Zixuan Wang
Senior Software Engineer, Apple
Ph.D., University of California, San Diego

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EDUCATION

University of California, San Diego
Ph.D. in Computer Science.

San Diego, CA, US
Sep. 2018 – Aug. 2024

Zhejiang University
BS in Computer Science.

Hangzhou, China
Sep. 2014 – July. 2018

INTEREST

My *research* interests are in computer architecture and systems. More specifically, I am interested in cross-stack innovations that enhance the scalability and security of computer systems for emerging applications. My *industrial* efforts focus on trusted execution environments, including deploying the emerging confidential virtual machine technology in real-world industrial systems. And my *open-source* projects facilitate research, industry, and personal usages, which have been used by more than a quarter million users.

EXPERIENCE

Research Experience

Graduate Research Assistant, STABLE Lab
Advisor: Jishen Zhao, Steven Swanson

UC San Diego
Sep. 2018 – Aug. 2024

- **Emerging Architecture:**
  * Characterizing and simulating emerging main memory systems [5] [7] [PU3] [PP1].
  * Reverse engineering and side channel attacks in main memory systems [2].
- **System Integration:**
  * Building scalable distributed AI training infrastructure based on CXL, an emerging memory interconnection protocol [4].
  * Reverse-engineering and attacking CXL-enabled systems [PP3].
  * Developing scalable system support for CXL-based heterogeneous systems [3].
- **Emerging Application and Programming Techniques:**
  * Developing generative AI that automatically writes high-quality code to leverage emerging architectures [6] [PP2].
  * Investigating system supprot for autonomous vehicle systems [1] [PU2].
  * Characterizing performance of serverless systems based on WebAssembly [PU1].

Research Intern, SOLAB
Collaborators: Joonseop Sim, Euicheol Lim

SK Hynix USA
Jun. 2019 – Sep. 2019

- **Emerging Memory:** One of the first performance evaluations of CXL, an emerging memory interconnection protocol.
- **ML Training Acceleration:** Efficient distributed infrastructure to train ML models using CXL [4].

Undergraduate Research Assistant, Computer Architecture Lab
Advisors: Qingsong Shi, Wenzhi Chen

Zhejiang University
Sep. 2015 – Jun. 2018

- **Developed a Full Computer System from Scratch:** Implemented a CPU (with peripherals) on FPGA, a fully functional operating system kernel in C and assembly, and integrated the kernel to run on this CPU.
- **Developed new Undergrad Courses:** Developed two new courses that guide undergrads to develop their own operating systems running on their own CPU.

Industry Experience

Senior Software Engineer
Private cloud computing.

cloudOS, Apple
Apr. 2025 – Present

Software Engineer
Private cloud computing.

clousOS, Apple
Sep. 2024 – Apr. 2025

Software Engineering Intern
Enhanced cloud user data confidentiality with emerging AMD SEV-SNP SVSM.

Confidential VM, Google Cloud
Jun. 2023 – Sep. 2023

Part-Time Student Researcher
Deployed the confidential VM platform at scale.

Network Infra, Meta
Sep. 2022 – Jan. 2023

Software Engineering Intern
Initiated and developed Meta's first confidential VM platform.

Network Infra, Meta
Jun. 2022 – Sep. 2022

Software Engineering Intern
Modernizing Linux KVM testing with UEFI and AMD SEV confidential VM supports.

Confidential VM, Google Cloud
Jun. 2021 – Sep. 2021

PUBLICATIONS

In Progress & Under Submission

[PP1] *Zixuan Wang*, Suyash Mahar, Luyi Li, Jangseon Park, Jinpyo Kim, Theodore Michailidis, Yue Pan, Tajana Rosing, Dean Tullsen, Steven Swanson, Kyung Chang Ryoo, Sungjoo Park, Jishen Zhao. The Hitchhiker's Guide to Programming and Optimizing CXL-Based Heterogeneous Systems, *ArXiV, 2024*

[PP2] Hanxian Huang, Zhenghan Lin, *Zixuan Wang*, Xin Chen, Ke Ding, Jishen Zhao. Towards LLM-Powered Verilog RTL Assistant: Self-Verification and Self-Correction, *ArXiV, 2024*

