Ali Hajiabadi

Computer Science PhD Student
National University of Singapore (NUS)

Contact Information

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Research Interests

Systems Security, Machine Learning Privacy and Security, Hardware/Software Co-design, Optimizing Compilers

Education

August 2019 - Present
Doctor of Philosophy in Computer Science
National University of Singapore (NUS), Singapore
Advisor: Dr. Trevor E. Carlson

2014 - 2019
Bachelor of Science in Computer Engineering
Sharif University of Technology, Tehran, Iran
Thesis: "High Concurrency Latency Tolerant Register Files for GPUs"
Advisor: Prof. Hamid Sarbazi-Azad

2009 - 2013
Diploma in Physics and Mathematics Discipline
Shahid Beheshti High School, Birjand, Iran
Affiliated with the National Organization for the Development of Exceptional Talents (NODET)

Research Experience

August 2019 - Present
Graduate Research Assistant at National University of Singapore, Singapore
NUS Computer Architecture Group
Supervisor: Prof. Trevor E. Carlson
My current research spans around HW/SW co-design to build secure and efficient general-purpose processors. My focus is on mitigating Speculative Execution attacks and Power Analysis attacks.

July 2016 - June 2019
Research Assistant at Sharif University of Technology, Tehran
High Performance Computer Architectures and Networks (HPCAN) Lab
Supervisor: Prof. Hamid Sarbazi-Azad
Focus of my research has been on latency tolerant register files for GPUs through HW/SW cooperative register prefetching. I contributed to an ASPLOS paper (acknowledged) and an ACM TOCS paper. In collaboration with *Institute for Research in Fundamental Sciences, EPFL,* and *ETH Zürich.*

Summer 2018
Research Intern at National University of Singapore (NUS)
Supervisor: Prof. Trevor E. Carlson
As a visiting research assistant, I investigated the potentials of out-of-order commit and how to implement an efficient system to enable out-of-order commit.

Teaching Experience

Spring 2020 & Spring 2021
Teaching Assistant, National University of Singapore, Singapore
Course: CS2106 Introduction to Operating Systems
Instructor: Prof. Djordje Jevdjic

Publications

[1] **Ali Hajiabadi**, Andreas Diavastos, Trevor E. Carlson
NOREBA: *A Compiler-Informed Non-speculative Out-of-Order Commit Processor*. Proceedings of 26^{th} International Conference on Architectural Support for Programming Languages and Operating Systems (**ASPLOS 2021**). April 2021. Acceptance rate: 75/398 = 18.8%
[Paper][Extended Abstract][Short Slides][Short Talk][Slides][Full Talk]

[2] Harish Patil, Alexander Isaev, Wim Heirman, Alen Sabu, **Ali Hajiabadi**, Trevor E. Carlson
ELFies: Executable Region Checkpoints for Performance Analysis and Simulation. Proceedings of 19^{th} International Symposium on Code Generation and Optimization (**CGO 2021**), March 2021. Acceptance rate: 31/89 = 34.8%
[Paper]

[3] Mohammad Sadrosadati, Amirhossein Mirhosseini, **Ali Hajiabadi**, Seyed Borna Ehsani, Hajar Falahati, Hamid Sarbazi-Azad, Mario Drumond, Babak Falsafi, Rachata Ausavarungnirun, Onur Mutlu
Highly Concurrent Latency-tolerant Register Files for GPUs. In ACM Transactions on Computer Systems (**TOCS**), 2021.
[arXiv Paper]

[4] Yun Chen*, **Ali Hajiabadi***, Romain Poussier, Andreas Diavastos, Shivam Bhasin, Trevor E. Carlson
Mitigating Power Attacks through Fine-Grained Instruction Reordering. arXiv (unpublished), 2021.
* Authors with equal contribution.
[arXiv Paper]

Honors & Awards

August 2021	Recipient of Research Achievement Award from School of Computing, NUS.
March 2020	Invited talk and travel grant for the 2^{nd} Young Architect Workshop at ASPLOS'20, Switzerland.
February 2019	Recipient of President's Graduate Fellowship, the most prestigious doctoral fellowship at National University of Singapore (NUS).
September 2014	Ranked **164**th in Iranian National University Entrance Exam among more than 250,000 students.
2006 & 2009	Recognized as talented student in entry exam of NODET among Birjand students for middle school and high school.

Talks

August 2021	NOREBA: **A Compiler-Informed Non-speculative Out-of-Order Commit Processor** *Computing Research Week, School of Computing (NUS)*, Virtual.
April 2021	NOREBA: **A Compiler-Informed Non-speculative Out-of-Order Commit Processor** *International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2021)*, Virtual.
February 2021	**Accelerating HPC applications with Out-of-Order Commit Processors** *Free and Open source Software Developers' European Meeting (FOSDEM 2021), HPC, Big Data, and Data Science track*, Virtual.
March 2020	**Speculation-Free Out-of-Order Commit** 2^{nd} *Young Architect Workshop at the* 25^{th} *International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS 2020)*, Virtual.

Services

June 2021 **Student Volunteer** at 42^{nd} International Conference on Programming Language Design and Implementation (PLDI 2021), Virtual.

Skills

Programming Languages:	C/C++, Python, and familiar with Java, Scala, Matlab
Scientific Tools:	LLVM Compiler Infrastructure, gem5 Simulator, Sniper Simulator, GPGPU-Sim, BookSim, GPU-Ocelot, Pin
Operating Systems:	Linux, Mac OS, Windows
Typesetting:	LaTeX, Microsoft Word