Fuchen Ma

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Personal Statement

I received my Ph.D. from Tsinghua University in 2024, under the supervision of Professors Jiaguang Sun and Yu Jiang. Currently, I am a postdoctoral researcher at Tsinghua University, supported by the Shuimu Tsinghua Scholar Program. My research focuses on fuzz testing for blockchain systems, distributed systems, and protocol implementations.

I have published over 20 papers in top-tier conferences and journals, including IEEE S&P, USENIX Security, CCS, NDSS, TSE, and TOSEM. My research has led to the discovery of more than 50 vulnerabilities in widely-used commercial blockchain systems such as FISCO BCOS, Diem, HyperLedger Fabric, and Go-Ethereum, with 14 CVEs assigned by the U.S. National Vulnerability Database (NVD).

My work has been recognized with several prestigious honors, including the First Prize for Technical Invention from the China Computer Federation (CCF), the First Prize of the Beijing Science and Technology Progress Award, and the Excellent Doctoral Dissertation Award from the China Institute of Electronics (CIE).

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

- Camveil: Unveiling Security Camera Vulnerabilities through Multi-Protocol Coordinated Fuzzing
  ***F Ma**, Y Yang, Y Chen, Y Zhao, T Chen, Y Jiang* (**S&P 2026**)
- 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**)
- V-Gas: Generating High Gas Consumption Inputs to Avoid Out-of-Gas Vulnerability
  ***F Ma**, M Ren, Y Fu, W Sun, H Song, H Shi, Y Jiang, H Li* (**TOIT 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**)
- Security reinforcement for Ethereum virtual machine
  ***F Ma**, M Ren, Y Fu, M Wang, H Li, H Song, Y Jiang* (**IPM 2021**)
- EVM*: From Offline Detection to Online Reinforcement for Ethereum Virtual Machine
  ***F Ma**, Y Fu, M Ren, M Wang, Y Jiang, K Zhang, H Li, X Shi* (**SANER 2019**)

- CAFault: Enhance Fault Injection Technique in Practical Distributed Systems via Abundant Fault-Dependent Configurations
  *Y Chen, **F Ma**(corresponding author), Y Zhou, Z Yan, Y Jiang* (**ATC 2025**)
- 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**)

Projects

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

- Designed a system named **LOKI** that performs fuzz testing on consensus protocols by masquerading as a blockchain node.
- LOKI discovered over 50 vulnerabilities in major blockchain systems, including Ethereum, Hyperledger Fabric, FISCO BCOS, Diem, and EOS; 14 of them have been assigned CVE identifiers by the U.S. National Vulnerability Database (NVD).
- Currently collaborating with **Aptos Lab** and **Chainmaker** to integrate LOKI into their blockchain infrastructures.

2) SCStudio: Smart Contract IDE 2020 – 2021

- Developed the front-end of **SCStudio**, a smart contract IDE built as a VSCode extension.
- Implemented Pluto, a symbolic execution tool integrated into the IDE to detect smart contract bugs; Pluto uniquely supports inter-contract vulnerability detection, outperforming state-of-the-art tools.
- Recognized as the **MVP** of the FISCO BCOS open-source community for contributions to this project.

Honors and Awards

1) Grant from Aptos Foundation	2025
2) Excellent Doctoral Dissertation by the China Institute of Electronics (CIE)	2024
3) First Prize of the Beijing Science and Technology Progress Award (ranking 4/15)	2024
4) China Computer Federation's (CCF) First Prize for Technical Invention (ranking 3/6)	2024
5) Outstanding Graduate of Beijing	2024
6) FISCO BCOS MVP of the Year	2021
7) Tencent Rhino-Bird Elite	2020

Other Information

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