Haoxin **Tu**

PhD in Computer Science and Software Engineering

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"Stay hungry. Stay foolish."

Research Interests

Software systems written by humans tend to be unreliable and insecure. My research interests focus on developing practical techniques and tools that can help improve the reliability and security of software systems (mainly system software such as compilers and Linux kernels). I am quite interested in developing advanced automated approaches, based on program analysis techniques such as fuzzing and symbolic execution, to resolve labor-intensive engineering tasks, e.g., automatic bug finding and exploit generation.

Education

Singapore Management University (No.3 in Software Engineering on CSRanking) — *Singapore*

P.h.D in Computer Science (Supervisor: Lingxiao Jiang & Xuhua Ding) — *Aug. 2020 - Dec. 2024 (Expected)*

- Thesis topic: "Boosting Symbolic Execution for Software Reliability and Security". (Proposed)

Dalian University of Technology ("985", "211") — *Dalian, China*

P.h.D in Software Engineering (Supervisor: He Jiang) — *Sep. 2019 - Dec. 2023 (Expected)*

- Thesis topic: "Research on Test Program Construction Approaches for Compiler Testing and Debugging".

Dalian University of Technology ("985", "211") — *Dalian, China*

Master in Software Engineering — *Sep. 2017 - Jul. 2019*

Northeast Forestry University ("211") — *Harbin, China*

Bachelor in Electronic Information Engineering — *Sep. 2013 - Jul. 2017*

Skills

General	C/C++, Python, Shell,
DevOps	LibFuzzer, etc
SE and Security	S2E
Language	Chinese (Fluent), English

Publications

Conference Papers

- [CCS'23] Pansilu Pitigalaarachchi, Xuhua Ding, Haiqing Qiu, **Haoxin Tu**, Jiaqi Hong, and Lingxiao Jiang, ***"KRover: A Symbolic Execution Engine for Dynamic Kernel Analysis"***, in Conference on Computer and Communications Security, Research Track. [PDF] [Code(☆1)]
  - (One-line Abstract) xx
- [ICSE'23] **Haoxin Tu**, ***"Boosting Symbolic Execution for Heap-based Vulnerability Detection and Exploit Generation"***, in International Conference on Software Engineering, Doctoral Symposium Track. [PDF]
  - (One-line Abstract) xx
- [FSE'22] **Haoxin Tu**, Lingxiao Jiang, Xuhua Ding, and He Jiang, ***"FastKLEE: Faster Symbolic Execution via Reducing Redundant Bound Checking of Type-Safe Pointers"***, in Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering, Tool Demonstrations Track. [PDF] [Code(☆16)]
  - (One-line Abstract) xx
- [ISSRE'22] **Haoxin Tu**, He Jiang, Xiaochen Li, Zhilei Ren, Zhide Zhou, and Lingxiao Jiang,***"RemGen: Remanufacturing A Random Program Generator for Compiler Testing"***, in International Symposium on Software Reliability Engineering, Research Track. [PDF] [Code(☆ 5)]
  - (One-line Abstract) xx

Journal Papers

- [TR'22] **Haoxin Tu**, He Jiang, Zhide Zhou, Yixuan Tang, Zhilei Ren, Lei Qiao, and Lingxiao Jiang, ***"Detecting C++ Compiler Front-end Bugs via Grammar Mutation and Differential Testing"***, in IEEE Transactions on Reliability. [PDF]

- (One-line Abstract) xx

Under Review Papers

- [TSE] **Haoxin Tu**, Lingxiao Jiang, Jiaqi Hong, Xuhua Ding, and He Jiang, ***"Concretely Mapped Symbolic Memory Locations for Memory Error Detection"***, Submitted to IEEE Transactions on Software Engineering (Major Revision).
  - (One-line Abstract) xx
- [TSE] **Haoxin Tu**, Zhide Zhou, He Jiang, Imam Nur Bani Yusuf, Yuxian Li, and Lingxiao Jiang, ***"LLM4CBI: Taming LLMs to Generate Effective Test Programs for Compiler Bug Isolation"***, Submitted to IEEE Transactions on Software Engineering (Under Review). [Pre-print]
  - (One-line Abstract) xx
- [Conference] **Haoxin Tu**, and others, ***"Beyond a Joke: Dead Code Elimination Can Delete Live Code"***, Submitted to a Top-tier Conference in Software Engineering (Under Review).
  - (One-line Abstract) xx

Practical Impacts

The list of bugs and vulnerabilities found through my research (counted by Sep. 30, 2023).

- GCC Bug Reports: 121 (in total) / 76 (confirmed or fixed) Links: in GCC Bugzilla
- LLVM Bug Reports: 137 (in total) / 88 (confirmed or fixed) Links: [in GitHub issues from llvm-project]
- GNU Coreutils Bug Reports: 1 (in total) / 1 (fixed) Links: [in GNU Coreutils Bugzilla]
- Angr Bug Reports: 1 (in total) / 1 (fixed) Links: [in GitHub issues from Angr]
- S2E Bug Reports: 1 (in total) / 1 (fixed) Links: [in GitHub issues from S2E]
- To be continued ...

Work Experience

Huawei Technologies Co. Corp. *Beijing, China*

Software Engineer (Summer Intern) *Jun. 2018 - Sep. 2018*

- Android JNI developing.

Teaching Experience

2022 **Teaching Assistant for "CS443: System Security"**, Singapore Management University *Singapore*

2019 **Teaching Assistant for "Operating Systems"**, Dalian University of Technology *Dalian, China*

Honors & Awards

2022 **Excellent Postgraduate Students**, Dalian University of Technology (Top 1%) *Dalian, China*

2022 **National Scholarship for Postgraduate Students**, Dalian University of Technology (Top 1%) *Dalian, China*

2020 **PhD Full Scholarship**, from Singapore Management University *Singapre*

2019 **Third Prize**, National Software and Application Academic Conference (Proposition-based Competition) *Shanghai, China*

2019 **Third Prize**, National Post-Graduate Mathematical Contest in Modeling (Top 20%) *Dalian, China*

2017 **Outstanding Graduates**, Northeast Forestry University (Top 5%) *Harbin, China*

Academic Service

2023 **Student Volunteer**, for International Conference on Software Engineering (ICSE 2023) *Melbourne*

2022 **Reviewer**, for IEEE Transactions on Reliability

2022 **External Reviewer**, for ASE 2019, SANER 2022, QRS 2022/2023

Hobbies

I am an avid tennis enthusiast.