC 2008), Nov 2008.

Other

LLVM Committer, Code owner of the X86 backend and Vectorizer
Webkit Committer
Army Rank: Captain
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References available upon request