[PP3] *Zixuan Wang**, Zheng Zhang*, Daniel Moghimi, Jishen Zhao, Mohammadkazem Taram. CXLeak: Architectural Attacks via Practical CXL Systems

[PP4] Kevin Song, Jiacheng Yang, Zixuan Wang, Jishen Zhao, Sihang Liu, Gennady Pekhimenko. HybridTier: An Adaptive and Lightweight CXL-Memory Tiering System, *ASPLOS, 2025*

Peer Reviewed

[1] Haolan Liu, *Zixuan Wang*, Jishen Zhao. COLA: Characterizing and Optimizing the Tail Latency for Safe Level-4 Autonomous Vehicle Systems, *ICRA, 2025*

[2] *Zixuan Wang*, Mohammadkazem Taram, Daniel Moghimi, Steven Swanson, Dean Tullsen, Jishen Zhao. NVLeak: Off-Chip Side-Channel Attacks via Non-Volatile Memory Systems, *USENIX Security, 2023*

[3] *Zixuan Wang*, Jishen Zhao. Fork is All You Needed in the Era of Heterogeneous Computing, *WCDS@ASPLOS, 2024*

[4] *Zixuan Wang*, Joonseop Sim, Euicheol Lim, Jishen Zhao. Enabling Efficient Large-Scale Deep Learning Training with Cache Coherent Disaggregated Memory Systems, *HPCA, 2022*

[5] *Zixuan Wang*, Xiao Liu, Jian Yang, Theodore Michailidis, Steven Swanson, Jishen Zhao. Characterizing and Modeling Non-Volatile Memory Systems, *IEEE Micro Top Picks, 2021*

[6] Hanxian Huang, *Zixuan Wang*, Juno Kim, Steven Swanson, Jishen Zhao. Ayudante: A Deep Reinforcement Learning Approach to Assist Persistent Memory Programming, *USENIX ATC, 2021*

[7] *Zixuan Wang*, Xiao Liu, Jian Yang, Theodore Michailidis, Steven Swanson, Jishen Zhao. Characterizing and Modeling Non-Volatile Memory Systems, *MICRO, 2020*

Technical Reports

[PU1] Jamshed Ashurov, *Zixuan Wang*, Jishen Zhao. Characterizing WebAssembly Performance in the Era of Serverless Computing, *ISSTA SRC, 2023*

[PU2] Maximilian Apodaca, Shengye Wang, *Zixuan Wang*, Jishen Zhao. Enabling Fast Recovery for Autonomous Vehicle Systems with Linux Container Checkpointing, *SOSP SRC, 2021*

[PU3] Joseph Izraelevitz, Jian Yang, Lu Zhang, Juno Kim, Xiao Liu, Amirsaman Memaripour,Yun Joon Soh, *Zixuan Wang*, Yi Xu, Subramanya R. Dulloor, Jishen Zhao, Steven Swanson. Basic Performance Measurements of the Intel Optane DC Persistent Memory Module, *ArXiv, 2019*

[PU4] *Zixuan Wang*, Xiao Liu, Jongryool Kim, Hokyoon Lee, Jishen Zhao. Reliable and Flexible Large Scale Memory Network, *NVMW, 2019*

MENTORSHIPS

Luyi Li (PhD Student)	UC San Diego
Micro architecture performance characteristics in CXL-based heterogeneous systems.	*2024 – Present*
Jangseon Park (PhD Student)	UC San Diego
Cycle-level simulators for CXL-based heterogeneous systems.	*2024 – Present*
Jinpyo Kim (PhD Student)	UC San Diego
LLM inference in CXL systems	*2024 – Present*
Yue Pan (PhD Student)	UC San Diego
FPGA-based near-memory-processing accelerators with CXL FPGA.	*2024 – Present*
Zheng Zhang (PhD Student)	Purdue University
Micro architecture security and vulnerability in CXL systems	*2024 – Present*
Kevin Xue (Undergrad Student)	UC Los Angeles
Vector database performance in heterogeneous memory systems	*2024 – Present*
Jamshed Ashurov (Undergrad → Master)	UC San Diego
WebAssembly system interface characterization, published on ISSTA'23 SRC.	*2022 – Present*
Haolan Liu (PhD Student)	UC San Diego
Characterizing autonomous vehicle system, under submission.	*2022 – Present*
Maximilian Apodaca (Undergrad → Tesla)	UC San Diego
Container checkpointing, published on SOSP'23 SRC.	*2020 – 2021*
Hanxian Huang (PhD Student)	UC San Diego
Generative AI for programming, published on USENIX ATC'21; LLM for Verilog.	*2020 – 2021*

