

Qingzhao Zhang

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EDUCATION

University of Michigan <i>Ph.D. candidate in Computer Science</i> Overall GPA: 3.98/4.0	<i>Sep 2019 – May 2025 (Expected)</i>
University of Michigan <i>M.S. in Computer Science</i>	<i>Sep 2019 – Dec 2023</i>
Shanghai Jiao Tong University <i>B.E. in Computer Engineering</i> Overall GPA: 89.63/100	<i>Sep 2015 – May 2019</i>

RESEARCH INTERESTS

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

EXPERIENCE

Research Assistant University of Michigan <i>Advisor: Prof. Z. Morley Mao</i>	<i>Sep 2020 - Present</i>
<ul style="list-style-type: none">• Research on software/system for cyber-physical system safety — <i>AVChecker</i>, the first traffic rule compliance checker on autonomous driving software; <i>SmtConf</i>, safety vetting of industrial control system configuration.• Research on adversarial machine learning on cyber-physical systems — Adversarial attack and mitigation on trajectory prediction on autonomous driving; Analyzed data fabrication vulnerability on collaborative perception.• Research on robustness of vehicular network — <i>RAO</i>, collaborative perception with asynchronous sensors.• Research on robust perception algorithms of autonomous driving, and large language model security/efficiency.	
Software Engineer Intern Google	<i>May 2023 - July 2023</i>
<ul style="list-style-type: none">• Designed and implemented formal verification solutions to enhance the security properties of an embedded system kernel (based on open-sourced Tock OS), involving modular model checking and theorem proving.	
Software Engineer Intern Google	<i>May 2022 - July 2022</i>
<ul style="list-style-type: none">• 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.	
Software Engineer Intern YITU Technology	<i>May 2019 - July 2019</i>
<ul style="list-style-type: none">• Implemented Web APIs for face recognition applications in the company's production.	
Visiting Scholar UIUC <i>Advisor: Prof. Tao Xie, Prof. Bo Li</i>	<i>Jul 2018 - Oct 2018</i>
<ul style="list-style-type: none">• Designed blockchain-based decentralized advertising systems using public smart contracts.• Research on vulnerability detection and automatic repair of Ethereum smart contracts.	
Research Assistant Shanghai Jiao Tong University <i>Advisor: Dr. Haining Lu, Dr. Ning Ding</i>	<i>May 2017 - May 2019</i>
<ul style="list-style-type: none">• Research on vulnerability detection of smart contracts and privacy-preserving blockchain systems.	

SELECTED PUBLICATIONS (*: co-primary)

