

# Lu Liu

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## EDUCATION

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**Hong Kong University of Science and Technology | Hong Kong** **Sep 2019 – Present**

Ph.D. in Computer Science and Engineering

- Supervisor: Shing-Chi Cheung, Yepang Liu (co-supervised, SUSTech)
- Research Area: AI4SE, AI for smart contracts, quality assurance of blockchain-related applications, smart contract vulnerability detection.

**Wuhan University | Wuhan** **Sep 2015 – Jul 2019**

B.E. in Computer Science

- GPA: 3.8/4.0, Ranking: 3/246

## PUBLICATIONS

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- **[Submitted to FSE 2026]** Towards Detecting Price Manipulation Vulnerabilities in DeFi Ecosystems  
**Lu Liu**, Wuqi Zhang, Lili Wei, Hao Guan, Yongqiang Tian, Yepang Liu, Shing-Chi Cheung
- **[EMSE 2024]** On State Reverting in Solidity Smart Contracts: Developer Practices, Fault Categorization, and Tool Evaluation  
**Lu Liu**, Lili Wei, Wuqi Zhang, Shuqing Li, Yifan Zhou, Yepang Liu, Shing-Chi Cheung, Michael R. Lyu
- **[S&P 2023]** Nyx: Detecting Exploitable Front-Running Vulnerabilities in Smart Contracts  
Wuqi Zhang, Zhuo Zhang, Qingkai Shi, **Lu Liu**, Lili Wei, Yepang Liu, Xiangyu Zhang, Shing-Chi Cheung
- **[TSE 2023]** Combatting Front-Running in Smart Contracts: Attack Mining, Benchmark Construction and Vulnerability Detector Evaluation Journal  
Wuqi Zhang, Lili Wei, Shing-Chi Cheung, Yepang Liu, Shuqing Li, **Lu Liu**, Michael R. Lyu
- **[ASE 2021]** Characterizing Transaction-Reverting Statements in Ethereum Smart Contracts Conference  
**Lu Liu**, Lili Wei, Wuqi Zhang, Ming Wen, Yepang Liu, Shing-Chi Cheung

## RESEARCH EXPERIENCE

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**Detecting Price Manipulation Vulnerabilities in DeFi Smart Contracts** **Oct 2024 – Present**

- Developed PMDetector, a hybrid framework that integrates static taint analysis with Large Language Model (LLM) reasoning for detecting price manipulation vulnerabilities in DeFi smart contracts. Introduced a formal attack model to guide the detection pipeline, enabling precise analysis of complex economic logic and defense mechanisms within smart contracts.
- A research paper has been submitted to FSE 2026 and is currently under review.

**CBDC Unified Ledge White Paper Project**

**Nov 2023 – May 2024**

- Assisted with writing the white paper for the Hong Kong Monetary Authority's Central Bank Digital Currency (CBDC) Unified Ledger. Participated in project discussions and reviewed technical implementations to provide suggestions for the CBDC system development.

**Attack Mining and Detecting Front-Running Vulnerabilities in Smart Contracts** **Feb 2021 – Oct 2023**

- Published 2 co-authored papers in top-tier (CORE A\*) venues.
- Proposed an automated vulnerability localization approach to localize code snippets in smart contracts that enable front-running attacks and created a real-world attacks benchmark. Formalized the definition of exploitable front-running vulnerabilities and proposed a static analyzer for detecting them.

## **Characterizing and Evaluating Transaction-reverting Faults in Smart Contracts**    Sep 2019 – Nov 2024

- Published 2 first-author papers in top-tier (CORE A\*) venues.
- Examined the prevalence and security impacts of transaction-reverting statements and transaction-reverting vulnerabilities in Ethereum smart contracts. Evaluated state-of-the-art smart contract security testing tools to identify their limitations.

## **SERVICE**

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### **Conference and Journal Reviewer**

- ACM Transactions on Software Engineering and Methodology (TOSEM) 2024
- International Conference on Software Engineering (ICSE) ARTIFACT 2024
- ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA) ARTIFACT 2025

## **TEACHING EXPERIENCE**

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- HKUST COMP 3111 Software Engineering. Teaching Assistant. Spring 2023
- HKUST COMP 4431 Multimedia Computing. Teaching Assistant. Fall 2022

## **SELECTED AWARDS**

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- Overseas Research Award 2023
- Hong Kong Postgraduate Scholarship 2019-2023
- Outstanding Graduates of Wuhan University 2019
- China National Scholarship 2018
- First Prize Scholarship 2016-2018