Fuchen Ma

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👤 Personal Statement

I received my Ph.D in Tsinghua University in 2024, advised by professor Jiaguang Sun and professor Yu Jiang. Currently, I'm a postdoctoral researcher (a shuimu scholar) in Tsinghua University. My research focuses on the fuzzing testing of blockchain systems, distributed systems, and protocol implementations.

I've published 20+ papers in USENIX Security, CCS, NDSS, S&P, TSE, TOSEM, and etc. I have detected 50+ vulnerabilities in renowned commercial blockchain systems such as FISCO BCOS, Diem, HyperLedger Fabric and Go-Ethereum, with 14 CVEs assigned by US National Vulnerabilities Database. I achieved the China Computer Federation's(CCF) First Prize for Technical Invention in 2024.

🎓 Work Experience

Tsinghua University, School of Software   2024 – present

Postdoctoral Researcher supervised by Prof. Yu Jiang

🎓 Education

Tsinghua University , School of Software   2019 – 2024

PhD in Software Engineering

Beijing University of Posts and Telecommunications, School of Software   2015 – 2019

B.S. in Software Engineering

📖 Representative Publications

- Finding Metadata Inconsistencies in Distributed File Systems via Cross-Node Operation Modeling
  F Ma, Y Chen, Y Zhou, Z Yan, H Sun, Y Jiang (**Usenix Security 2025**)

- Phoenix: Detect and Locate Resilience Issues in Blockchain via Context-Sensitive Chaos
  F Ma, Y Chen, Y Zhou, J Sun, Z Su, Y Jiang, J Sun, H Li (**CCS 2023**)

- LOKI: State-Aware Fuzzing Framework for the Implementation of Blockchain Consensus Protocols.
  F Ma, Y Chen, M Ren, Y Zhou, Y Jiang, T Chen, H Li, J Sun (**NDSS 2023**)

- Pied-Piper: Revealing the Backdoor Threats in Ethereum ERC Token Contracts.
  F Ma, M Ren, L Ouyang, Y Chen, J Zhu, T Chen, Y Zheng, X Dai, Y Jiang, J Sun (**TOSEM 2022**)

- Pluto: Exposing Vulnerabilities in Inter-Contract Scenarios.
  F Ma, Z Xu, M Ren, Z Yin, Y Chen, L Qiao, B Gu, H Li, Y Jiang, J Sun (**TSE 2021**)

- Themis: Finding Imbalance Failures in Distributed File Systems via a Load Variance Model.
  Y Chen, F Ma(corresponding author), Y Zhou, Z Yan, Q Liao, Y Jiang (**EuroSys 2025**)

- CMFuzz: Parallel Fuzzing of IoT Protocols by Configuration Model Identification and Scheduling
  Q Xu, F Ma(corresponding author), Y Chen, W Chen, F Wu, Y Zhao, H Shi, Y Jiang (**DAC 2025**)

- Chord: Towards a Unified Detection of Blockchain Transaction Parallelism Bugs
  Y Zhou, Z Yan, Y Chen, F Ma(corresponding author), T Chen, Y Jiang (**ICSE 2025**)

- Chronos: Finding Timeout Bugs in Distributed Systems by Deep-Priority Fuzzing with Transient Delay.
  Y Chen, F Ma(co-first author), Y Zhou, M Gu, Q Liao, Y Jiang (**S&P 2024**)

- Tyr: Finding Consensus Failure Bugs in Blockchain System with Behaviour Divergent Model.
  Y Chen, F Ma(co-first author), Y Zhou, Y Jiang, T Chen, J Sun (**S&P 2023**)

- Making Smart Contract Development More Secure and Easier.
  M Ren, F Ma(co-first author), Z Yin, Y Fu, H Li, W Chang, Y Jiang (**ESEC/FSE 2021**)

👥 PROJECTS

1) LOKI: a fuzzing framework for blockchain systems   2021 – Present

- I designed a system named LOKI which performs the fuzz testing on consensus protocols by masquerading itself as a blockchain node.
- LOKI detected 40 vulnerabilities in 6 blockchain systems including Ethereum, Quorum, Hyperledger Fabric, FISCO BCOS, Diem and EOS, 13 of them are assigned with CVE identifiers by NVD.
- Our team is currently collaborating with Aptos development team to integrate LOKI into the Aptos.
- The code is listed at: https://github.com/ConsensusFuzz/LOKI

2) SCStudio: Smart Contract IDE   2020 – 2021

- I developed the front-end part of an smart contract IDE named SCStudio which is an extension of VSCode.
- I implemented a symbolic execution tool named Pluto to detect the bugs in smart contracts in this IDE. Compared with state-of-the-art tools, Pluto supports vulnerabilities in inter-contract scenarios.
- I was elected as the MVP of the FISCO BCOS open-source community due to this project.

🏆 HONORS AND AWARDS

1) China Computer Federation's(CCF) First Prize for Technical Invention	2024
2) Shuimu Scholar in Tsinghua University	2024
3) Outstanding Graduate of Beijing	2024
4) FISCO BCOS MVP of the Year	2021
5) Tencent Rhino-Bird Elite	2020

ℹ OTHER INFORMATION

- TA for the course 'Fundamentals of Computer Programming' in 2019-2021