

Rasool Sharifi

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Overview

My research interests lie broadly in Computer Architecture, Compilers, and Computer Security. My research explores novel hardware and software techniques to design secure machines while maintaining performance, energy efficiency, and high programmability. I'm also interested in applying novel machine learning techniques to detect and mitigate security threats. I have extensive experience in designing high performance, energy efficient FPGA and embedded systems for core consumer products. Recent research highlights include:

- **Hardware Security:** High performance and transparent capability based protection mechanism to secure unmodified source and object code against temporal and spatial memory safety exploits
- **Processing in Memory:** DRAM-based in-situ k-mer matching accelerator design for simultaneous comparisons of millions of DNA base pairs
- **Speculation-Driven Dynamic Binary Optimization:** Exploring dynamic binary optimization techniques at the processor level to speculatively generate and execute a super-optimized instruction stream

Education

University of Virginia, Charlottesville, USA Ph.D., Computer Science	Sep. 2018 - Present
University of Tehran, Tehran, Iran M.Sc., Electronics-Circuit and Systems	Sep. 2013 - June 2016
Isfahan University of Technology, Isfahan, Iran B.Sc., Electrical Engineering	Sep. 2009 - June 2013

Research Experience

University of Virginia, Charlottesville, USA, Graduate Research Assistant Projects: <ul style="list-style-type: none">• Architecture Support for Memory Safety• Boosting Performance via Speculation-Driven Dynamic Binary Optimization• Processing in Memory for Bioinformatics Applications	Sep. 2018 - Present
University of Tehran, Tehran, Iran, Graduate Research Assistant Projects: <ul style="list-style-type: none">• Cluster Specific Multi-Rate Refreshing in Modern DRAM Systems	Sep. 2013 - June 2016

Work Experience

Huawei Technology Co., Tehran, Iran, Wireless Engineer	July. 2015 - December. 2016
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Publications

- Lingxi Wu, Rasool Sharifi, Marzieh Lenjani, Kevin Skadron, and Ashish Venkat, "Sieve: A Scalable In-Situ DRAM-based Accelerator for Massively Parallel K-mer Matching," in *2021 ACM/IEEE 48th Annual International Symposium on Computer Architecture (ISCA)*, 2021, **Acceptance Rate: 18%**
- Rasool Sharifi and Ashish Venkat, "CHEX86: Context-Sensitive Enforcement of Memory Safety via Microcode-Enabled Capabilities," in *2020 ACM/IEEE 47th Annual International Symposium on Computer Architecture (ISCA)*, 2020, **Acceptance Rate: 18%**
- Rasool Sharifi and Zain Navabi, "Online Profiling for cluster-specific variable rate refreshing in high-density DRAM systems," in *2017 22nd IEEE European Test Symposium (ETS)*, 2017

Skills

Programming Languages/APIs:

- C/C++, Python, Bash, Assembly Programming (x86), VHDL, Verilog, SystemC

Simulators and Analyzers:

- Gem5 Architectural Simulator, McPAT, MARSSx86, Sniper Multi-Core Simulator, DRAMSim2, Ramulator, CACTI

Benchmarking and Performance Analysis:

- SPEC Benchmarks, SimPoints, Pin

Industry Software Skills:

- HSpice, Matlab, Modelsim, Vivado, Quartus, Xilinx ISE, Xilinx EDK, Matlab System Generator

Practical Skills:

- SOC Design on FPGA, Embedded Linux on FPGA

Notable Projects

Architecture Support for Memory Safety,

Language: *C++, Python*, **Framework:** *GEM5*

Speculation-Driven Dynamic Binary Optimization,

Language: *C++, Python*, **Framework:** *GEM5*

Processing in Memory for Bioinformatics Applications,

Language: *C++, Python*, **Framework:** *DRAMSim2*

Cluster Specific Multi-Rate Refreshing in Modern DRAM Systems,

Language: *Verilog, VHDL, C*, **Platform:** *Altera Stratix IV*

Design and Implementation of SMPTE 2022-6 Video Over IP Transmitter and Receiver Cores

Language: *VHDL, Verilog*, **Platform:** *Xilinx Virtex 7*

Design and Implementation of a Multi-touch Framework Based on ARM-M3 Micro-Controllers

Language: *C, C++, Assembly*

Courses

CS6316: Machine Learning

University of Virginia

Fall 2019

CS6501: Deep Learning for Visual Recognition

University of Virginia

Spring 2020

CS6501: Compilers

University of Virginia

Spring 2020

Teaching Experience

Teaching Assistant, CS3330: Undergraduate Computer Architecture ,

University of Virginia

Spring 2020, Spring 2021

Teaching Assistant, CS6354: Graduate Computer Architecture,

University of Virginia

Fall 2020

Teaching Assistant, Digital Logic Design Laboratory,

University of Tehran

September 2012 – June 2015

References

Ashish Venkat (venkat@virginia.edu), Assistant Professor, University of Virginia

Kevin Skadron (skadron@virginia.edu), Professor, University of Virginia