

# XINGKAI WANG

+86 15268398101 [✉ bittervan@zju.edu.cn](mailto:bittervan@zju.edu.cn) [🌐 Github](#)

## RESEARCH INTEREST

Focused on hardware-software co-design mechanisms for performance and security, system design and implementation, and host-peripheral interaction and collaboration.

## EDUCATION

Zhejiang University, College of Computer Science

Sept. 2023 - Mar. 2026

Master of Cybersecurity, advised by [Prof. Wenbo Shen](#)

(Expected)

Zhejiang University, Chu Kochen Honors College

Sept. 2019 - June 2023

Bachelor of Computer Science

3.94/4 CGPA

## PUBLICATIONS

🔗 **DMAAUTH: A Lightweight Pointer Integrity-based Secure Architecture to Defeat DMA Attacks** *USENIX Sec'24*

*Xingkai Wang, Wenbo Shen, Yujie Bu, Jinmeng Zhou, Yajin Zhou*

- Designed **hardware-software co-design** to perform access authentication for all the DMA transactions, providing fine-grained spatial and strong temporal legitimacy guarantees.
- Used hardware description languages to integrate the solution between the PCIe bus and memory controller. Evaluated the implementation with **real-world hardware** connected to RISC-V SoC on FPGA.
- Conducted detailed **characterization** about DMA transactions revealing access peculiarity.
- Implemented both RISC-V and ARM QEMU emulators to show **cross-architecture** capability.
- Provided a **fully customizable research platform** for the community to study DMA and host-peripheral interactions, contributing to enhanced security in modern computing systems.

🔗 **Ambush From All Sides: Understanding Security Threats in Open-Source Software CI/CD Pipelines** *TDSC'23*

*Ziyue Pan, Wenbo Shen, Xingkai Wang, Yutian Yang, Rui Chang, Yao Liu, Chengwei Llu, Yang Liu, Kui Ren*

- Analyzed potential vulnerabilities, such as information leakage, remote code execution, and pipeline output modification. Developed proof-of-concept attacks and proposed mitigations.
- Conducted a large-scale analysis of over 300,000 GitHub repositories and 8,000 unique scripts created by more than 5000 developers, providing dataset for future CI/CD related researchs.

## TEACHING ASSISTANT EXPERIENCE

🔗 **Operating System**

2022 Fall, 2023 Fall

- Design, implement and write documents for:
  - New process creation via the `fork` syscall.
  - ELF support for user programs and VMA management.
  - Virtual file system and corresponding `read`, `write`, `open`, `close`, `lseek` syscalls.
  - VirtIO-based block device driver and FAT32 file system based on the emulated disk.
- Give experiment lectures on:
  - RISC-V Linux kernel bootstrap, from ZSBL, OpenSBI, U-Boot to kernel.
  - Process creation, scheduling, timer interrupt handling and context switch.
  - Linux file abstraction, virtual file system and actual FAT32 file system implementation.

## TECHNICAL SKILLS

**Programming Languages:** C, Rust, C++, CUDA, Python, Go, Java

**Hardware Description Languages:** Verilog, Chisel

**Emulators:** QEMU, GEM5

## HONOURS AND AWARDS

**Scholarship for top talents in basic disciplines**

2022

First-class

*Chu Kochen Honors College, Zhejiang University*

**Scholarship for top talents in basic disciplines**

2020, 2021

Third-class

*Chu Kochen Honors College, Zhejiang University*

**School Scholarship**

2020, 2021, 2022

Third-class

*Zhejiang University*