SERVICES

Co-Founder and Organizing Committee | Students@Systems
I'm one of the founders and organizers of Students@Systems: www.students-at-systems.org | *Jan. 2022 – Present*
- I have hosted multiple online panel discussions on academic job hunting (2022 June, 2023 Oct) and artifact reproducibility (2023 Apr).
- I helped with organizing more than ten online events, including panels on applying for PhD, and interviews with researchers from underrepresented groups.

Submission Chair | MICRO 2021
I served as a submission chair for the MICRO 2021 conference. | *Mar. 2021 – Jun. 2021*
- I have developed MightyPC, a recommendation system to match submissions with reviewers.
- MightyPC has then been used by: MICRO'21, IEEE MICRO TopPicks'22, HPCA'22, MICRO'22, DSN'23, and more.

TEACHING

Teaching Assistant: Introduction to Computer Architecture | University of California, San Diego
Undergrad level computer arch course. | *Jan. 2022 – Mar. 2022*

Associate Instructor: Hardware-Based Computer System Design | Zhejiang University
Developed and instructed a new course that guides students to develop their own CPU to run their OS. | *Mar. 2018 – Jun. 2018*

Associate Instructor: Operating System Course | Zhejiang University
Developed and instructed a new course that guides students to develop their own OS from scratch. | *Sep. 2017 – Feb. 2018*

INVITED TALKS

NVLeak: Off-Chip Side-Channel Attacks via Non-Volatile Memory Systems
NVMW'23, PRISM Center at Semiconductor Research Corporation

Enabling Efficient Large-Scale Deep Learning Training with Cache Coherent Disaggregated Memory Systems
Intel Co., IBM Research, SK hynix Inc., Micron Inc., Alibaba Cloud USA Inc., Foundational Microarchitecture Research (FoMR), CRISP Center at Semiconductor Research Corporation

Characterizing and Modeling Non-Volatile Memory Systems
TECHCON'20, NVMW'21, Foundational Microarchitecture Research (FoMR), CRISP Center at Semiconductor Research Corporation

Trust but Verify: Co-Locating Hypervisor Services with User Code via AMD SEV-SNP SVSM
Google Cloud'23

Securing User Data with Confidential Virtual Machine
Meta Annual Security Summit'22

Modernizing KVM-Unit-Tests with UEFI and AMD Confidential Virtual Machine
Google Cloud'21, AMD'21

HONORS & AWARDS

MICRO PhD Forum Attendee: Selected as one of the presenters on the PhD Forum, 2023 MICRO

Google Peer Bonus: Awarded one peer bonuse recognizing the impact of my project, 2023 Google

NVMW Memorable Paper Finalist: Awarded to one of the most impactful paper in persistent memory research, 2023 NVMW

Meta Security Highlight: Highlight presentation on Meta's annual security summit, 2022 Meta

Google Peer Bonus: Awarded two peer bonuses recognizing the impact of my project, 2021 Google

IEEE Micro TopPicks: Annually awarded to 12 best papers in computer architecture area, 2021 IEEE

NVMW Memorable Paper Finalist: Awarded to one of the most impactful paper in persistent memory research, 2021 NVMW

Outstanding Dissertation: Outstanding undergraduate dissertation, 2018 Zhejiang University

He-Zhi-Jun Scholarship: Top 10 outstanding students of the computer science department, 2017 Zhejiang University

Outstanding Prize: Challenge Cup, National Undergraduate Academic Science and Technology Works Competition, 2017 China

Rising Star in Academic: Top 1% of computer science students in academic achievements, 2017 Zhejiang University

Academic Scholarship: Top 10% students of the computer science department

Second Prize: Digilent Design Contest, 2017 China

Third Prize: Advanced Computer Architecture Undergraduate Innovation Competition, 2016 CCF China

REFERENCES

Jishen Zhao   Associate Professor, UC San Diego
Steven Swanson   Professor, UC San Diego
Dean Tullsen   Professor, UC San Diego
Yuan Xie   Chair Professor, HKUST