Parnian Mokri

Contact Information

https://sites.tufts.edu/pmokri
161 College Ave
Medford, MA 02155

703-4636401
pmokri01@tufts.edu

Research Interests

Computer Architecture, Workload Characterization, Designing Application-Specific Hardware on FPGAs and Embedded Systems, LLVM/clang Compilers

Education

Tufts University, Medford, MA Ph.D., Electrical Engineering, *Expected:* Spring 2020

Ph.D., Electrical Engineering, *Expected:* Spring 2020

- *Many Accelerator Systems: designing application specific hardware; their memory and control system selection in heterogeneous architecture* Advisors: Mark D. Hempstead

George Mason University, Fairfax, VA

M.S., Computer Engineering, May 2014

- *Designing bio-neuron in hardware*: Implementing optimal Izhikevich and Hodgkin-Huxley model in Xilinx FPGAs and their control system Adviser: Houman Homayoun, Ph.D

Tehran Azad University, Tehran, Iran

B.S., Computer Engineering (Hardware), May 2009

- *Heart arrhythmia detection using FPGA* designing an optimal R-R detection algorithm based on physionet ECG signals
- *System level hardware design and simulation with SystemAda* Combining Ada and VHDL to describe computer architecture at transaction level model (TLM)
- Advisor: Zain Navabi, Ph.D

Research Experience

Tufts University and Drexel University Aug 2015 to present
Developed tools to find Shared Accelerators in Early Stage of Designs, Adviser: Dr. Mark Hempstead

George Mason University June 2012 to May 2014
Developed frameworks for Neuromorphic Computing Models on FPGAs with limited area , Adviser: Houman Homayoun

Tehran University Sept 2005 to Aug 2009
Developed System-Ada: A language for designing embedded system at TLM level, Adviser: Zain Navabi

Skills

CAD Tools: C and C++ HLS, VHDL, Vivado Xilinx, Vivado HLS Xilinx SDSoC, Quartez, SymphonicC, Virtuoso , Hotspot
Computer Architecture: Sniper multi-core simulator, GEM5, Booksim
Scripting: bash, git, python
Compilers: clang/llvm, gdb
Kernels : linux, windows
Programming languages : C++, Ada

Publications

1. Negin Mahani, **Parnian Mokri**, Mahshid Sedghi, and Zainalabedin Navabi. SystemAda: an Ada based system-level hardware description language. Ada Lett. 29, 2 (September 2009)

Current projects

1. ReconfAST: Developed a tool based on compiler front-end to represent and find similar patterns among workloads' control, computational and memory access behaviors; the patterns are then used to implement **Shared Accelerators** (SAs) in Xilinx FPGAs and ASIC. The right Shared Accelerator, can accelerate workloads by an average of 5x speedup and reduces resource required for FPGA implementations: 37% FFs, 16% DSPs, and 10% on LUTs on average.
2. Shared Accelerator System on Chip: Implementing shared accelerators and their memory system to minimize energy per instruction on ASIC and Xilinx FPGAs (Zynq and Ultra-scale)
3. Fingerprinting Workloads to Find Shared Accelerators: Developed a methodology to quickly detect Shared Accelerators at early-stage using static and dynamic behavior of workload. Finding similarities between workloads are computationally expensive; we propose a method based on workload's characteristics that reduces the process by 10%.

Awards

Best Regular Paper Award Negin Mahani, Parnian Mokri, Zainalabedin Navab
Award best regular paper IEEE EWDT08 Symposium Award Feb 2009

Peer reviewed Workshop and presentations

1. Detecting Coarse-Grained Reconfigurable kernels using ReconfAST **Parnian Mokri**, Mark Hempstead, BARC 2018
2. Detecting Coarse-Grained Reconfigurable kernels using ReconfAST **Parnian Mokri**, Mark Hempstead, Micro 17 - Workshop
3. **Parnian Mokri**, Mark Hempstead, Stockpile of Accelerators: ReconfASTs: Early-stage Identification of Reconfigurable Accelerators with Annotated Abstract Syntax Tree, BARC, 2017
4. Stockpile of Accelerators: A Methodology to increase accelerator coverage, **Parnian Mokri**, Mark Hempstead, BARC 2016
5. Siddharth Nilakantan, **Parnian Mokri**, Mike Lui and Mark Hempstead, SIGIL A tool for assisting acceleration selection **HPCA workshop**, Jan 2015

Teaching Experience

Teaching Assistant Springs 2014–17

Introduction to Computation: Spring 2018 , Instructor: Brain Tracey, Ph.D., Computer Science, Electrical Engineering Department, Tufts University: Designing solutions for homework and labs, teaching labs, office hours and grading

ECE 194 Advanced Computer Architecture: Spring 2016, Instructor: Mark Hempstead, Ph.D., Computer Science, Electrical Engineering Department, Tufts University: Designing labs, designing solutions for homework and labs, help with students final projects, office hours and grading

Computer Architecture: Spring 2015 ; Instructor: Karkal Prabhu, Ph.D Electrical Engineering Department, Drexel University: Holding Weekly Review Classes, designing quizzes and grading

Computer Networks: Fall 2014, Instructor: Karkal Prabhu, Ph.D, Electrical Engineering Department, Drexel University: : Holding Weekly Review Classes, designing quizzes and grading

Clubs and leadership

- President and founder of Tufts Computer Architecture Club
- Member and former chair of Student life at Tufts Graduate Student Council: Organizer for Coffee hours with deans, and venting events