Yuheng Shen

Email: syh1308@gmail.com   Website: https://rrooach.github.io

EDUCATION

Tsinghua University, School of Software   Aug 2025 – Present

Postdoctoral Researcher, Shuimu Scholar   Advisor: **Prof. Yu Jiang** (Tenured Associate Professor)

Tsinghua University, School of Software   Sep 2020 – Jul 2025

Ph.D. in Software Engineering   Advisor: **Prof. Yu Jiang** (Tenured Associate Professor)

Hunan Agricultural University, College of Information Science and Technology   Sep 2016 – Jul 2020

B.Eng. in Computer Science and Technology

RESEARCH INTERESTS: SOFTWARE ENGINEERING & SYSTEM SECURITY

My research focuses on the security and reliability assurance of system software. I develop automated techniques, such as program analysis and fuzzing, to detect defects in complex platforms, including general-purpose, embedded, and robot operating systems. Over the past five years, I have published 20 papers in top-tier journals and conferences, including 7 first-author or co-first-author papers and 1 corresponding-author paper. My research has contributed to discovering and fixing 100+ impactful bugs.

SELECTED PUBLICATIONS

First-Author and Corresponding-Author Publications

- **Yuheng Shen**, Jianzhong Liu, Qiming Guo, Yifei Chu, Qiang Zhang, Heyuan Shi, Yu Jiang. "Effective On-Hardware Fuzzing of Embedded Operating Systems." EuroSys'26.
- **Yuheng Shen**, Jianzhong Liu, Yuhan Chen, Yifei Chu, Qiang Zhang, Guoyu Yin, Heyuan Shi, Yu Jiang. "Configuration-Sensitive Linux Kernel Fuzzing." ICSE'26.
- **Yuheng Shen**, Jianzhong Liu, Yuhan Chen, Qiang Zhang, Runzhe Wang, Heyuan Shi, Yu Jiang "Directed Real-time Linux Fuzzing with Configuration Awareness". TECS'25.
- Yuhan Chen, **Yuheng Shen**, Guoyu Yin, Fan Ding, Runzhe Wang, Tao Ma, Xiaohai Shi, Qiang Fu, Ying Fu, Heyuan Shi. "Linux Kernel Fuzzing Guided by Distribution-Specific Runtime Parameter Interfaces." ASE'25.
- **Yuheng Shen**, Jianzhong Liu, Yiru Xu, Hao Sun, Mingzhe Wang, Nan Guan, Heyuan Shi, Yu Jiang. "Enhancing ROS System Fuzzing through Callback Tracing." ISSTA'24.
- **Yuheng Shen**, Shijun Chen, Jianzhong Liu, Yiru Xu, Qiang Zhang, Runzhe Wang, Heyuan Shi, Yu Jiang. "Brief Industry Paper: Directed Kernel Fuzz Testing on Real-time Linux." RTSS'23.
- **Yuheng Shen**, Yiru Xu, Hao Sun, Jianzhong Liu, Zichen Xu, Aiguo Cui, Heyuan Shi, Yu Jiang. "Tardis: Coverage-Guided Embedded Operating System Fuzzing." IEEE TCAD'22.
- **Yuheng Shen**, Hao Sun, Yu Jiang, Heyuan Shi, Yixiao Yang, Wanli Chang. "Rtkaller: State-aware Task Generation for RTOS Fuzzing." EMSOFT'21.
- Heyuan Shi, Shijun Chen, Runzhe Wang, Yuhan Chen, Weibo Zhang, Qiang Zhang, **Yuheng Shen**, Xiaohai Shi, Chao Hu, Yu Jiang. "Industry Practice of Directed Kernel Fuzzing for Open-source Linux Distribution." ASE'24.

Selected Co-Author Publications & Outputs

- Hao Sun, **Yuheng Shen**, Jianzhong Liu, Yiru Xu, Yu Jiang. "KSG: Augmenting Kernel Fuzzing with System Call Specification Generation." USENIX ATC'22.

