

Seyed Armin Vakil Ghahani

 Computer Science & Engineering Department, University Park, PA 16802



EDUCATION

Pennsylvania State University, University Park, PA

Aug 2018 – Now

- Ph.D. Student in Computer Science & Engineering Department
 - Advisor: Prof. Mahmut Taylan Kandemir
 - GPA: 4/4
 - **Relevant Graduate Courses:** Computer Architecture, Data Structures & Algorithms, Binary-level Analysis, Language-based Security, Operating Systems, Emerging Technologies, Compiler Construction

Sharif University Of Technology, Tehran, Iran

Sep 2013 – Jul 2018

- Bachelor of Science (B.S.) in Computer Engineering - Hardware
 - Thesis: Cache Replacement Policy Based on Expected Hit Count
 - Advisor: Prof. Hamid Sarbazi-Azad

RESEARCH INTERESTS

- Computer Architecture
- Memory Systems
- Virtual Memory
- Virtualized Systems
- Persistent Memory

PUBLICATIONS

- **Armin Vakil**, Mahmut Taylan Kandemir, Jagadish Kotra “DSM: A Case for Hardware-Assisted Merging of DRAM Rows with Same Content”, *In Proceedings of the ACM on Measurement and Analysis of Computing Systems*, (**SIGMETRICS 2020**)
- Mohammad Bakhshalipour, Aydin Faraji, **Armin Vakil**, Farid Samandi, Pejman Lotfi-Kamran, Hamid Sarbazi-Azad “Reducing Writebacks Through In-Cache Displacement”, *ACM Transactions on Design Automation of Electronic Systems*, (**TODAES 2019**)
- **Armin Vakil**, Sara Mahdizadeh Shahri, Mohammad Bakhshalipour, Pejman Lotfi-Kamran, Hamid Sarbazi-Azad “Making Belady-Inspired Replacement Policies More Effective Using Expected Hit Count.” *arXiv preprint*, (**arXiv 2018**)
- **Armin Vakil**, Sara Mahdizadeh Shahri, Mohammad-Reza Lotfi-Namin, Mohammad Bakhshalipour, Pejman Lotfi-Kamran, Hamid Sarbazi-Azad, “Cache Replacement Policy Based on Expected Hit Count”, *IEEE Computer Architecture Letters*, (**CAL 2017**)

WORK EXPERIENCE

- Software Developer, **I-Cliqq** Jan 2018 – Aug 2018
 - Designing Embroidery Software
- Software Developer, **Viratech Sharif**, Tehran, Iran Sep 2015 – Sep 2016
 - Traffic Simulator (C++) - Network Simulator
 - Add tunneling protocol between link, internet, and transport layer

RESEARCH EXPERIENCE

- **Pennsylvania State University**
 - ◇ **DRAM Memory** - DRAM memories need refresh operations because they lose their content/charge over time. The overhead of these refreshes increases with larger DRAM memories. My research in this area reduces the memory refresh overhead in virtualized systems by leveraging the same-content values in DRAM.
 - ◇ **Virtual Memory** - Huge pages reduce the virtual-to-physical address translation by reducing the pressure on TLB and increasing the TLB reach. However, allocating huge pages in presense of memory fragmentation has high overheads and I try to address this problem in my research.
 - ◇ **Persistent Memory** - Exploring persistent memory programming challenges and opportunities.
- **Sharif University of Technology**
 - ◇ **Cache Replacement Policies** - My B.Sc. thesis project is on predicting the correlation of reuse-distance between cache blocks and remaining hit count of each cache block. In our research, we proposed a cache replacement policy that leverages the correlation between reuse-distance and the remaining hit count.

TEACHING EXPERIENCE	<ul style="list-style-type: none"> Teaching Assistant at Pennsylvania State University <ul style="list-style-type: none"> Introduction to Computer Architecture (CMPEN 431) Spring 2020 Computer Organization and Design (CMPEN 331) Fall 2018, 2019, Spring 2019 Teaching Assistant at Sharif University of Technology <ul style="list-style-type: none"> Computer Architecture Fall 2016, 2017 Digital System Design Spring & Fall 2017 Digital Design Spring 2017 Advanced Logic Design Fall 2016 Discrete Structures Spring 2016 Advanced Programming Fall 2014, 2015 Fundamental Of Programming Spring & Fall 2014 High School Teacher 2013 – 2018 <ul style="list-style-type: none"> Teaching Combinatorics, Graph Theory, Algorithm, and C++ Programming
PRESENTATIONS	<ul style="list-style-type: none"> DSM: A Case for Hardware-Assisted Merging of DRAM Rows with Same Content <ul style="list-style-type: none"> ACM SIGMETRICS June 2020
SKILLS	<ul style="list-style-type: none"> Programming Languages: C/C++, Python, Verilog, R, Shell, Assembly Simulators: gem5, BadgerTrap, DRAMsim2, BigHouse, Ramulator, CACTI, SimpleSSD, ChampSim Tools & Frameworks: Qemu, Pin, DynamoRIO, LLVM, Google Protobuf, gRPC, Qt Operating Systems: Ubuntu(Native), Windows Type Setting: L^AT_EX, Microsoft Office
HONORS AND AWARDS	<ul style="list-style-type: none"> Qualified for 2nd Cache Replacement Championship (CRC-2) <ul style="list-style-type: none"> Cache Replacement Policy Based on Expected Hit Count Jun 2017 Undergraduate grant from the Iranian National Elites Foundation Sep 2012 – Jan 2015 Silver Medal in 22nd Iran National Olympiad in Informatics(INOI) Sep 2012
COMMUNITY SERVICE	<ul style="list-style-type: none"> Sharif AI Challenge (Contest Organizer) Jan 2015 – Jan 2017 <ul style="list-style-type: none"> Undergraduate Programming Contest C++ Client 1st Gateuino Contest (Contest Organizer) May 2016 <ul style="list-style-type: none"> Founded a new hardware contest for undergraduate freshman and sophomore
COURSE PROJECTS	<ul style="list-style-type: none"> Parallel Distributed File System Dec 2019 <ul style="list-style-type: none"> Based on gRPC and Google Protobuf Binary Instrumentation May 2019 <ul style="list-style-type: none"> Dynamic Binary Instrumentation for dynamic libraries during runtime of applications for providing persistency guarantees Hospital Management System Jan 2017 <ul style="list-style-type: none"> Patient's condition monitoring scheduler Implemented Schedulers: Background Scheduling, Polling Server, Defferable Server, Sporadic Server Trax Game Apr 2016 <ul style="list-style-type: none"> Two player game based on Verilog NoC Jan 2016 <ul style="list-style-type: none"> 3D Mesh Network on Chip based on Verilog Judge Mar 2015 <ul style="list-style-type: none"> Designing and implementing a judge system for evaluating codes Plants vs Zombies Jul 2014 <ul style="list-style-type: none"> Based on Qt Creator Sudoku Jan 2014 <ul style="list-style-type: none"> Graphical Sudoku game based on GTK Billiard Jan 2014 <ul style="list-style-type: none"> Graphical Billiard game based on GTK
LANGUAGES	<ul style="list-style-type: none"> Persian: Native English: Fluent