Conference papers

- [ICLR'25] Minkyong Cho, Yulong Cao, Jiachen Sun, **Qingzhao Zhang**, Marco Pavone, Jeong Joon Park, Heng Yang, Z. Morley Mao. “Cocoon: Robust Multi-Modal Perception with Uncertainty-Aware Sensor Fusion”.
- [Security'24] **Qingzhao Zhang**, Shuowei Jin, Ruiyang Zhu, Jiachen Sun, Xumiao Zhang, Qi Alfred Chen, Z. Morley Mao. “On Data Fabrication in Collaborative Vehicular Perception: Attacks and Countermeasures”, *The 33th USENIX Security Symposium*.
- [ICLR'24] Jiachen Sun, Haizhong Zheng, **Qingzhao Zhang**, Atul Prakash, Z. Morley Mao, Chaowei Xiao. “CALICO: Self-Supervised Camera-LiDAR Contrastive Pre-training for BEV Perception”, *The 12th International Conference on Learning Representations*.
- [Mobicom'23] **Qingzhao Zhang***, Xumiao Zhang*, Ruiyang Zhu*, Fan Bai, Mohammad Naserian, Z. Morley Mao. “Robust Real-time Multi-vehicle Collaboration on Asynchronous Sensors”, *The 29th International Conference on Mobile Computing and Networking*.
- [CVPR'22] **Qingzhao Zhang**, Shengtuo Hu, Jiachen Sun, Qi Alfred Chen, Z. Morley Mao. “On Adversarial Robustness of Trajectory Prediction for Autonomous Vehicles”, *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*.
- [RAID'22] **Qingzhao Zhang**, Xiao Zhu, Mu Zhang, Z. Morley Mao. “Automated Runtime Mitigation for Timing-based Safety Hazards in Industrial Controllers”, *The 25th International Symposium on Research in Attacks, Intrusions and Defenses*.
- [AsiaCCS'22] Shengtuo Hu, **Qingzhao Zhang**, André Weimerskirch, Z. Morley Mao. “GateKeeper: A Gateway-based Broadcast Authentication Protocol for the In-vehicle Ethernet”, *Proceedings of the ACM on Asia Conference on Computer and Communications Security*.
- [IV'22] Ze Zhang, Sanjay Sri Vallabh Singapuram, **Qingzhao Zhang**, David Ke Hong, Brandon Nguyen, Z. Morley Mao, Scott Mahlke, Qi Alfred Chen. “AVMaestro: A Centralized Policy Enforcement Framework for Safe Autonomous-driving Environments”, *IEEE Intelligent Vehicles Symposium*.
- [SIGMETRICS'21] **Qingzhao Zhang**, David Ke Hong, Ze Zhang, Qi Alfred Chen, Scott Mahlke, Z. Morley Mao. “A Systematic Framework for Checking Driving Rule Compliance in Autonomous Vehicle Software”, *Proceedings of the ACM on Measurement and Analysis of Computing Systems*.
- [SANER'20] **Qingzhao Zhang***, Yizhuo Wang*, Juanru Li, Siqi Ma. “EthPloit: From Fuzzing to Efficient Exploit Generation against Smart Contracts”, *IEEE 27th International Conference on Software Analysis, Evolution and Reengineering*.
- [FC'20] Yanxue Jia, Shi-Feng Sun, Yuncong Zhang, **Qingzhao Zhang**, Ning Ding, Zhiqiang Liu, Joseph K Liu, Dawu Gu. “Ringct 3.0 for blockchain confidential transaction: Shorter size and stronger security”, *Financial Cryptography and Data Security: 24th International Conference*.

Journal papers

- [TDSC] Yanxue Jia, Shi-Feng Sun, Yuncong Zhang, **Qingzhao Zhang**, Ning Ding, Zhiqiang Liu, Joseph K Liu, Dawu Gu. “PBT: A New Privacy-Preserving Payment Protocol for Blockchain Transactions”, *IEEE Transactions on Dependable and Secure Computing*.

Workshop papers

- [CPSIoTSec'24] **Qingzhao Zhang**, Z. Morley Mao. “Stealthy Data Fabrication in Collaborative Vehicular Perception”, *The 6th Workshop on CPS and IoT Security*.
- [SRML'22] Jiachen Sun, **Qingzhao Zhang**, Bhavya Kailkhura, Zhiding Yu, Chaowei Xiao, Z. Morley Mao. “ModelNet40-C: A Robustness Benchmark for 3D Point Cloud Recognition Under Corruption”, *ICLR 2022 Workshop on Socially Responsible Machine Learning*.

- [FEAST'20] Ze Zhang, **Qingzhao Zhang**, Brandon Nguyen, Sanjay Sri Vallabh Singapuram, Z Morley Mao, Scott Mahlke. “Automatic Feature Isolation in Network Protocol Software Implementations”, *ACM Workshop on Forming an Ecosystem Around Software Transformation*.

