

**Education**      **PhD in Computer Science (System Software)**      Sep. 2005 - Jul. 2009  
University of California, Irvine - Advisor: Prof. Michael Franz      GPA 4.0 out of 4.0  
**MSc in Computer Architecture**      Sep. 1998 - Jan. 2001  
Sharif University of Technology, Tehran/Iran      Graduated with Honors  
**BSc in Computer Engineering**      Sep. 1994 - Sep. 1998  
Sharif University of Technology, Tehran/Iran

**Computer Skills**      **Languages:** C++, C, C#, Java, SQL, PHP, Python, HTML, Javascript, XML  
**Operating Systems:** Linux, Mac OS X, Windows  
**Other techniques, Protocols and Products:** Familiar with GCC Internals, Linux kernel and System Calls, WebKit, Libc Internals, Multithreaded Programming, Superscalar Processor Architecture, MPI, OpenMP, Version Control (Git, SVN, CVS, Perforce)

**Work Experience**      **Qualcomm Bay Area R&D (BARD)**      Staff System Software Engineer  
Santa Clara, CA      March 2010 - Present  
Worked in a small team building a prototype parallel browser for mobile devices.  
Developed compiler optimization techniques to improve Javascript execution performance.  
Built a toolset to validate, measure, and compare performance of the Javascript engine.

**Yahoo Inc., Search**      Senior System Software Engineer  
Sunnyvale, CA      August 2009 - February 2010  
Improved performance of the searcher nodes' start-up by more than a factor of two using caching and parallelization techniques.  
Developed an adaptive optimization technique to significantly reduce network bandwidth usage of the search engine back-end.  
Profiled and analyzed Real Time Search engine to identify bottlenecks and to improve performance.  
Managed new version of search engine release and deployment.

**VMware Inc.**      Summer Intern  
Palo Alto, CA      June 2008 - September 2008  
Built custom static analysis checkers using Coverity products. Added functionality to a custom library to detect heap-based buffer overflows.  
Developed a tool in Python to run static analysis checkers automatically.

**Fara Rayaneh Eng. Co.**      Director of Software Dept. and Lead Programmer  
Tehran, Iran      February 2001 - August 2004  
Developed a very successful user management and accounting software package with unique features for ISPs and VoIP service providers. Languages, Technologies and protocols used in this project are Visual C++, ASP, Windows services, MS SQL, RADIUS, and SNMP.

**Fara Rayaneh Eng. Co.**      Director of the Network Dept.  
Tehran, Iran      May 1999 - February 2001  
Expanded the internet service capacity of the company to 20 times of its starting point.

**Fara Rayaneh Eng. Co.**      Member of the Board of Directors  
Tehran, Iran      May 1999 - August 2004  
Co-founded the Fara Rayaneh Eng. Co., which later acquired Morva Net and became one of the largest Iranian Internet Service Providers.

**Academic  
Research  
Experience**

**Software Security and Compilers (PhD Thesis)** Winter 2007 - Spring 2009  
Developed a Multi-Variant Execution Environment that runs multiple variants of a single application in lockstep and monitors their behavior at the granularity of system-calls to prevent exploitation of vulnerabilities.  
Modified GCC's and also LLVM-GCC's back-end to generate executables that write the stack in the reverse direction. These executables are used in the multi-variant environment to prevent exploitation of stack-based buffer overflow vulnerabilities.

**Energy saving and speedup of Data Cache** Winter 2006 - Spring 2006  
Introduced fast address generation and way caching to reduce dynamic and static energy consumption of L1 data cache. Developed simulator and evaluated fast address generation and L0 data cache to reduce memory access latency.

**Optimizing Compiler** Fall 2005  
Developed the middle- and back-end for an optimizing compiler using Java.

**Embedded Processors** Fall 2004 - Spring 2005  
Customized pipeline gating techniques for embedded processors to reduce energy dissipation caused by branch misprediction. Improved accuracy of small branch predictors used in embedded processors. Proposed a new scoreboard access technique to reduce energy consumption in embedded processors.

