

Zixuan Wang

Ph.D. student
CSE, University of California, San Diego

thenetadmin.net
github.com/TheNetAdmin
zxwang42[at] gmail [dot] com

EDUCATION

- **University of California, San Diego** San Diego, CA, US
Ph.D. candidate in Computer Science and Engineering; GPA: 3.875 Sep. 2018 – Present
- **Zhejiang University** Hangzhou, China
BS in Computer Science; GPA: 3.83; Third year GPA: 3.93 Sep. 2014 – July. 2018

PUBLICATIONS

- **Enabling Efficient Large-Scale Deep Learning Training with Cache Coherent Disaggregated Memory Systems** HPCA, 2022
Zixuan Wang, Joonseop Sim, Euicheol Lim, Jishen Zhao
- **Characterizing and Modeling Non-Volatile Memory Systems** IEEE Micro Top Picks, 2021
Zixuan Wang, Xiao Liu, Jian Yang, Theodore Michailidis, Steven Swanson, Jishen Zhao
- **Ayudante: A Deep Reinforcement Learning Approach to Assist Persistent Memory Programming** USENIX ATC, 2021
Hanxian Huang, Zixuan Wang, Juno Kim, Steven Swanson, Jishen Zhao
- **Enabling Fast Recovery for Autonomous Vehicle Systems with Linux Container Checkpointing** SOSP SRC, 2021
Maximilian Apodaca, Shengye Wang, Zixuan Wang, Jishen Zhao
- **Characterizing and Modeling Non-Volatile Memory Systems** MICRO, 2020
Zixuan Wang, Xiao Liu, Jian Yang, Theodore Michailidis, Steven Swanson, Jishen Zhao
- **Basic Performance Measurements of the Intel Optane DC Persistent Memory Module** ArXiv, 2019
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
- **Reliable and Flexible Large Scale Memory Network** NVMW, 2019
Zixuan Wang, Xiao Liu, Jongryool Kim, Hokyoon Lee, Jishen Zhao
- **A Modulized Portable 3D Bioprinter** Utility model patent, 201720246090.1, 2017
Zixuan Wang, Bin Zhang, Wenzheng Kuang, Huayong Yang

EXPERIENCE

- **Graduate Research Assistant, STABLE Lab & NVSL Lab** UCSD
Computer architecture and system research. Sep. 2018 – Present
- **Software Engineering Intern** Meta
Incoming intern for Edge Computing Security team. June. 2022 – Sept. 2022
- **Software Engineering Intern** GCP, Google
With Confidential VM team, developed KVM testing for AMD SEV features. June. 2021 – Sept. 2021
- **Research Intern** SOLAB, SK Hynix
Evaluated GEN-Z memory prototype, developed GPU direct access to GEN-Z memory. Jun. 2019 – Sep. 2019
- **Undergraduate Research Assistant, Computer Architecture Lab** Zhejiang University
Operating system and architecture research. Sep. 2015 – Jun. 2018

SERVICES

- **Organizing Committee** Students@Systems
I'm one of the founders and organizers of Students@Systems: students-at-systems.org Jan. 2022 – Present
- **Submission Chair** MICRO 2021
I served as a submission chair, part of the MICRO 2021 organizing committee. Mar. 2021 – June. 2021

SKILLS

- **Technologies** : AMD SEV/SEV-ES, KVM, UEFI, QEMU, Linux kernel, TensorFlow, FPGA, MongoDB, InfluxDB
- **Skills** : Performance profiling, x86 bootstrapping, microarchitecture reverse engineering, side/covert channel attacks
- **Languages** : C/C++, x86/MIPS/ARM Assembly, Python, R, Verilog, Rust, Java, JavaScript

