Wanning Ding

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Education

Syracuse University (Syracuse, USA)   08/2022-Now
Ph.D. of Computer and Information Science and Engineering (CISE)
Syracuse University (Syracuse, USA)   08/2020-06/2022
Master of Computer Science
East China Normal University (Shanghai, China)   09/2015-07/2019
Bachelor of Engineering in Computer Science and Technology

Publications

- **W Ding**, Y Tang, Y Wang, "Asymmetric Mempool DoS Security: Formal Definitions and Provable Secure Designs", IEEE S&P 2025
- Y Wang, Y Tang, K Li, **W Ding**, Z Yang, "Understanding Ethereum Mempool Security under Asymmetric {DoS} by Symbolized Stateful Fuzzing", USENIX Security 2024
- J Chen, Y Wang, Y Zhou, **W Ding**, Y Tang, XF Wang, K Li, "Understanding the Security Risks of Decentralized Exchanges by Uncovering Unfair Trades in the Wild", IEEE Euro S&P 2023

Awards

Ethereum protocol fellowship - $8k
Master Program Scholarship - $20k
Scholarship for outstanding students in 2018-2019 academic year - 1k
Scholarship for outstanding students in 2017-2018 academic year - 1k

Project Experience

SAFERAD Framework for Asymmetric Mempool DoS Attacks   06/2023- Now
- Developed the SAFERAD framework to define and prevent asymmetric mempool DoS attacks, particularly focusing on eviction- and locking-based attacks.
- Proposed formal definitions for eviction- and locking-safety and rule-based mitigation schemes to enhance mempool security.
- Evaluated SAFERAD's impact on blockchain performance, demonstrating negligible latency and insignificant changes to validator revenue, thereby providing effective security without compromising efficiency.

MPFUZZ: Enhancing Ethereum Mempool Security   01/2023 - 12/2023
- Developed MPFUZZ, a fuzzer for Ethereum's mempool to identify DoS vulnerabilities, directly improving DeFi security, including for DApps like Uniswap.
- Achieved 100× speedup in detecting exploits, uncovering vulnerabilities like mempool eviction that could impact DEX operations.
- Proposed mitigation strategies to safeguard transaction processing, contributing to a more secure and reliable protocol environment.

Understanding DEX Security Risks   10/2022 - 09/2023
- Conducted a large-scale empirical study on unfair trades in DEXs, including Uniswap, uncovering over 671,400 instances of unfair trading practices.
- Identified previously unknown causes of extractable value and adaptive attack strategies affecting DEXs, leading to over 3.88 million USD in token thefts.
- Proposed countermeasures to enhance DEX protocols' security, contributing to a more robust and equitable trading environment.

Deter Attack Mitigation (Already merged into Geth)   09/2022- 01/2024
- Contributed to the implementation of two new rules in the Ethereum transaction pool:

- ○ Preventing future transactions from evicting pending transactions.
  - ○ Ensuring transactions do not overspend the sender's funds.
- Successfully merged into Geth after thorough benchmarking and testing. [GitHub Link](#)

Instructional DEX Smart Contract Design (BADD Labs)   11/2021-05/2023
- Designed hands-on labs covering blockchain fundamentals, smart contract programming, DeFi concepts (DEX, lending), and financial attacks (arbitrage, MEV, frontrunning).
- Labs included transaction exploration, smart contract programming, AMM DEX ("Build-your-own-Uniswap"), order book DEX, and reentrancy attacks.
- Featured in blockchain education initiatives such as ASEE 2022 and NSF blockchain-education workshop 2022. [GitHub Link](#)

Skills

Blockchain Security, Smart Contracts, Solidity, Python, Mechanism Design, Ethereum, Decentralized Exchanges (DEX), Python, Go, C, C++, Java, JavaScript, Haskell, SQL, Linux, Slither, BigQuery, Etherscan

Extracurricular Activities

TA for CIS 657 Design of Operating System(Syracuse, NY)   08/2024-Now
TA for CSE 486 Design of Operating System(Syracuse, NY)   01/2022-06/2022
TA for CIS 467 Intro to AI in Syracuse University(Syracuse, NY)   08/2021-12/2021
Shanghai college students innovation and entrepreneurship project (Shanghai, China) 04/2017-06/2019
Team Leader, School of Computer Science and Technology