**Awards and  
Honors**

UCIrvine School of Information and Computer Sciences (ICS) Dean's Fellowship for three years (100,000\$), 2005  
University of Victoria Fellowship (\$15000), 2004  
Ranked 1st among 10 M.Sc. Fellows, Computer Architecture, Sharif University of Technology, 1998-2001  
Ranked 6th among more than 8000 graduates participating in the nationwide M.Sc. program entrance exam, Iran, August 1998  
Ranked 115th among more than 400,000 students participating in the nationwide undergraduate entrance exam, Iran, August 1994

**Patents**

"Multi-Variant Parallel Program Execution to Detect Malicious Code Injection," US Application Serial No. 12/075,127 (*pending*), March 2008  
Another IDF filed by Qualcomm, 2010

**Selected  
Publications**

"Run-Time Defense against Code Injection Attacks using Replicated Execution,"  
Babak Salamat, Todd Jackson, Gregor Wagner, Christian Wimmer, Michael Franz. *Accepted for publication in IEEE Transactions on Dependable and Secure Computing, IEEE Computer Society, 2011*

"On the Effectiveness of Multi-Variant Program Execution for Vulnerability Detection and Prevention,"  
Todd Jackson, Babak Salamat, Gregor Wagner, Christian Wimmer, and Michael Franz. *International Workshop on Security Measurements and Metrics (MetriSec 2010)*, September 2010

"Orchestra: Intrusion Detection Using Parallel Execution and Monitoring of Program Variants in User-Space,"  
Babak Salamat, Todd Jackson, Andreas Gal, and Michael Franz. *The European Conference in Computer Systems (EuroSys'09)*, March 2009

“Power-Aware Scoreboard Alternatives for Multimedia Processors,”  
Amirali Baniyasadi, Babak Salamat, and Kaveh Jokar Deris. *Elsevier Journal of Microprocessors and Microsystems (MICPRO)*, Volume 33, June 2009

“Reverse Stack Execution in a Multi-Variant Execution Environment,”  
Babak Salamat, Andreas Gal, and Michael Franz. *The 2008 Workshop on Compiler and Architectural Techniques for Application Reliability and Security (CATARS’08)*, June 2008

“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. *International Conference on Complex, Intelligent and Software Intensive Systems (CISIS’08)*, March 2008

“Reverse Stack Execution,”  
Babak Salamat, Andreas Gal, Alexander Yermolovich, Karthik Manivannan and Michael Franz. *Technical Report No. 07-07, School of Information and Computer Sciences, University of California, Irvine*, August 2007

“Fast Speculative Address Generation and Way Caching for Reducing L1 Data Cache Energy,”  
Dan Nicolaescu, Babak Salamat, Alexander Veidenbaum and Mateo Valero. *Proceedings of 24<sup>th</sup> IEEE International Conference on Computer Design (ICCD’06)*, October 2006

“Area-Aware Optimizations for Resource Constrained Branch Predictors Exploited in Embedded Processors,”  
Babak Salamat, Amirali Baniyasadi and Kaveh Jokar Deris. *Proceedings of the International Conference on Embedded Computer Systems: Architectures, MOdeling, and Simulation (IC-SAMOS)*, July 2006

“Power-Aware Scoreboard for Multimedia Processors,”  
Amirali Baniyasadi and Babak Salamat. *7<sup>th</sup> workshop on Media and Streaming Processors (MSP-7) held in conjunction with MICRO-38*, November 2005

“Area-Aware Pipeline Gating for Embedded Processors,”  
Babak Salamat and Amirali Baniyasadi. *International Workshop on Power and Timing Modeling, Optimization and Simulation (PATMOS’05)*, September 2005

“Design and implementation of a system for microprocessor laboratory,”  
Ghassem Miremadi, Babak Salamat and Amin Firoozshahian. *Proceedings of Sharif University of Tech.*, 1998-1999