

Karthikeyan Manivannan

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Education

Ph.D. student (System Software Concentration)

University of California, Irvine (UCI)

Sep 2007 – current

M.S. in Electrical and Computer Engineering (System Software)

University of California, Irvine

Sep 2005 – Aug 2007

Research Experience

Research Assistant, Secure Systems and Languages Lab, UCI

Advisor: Dr. Michael Franz

Sep 2008 – current

I am currently working on the *Hotpath* project which aims at improving the JIT performance of the Maxine Research VM from Sun Microsystems by adding a tracing-JIT. I have implemented a profiling framework for recording and analyzing trace statistics; and implemented optimization passes like CSE. I am currently trying to identify and implement trace-specific optimizations.

Research Assistant, Secure Systems and Languages Lab, UCI

Advisor: Dr. Michael Franz

Aug 2007 – May 2008

Worked on the *Orchestra* multi-variant execution project which detects vulnerabilities in software by simultaneously running multiple variants of the software. I investigated dynamic variant generation techniques for x86 binaries using the Strata Dynamic Binary Translation infrastructure.

Research Assistant, Center for Embedded Computer Systems, UCI

Advisor: Dr. Daniel Gajski

Dec 2006 – Aug 2007

Developed a GCC based front-end for the No Instruction Set Compiler. The project involved modifying GCC to generate XML equivalent of a C program's GIMPLE representation. The XML is used as input by the NISC compiler middle-end. Also developed an XML-to-C tool to verify the output of the front-end.

Work Experience Intern, Sun Microsystems Labs, Menlo Park, CA

Maxine Research Virtual Machine Project

May 2008 – Sep 2008

Developed a new mechanism to implement efficient per thread safe-points and local variable access. Added card tables and remembered sets to the Maxine garbage collection infrastructure. Implemented stack overflow handling. .

Intern, Atheros Communications Inc, Santa Clara, CA

Embedded Wireless Software Team

Jun 2006 – Sep 2006

Implemented firmware enhancements for the Atheros 802.11n embedded-platform chip. Also worked on bug-fixes and test bench development for the 802.11/b/g embedded-platform firmware.

Embedded Software Engineer, Skyworks Solutions Inc., India

Protocol Stack/Multimedia Team

Dec 2002 – Aug 2005

Designed and developed an audio framework to control audio CODECs and interface them with the stereo DAC device on the ARM9 based Skyworks platform. Ported the Helix MP3 decoder on the Skyworks Multimedia platform and made changes to accommodate the more loss-tolerant RTP payload format specified in RFC 3119. Fixed bugs, implemented features and optimized the Skyworks GSM Layer 3 protocol stack

code for optimum performance on ARM7 based platforms.

Intern, Hughes Software Systems, Gurgaon, India

Packet Gateway Network Simulator team

Jun 2001 – Dec 2001

Designed and developed a multi threaded User Interface (UI) for the Thuraya/Inmarsat Packet Gateway Network Simulator (PGNS), a simulator used to test the Thuraya satellite phone.

Publications

Refereed Papers

- "Multi-Variant Program Execution: Using Multi-Core Systems to Defuse Buffer-Overflow Vulnerabilities," Babak Salamat, Andreas Gal, Todd Jackson, Karthikeyan Manivannan, Gregor Wagner, and Michael Franz. Proceedings of the International Conference on Complex, Intelligent and Software Intensive Systems (CISIS'08), Pages 843-848, March 2008.

Technical Reports

- "Reverse Stack Execution," Babak Salamat, Andreas Gal, Alexander Yermolovich, Karthikeyan Manivannan and Michael Franz. Technical Report No. 07-07, Donald Bren School of Information and Computer Sciences, University of California, Irvine, August 2007

M.S. Thesis

- "Design and development of a GCC based C front-end for the NISC compiler" , University of California , Irvine , August 2007.

Teaching

Computational Methods in ECE
Systems and C Programming

Fall 2007 and Winter 2006
Spring 2006

**Select Course
Projects**

Advanced Compiler Construction

Advisor: Dr. Michael Franz

Aug 2006 - Dec 2006

Developed an SSA based optimizing compiler in Java, for a toy language, which performs compiler optimizations like CSE, dead code elimination, copy propagation and constant folding.

Select Courses

Advanced Compiler Construction
Design and Analysis of Algorithms

Advanced System Software
Parallel Computer Architecture

Computer Skills

Programming: C, C++, Java, C#, Python, MPI, UNIX Sockets, HTML, VB Script
Operating Systems: Linux, Solaris, Mac OS X, Windows
Protocols: GSM Layer 3, TCP, IP, UDP

**Honours and
Awards**

ICS Fellowship (2007-2009), University of California, Irvine
Excellent Performer Award, Skyworks Solutions Inc, India Design Centre.

**Positions and
Affiliations**

Student member, Association for Computing Machinery (ACM)