

QINGZHAO ZHANG

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EDUCATION

University of Michigan, Department of Computer Science and Engineering Sep 2019-Apr 2024 (expected)

Ph.D. student, Overall GPA: 3.98/4.0

School of Cyber Security, Shanghai Jiao Tong University (SJTU)

Oct 2015-June 2019

B.E. in Cyber Security, Overall GPA: 89.63/100, Major GPA: 90.62/100, Rank: 5/96

INTERESTS

System security (e.g., autonomous vehicles, cyber-physical systems), software security (e.g., program analysis, formal verification), AI security (e.g., adversarial attacks).

RESEARCH EXPERIENCES

Robustnet Lab | University of Michigan, Ann Arbor

Research Assistant

Sep 2019-Present

Advisor: Z. Morley Mao, Professor, University of Michigan

- Designed and implemented an automatic tool for verifying driving rule compliance in autonomous driving software (e.g., Baidu Apollo and Autoware) via program analysis and formal methods.
- Designed formal methods for detecting and repairing improper configurations in industrial control systems.
- Designed automatic debloating and feature customization for Internet protocol implementations.
- Analyzed adversarial robustness of trajectory prediction algorithms and their safety impact on autonomous vehicles.
- Explored and evaluated data fabrication vulnerabilities in multi-vehicle collaboration applications.
- Designed a flexible program repair solution integrating a large language model and conventional static analysis; explored the usage of large language models in software security domain.

Automated Software Engineering group | Department of Computer Science, UIUC

Visiting student

Jul 2018-Oct 2018

Advisor: Tao Xie, professor and Willett Faculty Scholar, UIUC | Bo Li, assistant professor, UIUC

- Designed blockchain-based decentralized advertising systems using public smart contracts, secure hardware and peer prediction methods.
- Analyzed vulnerabilities of real-world smart contracts (Ethereum). Proposed and designed automatic repairing method on smart contracts.

LOCCS Lab | Lab of Cryptology and Computer Security, SJTU

Research Assistant

May 2017-May 2019

Advisor: Haining Lu & Ning Ding, researcher at Lab of Cryptology and Computer Security, SJTU

- Designed an efficient fuzzer *EthPloit* for automatically generating exploits on smart contracts.
- Designed and implemented ring confidential transaction protocol *RingCT 3.0* and payment protocol *PBT* for blockchain.
- Designed a protocol of privacy-preserving permissioned blockchain system using zero-knowledge proof (zkSNARK) and implemented the demonstration.

WORKING EXPERIENCES

Google | Software Engineer Intern | Mountain View, CA

May 2023-July 2023

- Skills: model checking, theorem proving, operating systems, Rust, Python
- Designed and implemented formal verification solutions to enhance the security properties of an embedded system kernel (based on open-sourced Tock OS). The design involves modular model checking for proving memory safety of Rust unsafe blocks, and SMT-based theorem proving verifying system-level properties.

Google | Software Engineer Intern | Sunnyvale, CA

May 2022-July 2022

- Skills: static analysis, Android, Kotlin
- Designed and implemented static analysis checks based on Android Lint for Google's Android tests, which was deployed to assist Google developers to write high-quality unit tests.

YITU Technology | Software Engineer Intern | Shanghai

May 2019-July 2019

- Skills: Web, SpringBoot, Java, Python
- Implemented Web APIs for face recognition applications in the company's production.
- Implemented testing scripts for pressure testing on the Web APIs.

SELECTED PUBLICATIONS

- On Data Fabrication in Collaborative Vehicular Perception: Attacks and Countermeasures
Qingzhao Zhang, S. Jin, J. Sun, X. Zhang, R. Zhu, A. Chen, Z. Mao
The 33th USENIX Security Symposium (USENIX Security 2024). To appear.
- Robust Real-time Multi-vehicle Collaboration on Asynchronous Sensors
Qingzhao Zhang*, Xumiao Zhang*, Ruiyang Zhu*, Fan Bai, Mohammad Naserian, Z. Morley Mao
The 29th International Conference on Mobile Computing and Networking (MobiCom 2023). To appear.
- Automated Runtime Mitigation for Timing-based Safety Hazards in Industrial Controllers [\[paper\]](#)
Qingzhao Zhang, Xiao Zhu, Mu Zhang, Z. Morley Mao.
The 25th International Symposium on Research in Attacks, Intrusions and Defenses (RAID 2022)
- On Adversarial Robustness of Trajectory Prediction for Autonomous Vehicles [\[paper\]](#) [\[code\]](#)
Qingzhao Zhang, Shengtuo Hu, Jiachen Sun, Qi Alfred Chen, Z. Morley Mao.
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2022)
- A Systematic Framework for Checking Driving Rule Compliance in Autonomous Vehicle Software
[\[paper\]](#) [\[code\]](#)
Qingzhao Zhang, David Ke Hong, Ze Zhang, Qi Alfred Chen, Scott Mahlke, Z. Morley Mao.
Proceedings of the ACM on Measurement and Analysis of Computing Systems (SIGMETRICS 2021)
- EthPloit: From Fuzzing to Efficient Exploit Generation against Smart Contracts [\[paper\]](#) [\[code\]](#)
Qingzhao Zhang*, Yizhuo Wang*, Juanru Li, and Siqi Ma.
IEEE 27th International Conference on Software Analysis, Evolution and Reengineering (SANER 2020)

SKILLS

Programming Languages: familiar with Python, C++; know about Rust, Java, Kotlin, Go.
Applications/Frameworks: Linux, Docker, PyTorch, LLVM, ROS.

TEACHING & SERVICES

Reviewer, IEEE Intelligent Transportation Systems Magazine	2023
Reviewer, IEEE Transactions on Intelligent Vehicles (IV)	2023
Reviewer, 5G/6G Precise Positioning on C-ITS and CAV	2023
Reviewer, Workshop on Re-design Industrial Control Systems with Security (RICSS)	2023
Reviewer, Transactions on Dependable and Secure Computing (TDSC)	2022
Artifact Evaluation Reviewer, Usenix Security	2022
Supervisor of Multidisciplinary Design Program (a research program), University of Michigan	2022

HONORS & AWARDS

Usenix Security, SIGMETRICS, CCS Student Travel Grant	2020-2022
Student Fellowship	2019
Academic Excellence Scholarship of SJTU, B Class (top 5%)	2016, 2017, 2018