- Hao Sun, **Yuheng Shen**, Cong Wang, Jianzhong Liu, Yu Jiang, Ting Chen, Aiguo Cui. "Healer: Relation Learning Guided Kernel Fuzzing." SOSP'21.
- Jianzhong Liu, **Yuheng Shen**, Yiru Xu, Hao Sun, Yu Jiang. "Horus: Accelerating Kernel Fuzzing through Efficient Host-VM Memory Access Procedures." ACM TOSEM'23.
- Jianzhong Liu, **Yuheng Shen**, Yiru Xu, Hao Sun, Yu Jiang. "SnapCC: Effective File System Consistency Testing Using Systematic State Exploration." ACM TOSEM'25.
- Jianzhong Liu, **Yuheng Shen**, Yiru Xu, Yu Jiang. "Leveraging Binary Coverage for Effective Generation Guidance in Kernel Fuzzing." CCS'24.
- Qiang Zhang, **Yuheng Shen**, Jianzhong Liu, Yiru Xu, Heyuan Shi, Yu Jiang, Wanli Chang. "ECG: Augmenting Embedded Operating System Fuzzing via LLM-Based Corpus Generation." IEEE TCAD'24.
- Yiru Xu, Hao Sun, Jianzhong Liu, **Yuheng Shen**, Yu Jiang. "SATURN: Host-gadget Synergistic USB Driver Fuzzing." IEEE S&P'24.
- Hao Sun, Yiru Xu, Jianzhong Liu, **Yuheng Shen**, Nan Guan, Yu Jiang. "Finding Correctness Bugs in eBPF Verifier with Structured and Sanitized Program." EuroSys'24.

Patents

- Yuheng Shen; Jianzhong Liu; Yiru Xu; Yu Jiang (2024). "Method, Apparatus, and Device for Optimizing Vulnerability Detection in Robot Operating Systems." Published, Publication No.: 118427834.
- Yuheng Shen; Jianzhong Liu; Yiru Xu; Yu Jiang (2023). "Method, Apparatus, Device, and Medium for Testing Embedded Operating Systems." Published, Publication No.: 118069531.
- Yuheng Shen; Yiru Xu; Jianzhong Liu; Yu Jiang (2023). "Method, Apparatus, Electronic Device, and Storage Medium for Application System Testing." Published, Publication No.: 118093421.

Research Projects

• Concurrency bug diagnosis and testing techniques for OpenHarmony (**Huawei collaboration**)	*2024–2025*
• Android kernel testing methodologies (**Xiaomi collaboration**)	*2024–2025*
• Fuzzing for next-generation cloud-native critical infrastructure (**Alibaba Cloud collaboration**)	*2023–2024*
• Security analysis for intelligent manufacturing software stacks (**NSFC-funded**)	*2022–2024*

Honors & Awards

• China Postdoctoral Science Foundation, General Program	*2025*
• Shuimu Scholar, Tsinghua University	*2025*
• Tsinghua University First-Class Scholarship	*2024*
• Tsinghua University First-Class Scholarship	*2022*

Academic Service

• External Reviewer, International Symposium on Software Reliability Engineering (ISSRE), **CCF-B**	*2021*
• Journal Reviewer, IEEE Transactions on Dependable and Secure Computing (TDSC), **CCF-A**	*2024*
• Journal Reviewer, IEEE Transactions on Dependable and Secure Computing (TDSC), **CCF-A**	*2025*
• Journal Reviewer, IEEE Transactions on Information Forensics and Security (TIFS), **CCF-A**	*2025*
• Journal Reviewer, ACM Transactions on Embedded Computing Systems (TECS), **CCF-B**	*2025*

Teaching Experience

• Fundamentals of Computer Programming, Instructor: Lin Qiao, Tsinghua University (Graduate Course)	*Fall 2024–2025*
• Linux-Based C++ Programming, Instructor: Lin Qiao, Tsinghua University (Graduate Course)	*Summer 2023–2024*

- Fundamentals of Computer Programming, Instructor: Lin Qiao, Tsinghua University (Graduate Course) *Spring 2023–2024*
- Fundamentals of Computer Programming, Instructor: Weitong Huang, Tsinghua University (Graduate Course) *Fall 2023–2024*
- Fundamentals of Computer Programming, Instructor: Lin Qiao, Tsinghua University (Graduate Course) *Fall 2022–2023*