MINGWEI ZHENG

zheng618@purdue.edu LinkedIn Google Scholar Homepage

EDUCATION

Purdue University ***West Lafayette, IN***
Ph.D. candidate in Computer Science, advised by Prof. Xiangyu Zhang *Aug. 2021 - May 2026 (expected)*
- Research Area: Software Engineering and Programming Languages

Huazhong University of Science and Technology ***Wuhan, China***
B.E. in Computer Science and Technology, Outstanding Graduate *Aug. 2016 - Jun. 2020*

RESEARCH INTEREST

My research focuses on building automated techniques that combine program analysis, formal methods, and large language models (LLMs) to improve the correctness, robustness, and trustworthiness of software systems.

PUBLICATIONS

(* indicates equal contribution)

[1] Validating Network Protocol Parsers with Traceable RFC Document Interpretation
Mingwei Zheng, Danning Xie, Qingkai Shi, Chengpeng Wang, Xiangyu Zhang
The ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2025)

[2] Large Language Models for Validating Network Protocol Parsers
Mingwei Zheng, Danning Xie, Xiangyu Zhang
The Eleventh Workshop on Language-Theoretic Security at the IEEE Security & Privacy (LangSec 2025)

[3] ParDiff: Practical Static Differential Analysis of Network Protocol Parsers
Mingwei Zheng, Qingkai Shi, Xuwei Liu, Xiangzhe Xu, Le Yu, Congyu Liu, Guannan Wei, Xiangyu Zhang
The ACM SIGPLAN Conference on Object Oriented Programming, Systems, Languages, and Applications (OOPSLA 2024), ***ACM SIGPLAN Distinguished Paper Award (7 out of 148 accepted papers)***

[4] Lifting Network Protocol Implementation to Precise Format Specification with Security Applications
Qingkai Shi, Junyang Shao, Yapeng Ye, **Mingwei Zheng**, Xiangyu Zhang
The ACM Conference on Computer and Communications Security (CCS 2023)

[5] Why Do Developers Remove Lambda Expressions in Java?
Mingwei Zheng, Jun Yang, Ming Wen, Hengcheng Zhu, Yepang Liu, Hai Jin
The IEEE/ACM International Conference on Automated Software Engineering (ASE 2021)

[6] An LLM Agent for Functional Bug Detection in Network Protocols
Mingwei Zheng, Chengpeng Wang, Xuwei Liu, Jinyao Guo, Shiwei Feng, Xiangyu Zhang
Under Submission, arXiv:2506.00714 (2025)

[7] CORE: Benchmarking LLMs' Code Reasoning Capabilities through Static Analysis Tasks
Danning Xie*, **Mingwei Zheng***, Xuwei Liu, Jiannan Wang, Chengpeng Wang, Lin Tan, Xiangyu Zhang
Under Submission, arXiv:2507.05269 (2025)

[8] SFA-Miner: Mining Path-Sensitive API Usage Patterns via Symbolic Finite Automata
Jiasheng Jiang, **Mingwei Zheng**, Qingkai Shi, Xiangyu Zhang
Under Submission (2025)

[9] IntenTest: Stress Testing for Intent Integrity in API-Calling LLM Agents
Shiwei Feng, Xiangzhe Xu, Xuan Chen, Kaiyuan Zhang, Syed Yusuf Ahmed, Zian Su, **Mingwei Zheng**, Xiangyu

Zhang
Under Submission, arXiv:2506.07524 (2025)

[10] PR^2: Peephole Raw Pointer Rewriting with LLMs for Translating C to Safer Rust
Yifei Gao, Chengpeng Wang, Pengxiang Huang, Xuwei Liu, **Mingwei Zheng**, Xiangyu Zhang
Under Submission, arXiv:2505.04852 (2025)

[11] Relational Neuro-Symbolic Static Program Analysis
Chengpeng Wang, Yifei Gao, Wuqi Zhang, Xuwei Liu, Jinyao Guo, **Mingwei Zheng**, Qingkai Shi, Xiangyu Zhang
Under Submission (2025)

[12] A Foundation Model for Behavior Abstraction in Audit Logs
Zhou Xuan, Xiangzhe Xu, Le Yu, **Mingwei Zheng**, Chanwoo Bae, Zhuo Zhang, Yousra Aafer, Xiangyu Zhang
Under Submission (2025)

WORK EXPERIENCES

Microsoft Research, RiSE Group ***Redmond, WA***
Research intern, mentored by Sarah Fakhoury, Nikhil Swamy *May 2025 - Aug. 2025*
- Project: Detecting Indent Mismatch through Deep Codebase Understanding

Microsoft Research, RiSE Group ***Redmond, WA***
Research intern, mentored by Tahina Ramananandro, Sarah Fakhoury, Nikhil Swamy *May 2024 - Dec. 2024*
- Project: Securing Binary Format Parsing with AI

AWARDS

ACM SIGPLAN Distinguished Paper Award, OOPSLA 2024
Outstanding Graduate, Huazhong University of Science and Technology, 2020

ACADEMIC SERVICE

Program Committee, EXPRESS (ISSTA Workshop), 2025
Journal Reviewer, IEEE Internet of Things Journal, 2023-2024
Journal Reviewer, High-Confidence Computing, 2023-2024
Journal Reviewer, IEEE Transactions on Wireless Communications, 2023
Journal Reviewer, Computer Networks, 2024
Journal Reviewer, PeerJ Computer Science, 2023-2025

INVITED TALKS

ParDiff: Practical Static Differential Analysis of Network Protocol Parsers *UIUC, Nov. 2024*
Static Analysis for Network Protocol Parsers *LangSec Workshop, May 2024*

TEACHING

Teaching Assistant, CS 18000: Problem Solving and Object-Oriented Programming *Purdue University, Spring 2022*
Teaching Assistant, CS 30700: Software Engineering *Purdue University, Fall 2022*