Preprints & In submission

- **Qingzhao Zhang**, Ziyang Xiong, Z. Morley Mao. “Safeguard is a Double-edged Sword: Denial-of-service Attack on Large Language Models”.
- Shuowei Jin, Xueshen Liu, **Qingzhao Zhang**, Z. Morley Mao. “Compute Or Load KV Cache? Why Not Both?”.
- Shuowei Jin, Yongji Wu, Haizhong Zheng, **Qingzhao Zhang**, Matthew Lentz, Z Morley Mao, Atul Prakash, Feng Qian, Danyang Zhuo. “Adaptive Skeleton Graph Decoding”.
- Fangzhou Wu, **Qingzhao Zhang**, Ati Priya Bajaj, Tiffany Bao, Ning Zhang, Ruoyu Wang, Chaowei Xiao. “Exploring the Limits of ChatGPT in Software Security Applications”.
- Spencer Hallyburton, **Qingzhao Zhang**, Z. Morley Mao, Miroslav Pajic. “Partial-Information, Longitudinal Cyber Attacks on LiDAR in Autonomous Vehicles”.
- Jiachen Sun, **Qingzhao Zhang**, Bhavya Kailkhura, Zhiding Yu, Chaowei Xiao, Z. Morley Mao. “Benchmarking Robustness of 3d Point Cloud Recognition Against Common Corruptions”.
- Anrin Chakraborti*, **Qingzhao Zhang***, Jingjia Peng, Z. Morley Mao, Michael K. Reiter. “StreetCred: A Privacy-Preserving Reputation System for Connected Autonomous Vehicles”.
- Ruiyang Zhu, **Qingzhao Zhang**, Xumiao Zhang, Fan Bai, Mohammad Naserian, Z. Morley Mao. “RAO++: Realistic Real-time Multi-vehicle Collaboration on Asynchronous Sensors”.

TEACHING AND MENTORSHIP

Supervisor of Undergraduate Research

2022

- Multidisciplinary Design Program (MDP) at University of Michigan. Lead cybersecurity research and supervised a team of four students.

Research Mentorship

2020-2024

- Research on program analysis, autonomous driving, adversarial machine learning.
- Mentees: Charles Ziegenbein Jr., Kevin Zhang, Andrew Wei, Xingyu Wang, Jingjia Peng, Ziyang Xiong.

SERVICES

- Conference Reviewer: ICLR 2025, ICRA 2025, ACM MM 2024, IV 2024, IV 2023
- Journal Reviewer: IEEE Internet of Things Journal, IEEE Intelligent Transportation Systems Magazine, 5G/6G Precise Positioning on C-ITS and CAV, Transactions on Dependable and Secure Computing
- Workshop Reviewer: Re-design Industrial Control Systems with Security (RICSS 2024)
- Artifact Reviewer: Usenix Security 2022
- Pre-review Task Force: NSDI 2025

TALKS

- Enhancing Security, Safety, and Reliability of Cyber-physical Systems

Presentation at Midwest Security Workshop

11/16/2024

- Stealthy Data Fabrication in Collaborative Vehicular Perception

Presentation at 6th CPSIoTSec Workshop, co-located with CCS 2024

10/18/2024

Poster at Midwest Security Workshop

11/16/2024

- On data fabrication in collaborative vehicular perception: attacks and countermeasures

<i>Poster at Athena institute (NSF AI Institute) annual showcase (best poster award)</i>	<i>5/3/2023</i>
<i>Presentation at USENIX Security 2024</i>	<i>8/16/2024</i>
<ul style="list-style-type: none"> • Automated runtime mitigation for timing-based safety hazards in industrial controllers 	
<i>Virtual presentation at RAID 2022</i>	<i>10/27/2022</i>
<ul style="list-style-type: none"> • On adversarial robustness of trajectory prediction for autonomous vehicles 	
<i>Poster at Athena institute (NSF AI Institute) annual showcase</i>	<i>8/18/2022</i>
<i>Poster at CVPR 2022</i>	<i>6/23/2022</i>
<ul style="list-style-type: none"> • Robustness of applications for autonomous vehicles 	
<i>Presentation at Workshop on Future Automotive Research Datasets</i>	<i>11/19/2021</i>
<ul style="list-style-type: none"> • A systematic framework for checking driving rule compliance in autonomous vehicle software 	
<i>Virtual presentation at SIGMETRICS 2021</i>	<i>6/16/2021</i>

HONORS AND AWARDS

<ul style="list-style-type: none"> • Student Travel Grant, Usenix Security 2024, SIGMETRICS 2021, CCS 2021 	<i>2019 – 2024</i>
<ul style="list-style-type: none"> • Rackham Student Fellowship, University of Michigan 	<i>2019</i>
<ul style="list-style-type: none"> • Academic Excellence Scholarship of SJTU (top 5%) 	<i>2016, 2017, 2018</i>