PROJECTS

- **KVM-Unit-Tests under UEFI and AMD SEV/SEV-ES** Sept, 2021
 - **Implement UEFI and AMD SEV/SEV-ES support in KVM-Unit-Tests.**
 - 2021 Google internship project.
 - We are the first to implement UEFI and AMD SEV/SEV-ES in the KVM testing framework.
 - It serves as a solid foundation for future development of trusted execution in KVM.
 - I received two Google peer bonuses recognizing my solid works during this internship.
 - 19 patches have been merged in Linux KVM.
 - **NVRAM Security** In progress
 - **Analyze security issues in new NVRAM products.**
 - Reverse engineer a commercial NVRAM product.
 - Analyze the hardware security issues.
 - **Communication Optimization for Distributed ML Training** Oct, 2021
 - **Memory-centric distributed ML training. Accepted by HPCA 2022.**
 - Accelerate distributed ML training with emerging cache-coherent interconnection.
 - GPU direct access to memory device over serial buses.
 - **NVRAM Reverse Engineering** July, 2020
 - **Part of a MICRO 2020 paper and an IEEE Micro TopPicks paper.**
 - Develop LENS, a reverse engineering framework for main memory.
 - LENS is a Linux kernel module written in C and x86 assembly.
 - Reverse engineer the first NVRAM product, Intel Optane Persistent Memory.
 - github.com/TheNetAdmin/LENS-VANS
 - **NVRAM Performance Modeling** July, 2020
 - **Part of a MICRO 2020 paper and an IEEE Micro TopPicks paper.**
 - Develop a cycle-accurate performance model for NVRAM, written in C++ 17.
 - github.com/TheNetAdmin/LENS-VANS
 - **GPU Direct Access to GEN-Z Memory** Sep. 2019
 - **SK hynix internship project.**
 - Characterize the GEN-Z memory prototype and develop GPU direct access to GEN-Z memory.
 - Develop GPU direct access to GEN-Z memory.
 - cuDF library runs 16x faster compared to using indirect access through CPU DRAM.
 - **FPGA Accelerated High-Frequency Trading** Sep. 2018
 - **Collaborative project with fintech companies.**
 - Use FPGA to accelerate network response and decision making.
 - Increase performance by **99.92%** (Respond time 2ms → 800ns).
 - 10-Gigabit Ethernet for communication between FPGA and PC.
 - **QEMU micro:bit** May, 2018
 - **A micro:bit emulator based on QEMU.**
 - **Outstanding graduation thesis** of the computer science department, 2018 Zhejiang University
 - Emulator of an Arduino-like board.
 - Implemented ARM Cortex-M0, virtual memory, interrupts, exceptions and peripherals.
 - Capable of running unmodified ARM-Mbed OS and micro:bit Bootloader.
 - github.com/TheNetAdmin/qemu-microbit
 - **ZJUNIX Operating System** Apr. 2017
 - **Self-designed OS running on self-designed SoC.**
 - Buddy and Slub memory management, multi-process, file system, device drivers, etc.
 - github.com/zjunix
 - **ZJUNIX SoC** Dec. 2016
 - **Self-designed SOC on FPGA**
 - Self-implemented MIPS32 CPU with DDR3, VGA, PS2, SD controller on FPGA.
 - Capable of running ZJUNIX Operating System.
 - github.com/zjunix/zjunix-soc
 - **Portable 3D Bioprinter** Dec. 2016
 - **Printing tissue directly on wounds; The whole device fits in a 28-inch travel case.**
 - FPGA accelerated edge detector for real-time computing.
 - Utility model patent, 201720246090.1
 - The outstanding prize of Challenge Cup, Zhejiang Province, China.

INVITED TALKS

- **Enabling Efficient Large-Scale Deep Learning Training with Cache Coherent Disaggregated Memory Systems**
HPCA'22, SK hynix Inc., Micron Inc., Higgs Co., Alibaba Inc.
- **Characterizing and Modeling Non-Volatile Memory Systems**
MICRO'20, TECHCON'20, NVMW'21

HONORS & AWARDS

- **IEEE Micro TopPicks** : Annually awarded to 12 best papers in computer architecture area, 2021 IEEE
- **Google Peer Bonus** : Awarded two peer bonuses recognizing my solid internship project, 2021 Google
- **Outstanding Undergraduate Dissertation**: Outstanding undergraduate dissertation, 2018 Zhejiang University
- **He-Zhi-Jun Scholarship** : Top 10 outstanding students of computer science department, 2017 Zhejiang University
- **Outstanding Prize** : Challenge Cup, National Undergraduate Curricular Academic Science and Technology Works Competition, 2017 Zhejiang Province China
- **Academic Star** : Top 1% of computer science students in academic achievements, 2017 Zhejiang University
- **2nd-Class Scholarship** : Top 10% of students in the computer science department
- **Second Prize** : Diligent Design Contest, 2017 China
- **Third Prize** : Advanced Computer Architecture Undergraduate Innovation Competition, 2016 CCF China

TEACHING

- **TA of CSE141: Introduction to Computer Architecture** University of California, San Diego
Undergrad level computer arch course. *Jan. 2022 – Mar. 2022*
- **TA of Hardware Based Computer System Comprehensive Practice** Zhejiang University
Guided students to develop their own SoC to support their OS. *Mar. 2018 – Jun. 2018*
- **TA of Operating System Course** Zhejiang University
Guided students to develop their own OS. *Sep. 2017 – Feb. 2018*

OTHER OPEN SOURCE PROJECTS

- **MightyPC** *Jul 2021*
Mighty toolkit for conference Program Chairs.
 - A toolkit for conference program chairs to manage submissions, assign reviewers and organize TPC meetings.
 - Initially developed for the MICRO 2021 conference, then used in other conferences including HPCA 2022.
 - github.com/TheNetAdmin/MightyPC
- **VS Code LinkerScript** *Aug 2018*
The first linker script language extension on VS Code.
 - GNU linker script highlight extension for VS Code, based on TmLanguage.
 - github.com/TheNetAdmin/vscode-linkerscript (95K Installations)
- **ZJU Thesis** *May 2018*
LaTeX template for Zhejiang University graduation thesis.
 - LaTeX template, widely used by students in Zhejiang University.
 - Recommended by School of Undergraduates.
 - github.com/TheNetAdmin/zjuthesis (1,200★ 16K Downloads)
- **Makefile Templates** *July 2017*
Makefile templates for C/C++ projects.
 - github.com/TheNetAdmin/Makefile-Templates (400★)
- **Tiger Language Compiler** *May 2017*
Based on bison, flex and C++ 11/14.
 - Lexical analysis, syntax analysis, abstract syntax tree, intermediate code generator.
 - github.com/TheNetAdmin/tiger-compiler