**You Wu**

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**Research Interests**

Computer Architecture, Micro-architecture Security, Side Channel Attack and Defense.

**Education**

**Ph. D. in Computer Engineering** at **University of Southern California**  Aug. 2017 - present

Ming Hsieh Department of Electrical Engineering Supervisor: Xuehai Qian

**M. S. in Computer Science** at **University of Southern California**  Aug. 2017 – Dec. 2020

Department of Computer Science

**B. E. in Microelectronic Science and Engineering** at **Tsinghua University**, China Aug. 2013 - Jul. 2017

Department of Microelectronics and Nanoelectronics Overall GPA: 89.2/100 Rank: 5/26

Thesis: The VLSI implementation of Binarized Neural Networks

**Research Experience**

**Control Flow Integrity on RISC-V ISA** | Alibaba Group U.S. | Research Intern May. 2022 – Aug.2022

Advisor: Dr, Lide Duan, Alibaba DAMO Academy

* Qemu profiling on a new proposed branch landing scheme defending for Jump Oriented Programming (JOP) attacks
* Proposed two extensions on branch landing scheme: one for Return Oriented Programing (ROP) defense, the other for function level fine-grained protection
* Designed a workflow to evaluate the proposed extension

**Defense for the Frontend Attack** | University of Southern California | Research Assistant Oct. 2021 – May. 2022

Advisor: Prof. Xuehai Qian, University of Southern California

* Frontend paths including LSD, DSB and MITE have the vulnerability to side channels
* Trying to enhance the gem5 simulator to simulate the Frontend behaviors
* Plan to use partition techniques with delaying update in the Frontend to eliminate speculative effects

**Rowhammer Attack Project** | University of Southern California | Research Assistant Apr. 2021 – Dec. 2021

Advisor: Prof. Xuehai Qian, University of Southern California

* Focus on counter-based mitigation protecting the DRAM from rowhammer attack
* Investigated the state-of-art rowhammer mitigation strategies
* Reproducing the existing work using different rowhammer simulators

**The Reversible Coherence Protocol** | University of Southern California | Research Assistant Sep. 2018 – Nov. 2021

Advisor: Prof. Xuehai Qian, University of Southern California

* Analyzed resent defense strategy like InvisiSpec and CleanupSpec.
* Designed a buffer-based Undo approach to mitigate the transient speculation flaw.
* Extended the current memory coherence protocol to support the merging and purging requests in our design
* Added processor support which help securely issue speculative instructions instead of blocking them
* Proposed a comprehensive mitigation which could eliminate the current speculation related attacks and interferences

**GPU Power Virus Project** | University of Southern California | Research Assistant Apr. 2018 - Nov. 2018

Advisor: Prof. Xuehai Qian, University of Southern California

* Used genetic algorithm to automatically generate extremely high power consumption.
* Modified gpgpusim simulator to trace the access pattern for gpgpu simulations.

**Design of a Specialization BNN Accelerator** | Tsinghua University | Research Assistant Sep. 2016 - Jul. 2017

Advisor: Prof. Shouyi Yin, Institute of Microelectronics

* Designed an architecture which can efficiently execute the binarized neural computation.
* Investigated its application in different neural networks to accelerate computation.

**Implementation of BNN on different platforms** | Cornell University | Research Assistant. Jun. 2016 - Sep. 2016

Advisor: Prof. Zhiru Zhang, Dept. of Electrical and Computer Engineering

* Implemented both the hardcore and softcore of the BNN network on an FPGA hardware.
* Coded for the interface to connect the Rocket chip softcore with the BNN accelerator.
* Used High Level Synthesis tool Stratus to utilize limited resources to implement the project.

**Vehicular behavior algorithm analysis** | Tsinghua University | Research Assistant. Sep. 2015 - Jun. 2016

Advisor: Prof. Shouyi Yin,Institute of Microelectronics

* Used deep learning algorithms to analyze human behavior while driving a vehicle.
* Used the deep learning platform “tensorflow” to solve traditional problems, e.g. MNIST classification.
* Investigated the mechanism behind deep learning algorithms.

**Pilot Assignment Algorithms for Wireless Networks** | Tsinghua University | SRT Project. Mar. 2015 – May. 2016

Advisor: Prof. Wei Feng, Dept. of Electronic Engineering

* Investigated pilot assignment algorithms to achieve better performance in cellular MIMO systems.
* Performed simulation in cellular Gaussian networks to verify the theoretical results.

**Skills**

* Good at Python, C/C++ Programming
* familiar with Simulators (such as Qemu and GEM5)

**Awards**

Recipient of School Scholarship for Outstanding Academic Award, 2014

Two-time recipient of School Scholarship for Literary Award of Excellence, 2014, 2016

**Publications**

**[ISCA'19]**[**A Time-Space Sharing Selected Scheduling Abstraction for Next Generation of Shared Cloud via Vertical Labels**](http://alchem.usc.edu/~youwu/publication/2019.isca.TSSS.pdf)

Yuzhao Wang, Lele Li, **You Wu**, Junqing Yu, Zhibin Yu, Xuehai Qian  
The 46th International Symposium on Computer Architecture (ISCA 2019)

**[CCF Trans HPC] ReBNN: in-situ acceleration of binarized neural networks in ReRAM using complementary resistive cell**

Linghao Song, **You Wu**, Xuehai Qian, Hai Li, Yiran Chen

CCF Transactions on High Performance Computing 1, no. 3-4 (2019): 196-208.

**[arXiv] A Case for Reversible Coherence Protocol**

**You Wu**, Xuehai Qian  
preprint arXiv: 2006.16535

**Other Experience**

Fall 2022 Teaching Assistant: EE557 Computer Systems Architecture

Fall 2021 Teaching Assistant: EE557 Computer Systems Architecture

Summer 2020 Teaching Assistant: EE559 Mathematical Pattern Recognition

Summer 2018 Student Volunteer at ISCA’18