CHENYUAN YANG

cy54@illinois.edu | yangchenyuan.github.io

RESEARCH INTEREST

My research covers software systems and machine learning, with the goal of enhancing the reliability of large-scale systems. To this end, I leverage and optimize LLMs with testing, reasoning, and verification techniques. To date, my research has detected **630+ critical bugs** for *ML systems, C/C++ compilers, and operating systems*, including **25 CVEs**.

- **System Reliability for ML.** Synthesizing diverse **[7,8,11]** & high-quality **[6]** tensor programs across inference **[11]**, training **[9]**, and optimization **[6]** components in ML systems, along with test oracles **[9,10]**.
- **ML for System Reliability.**
  - **LLM for Testing.** Designing LLM-driven workflows to synthesize *tests* **[6,7,8]**, *test generators* **[3]**, and *static analyzers* **[1]** for large-scale software systems. Evaluating LLMs' code reasoning via test generation **[5]**.
  - **LLM for Verification.** Training **[2,4]** and evaluating **[2]** LLMs to generate verification proofs for code.

EDUCATION

University of Illinois at Urbana-Champaign — Aug. 2022 - Present
Ph.D. Student in Computer Science, advised by Prof. Lingming Zhang — *IL, US*

Nanjing University — Sept. 2018 - July 2022
B.Sc. in Computer Science and Technology, graduated with honors — *Nanjing, China*

- Enrolled in *Elite Class*, GPA 91.2/100, rank 1/24

PUBLICATION

[1] **KNighter: Transforming Static Analysis with LLM-Synthesized Checkers**
Preprint 2025.
Chenyuan Yang, Zijie Zhao, Zichen Xie, Haoyu Li, Lingming Zhang. [paper] [code]

[2] **AutoVerus: Automated Proof Generation for Rust Code**
Preprint 2024.
Chenyuan Yang, Xuheng Li, Md Rakib Hossain Misu, Jianan Yao, Weidong Cui, Yeyun Gong, Chris Hawblitzel, Shuvendu Lahiri, Jacob R. Lorch, Shuai Lu, Fan Yang, Ziqiao Zhou, Shan Lu. [paper] [website]

[3] **KernelGPT: Enhanced Kernel Fuzzing via Large Language Models**
ASPLOS 2025. *30th ACM International Conference on Architectural Support for Programming Languages and Operating Systems*
Chenyuan Yang, Zijie Zhao, Lingming Zhang. [paper] [code]

[4] **Automated Proof Generation for Rust Code via Self-Evolution**
ICLR 2025. *The Thirteenth International Conference on Learning Representations*
Tianyu Chen, Shuai Lu, Shan Lu, Yeyun Gong, **Chenyuan Yang**, Xuheng Li, Md Rakib Hossain Misu, Hao Yu, Nan Duan, Peng Cheng, Fan Yang, Shuvendu K Lahiri, Tao Xie, Lidong Zhou. [paper]

[5] **TestEval: Benchmarking Large Language Models for Test Case Generation**
NAACL Findings 2025. *The 2025 Annual Conference of the Nations of the Americas Chapter of the ACL*
Wenhan Wang*, **Chenyuan Yang***, Zhijie Wang*, Yuheng Huang, Zhaoyang Chu, Da Song, Lingming Zhang, An Ran Chen, Lei Ma. [paper] [code]

[6] **WhiteFox: White-box Compiler Fuzzing Empowered by Large Language Models**
OOPSLA 2024. *Object-Oriented Programming, Systems, Languages, and Applications 2024 (in PACM PL)*
Chenyuan Yang, Yinlin Deng, Runyu Lu, Jiayi Yao, Jiawei Liu, Reyhaneh Jabbarvand, Lingming Zhang. [paper] [code]

[7] **Large Language Models are Edge-Case Generators: Crafting Unusual Programs for Fuzzing Deep Learning Libraries**
ICSE 2024. *46th IEEE/ACM International Conference on Software Engineering*
Yinlin Deng, Chunqiu Steven Xia, **Chenyuan Yang**, Shizhuo Dylan Zhang, Shujing Yang, Lingming Zhang. [paper]

[8] **Large Language Models are Zero-Shot Fuzzers: Fuzzing Deep-Learning Libraries via Large Language Models**
ISSTA 2023. *32nd ACM SIGSOFT International Symposium on Software Testing and Analysis*
Yinlin Deng, Chunqiu Steven Xia, Haoran Peng, **Chenyuan Yang**, Lingming Zhang. [paper] [code]

[9] **Fuzzing Automatic Differentiation in Deep-Learning Libraries**
ICSE 2023. *45th IEEE/ACM International Conference on Software Engineering*
Chenyuan Yang, Yinlin Deng, Jiayi Yao, Yuxing Tu, Hanchi Li, Lingming Zhang. [paper] [code]

[10] **Fuzzing Deep-Learning Libraries via Automated Relational API Inference**
ESEC/FSE 2022. *30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering*
Yinlin Deng*, **Chenyuan Yang***, Anjiang Wei, Lingming Zhang. [paper] [code]

[11] **Free Lunch for Testing: Fuzzing Deep-Learning Libraries from Open Source**
ICSE 2022. *44th IEEE/ACM International Conference on Software Engineering*
Anjiang Wei, Yinlin Deng, **Chenyuan Yang**, Lingming Zhang. [paper] [code]

** denotes joint first authors*

Professional Experience

Research Intern at Systems Research Group, Microsoft Research May 2024 - August 2024
Hosted by Shan Lu
Topic: AutoVerus – Automated Proof Generation for Rust Code

SWE Intern at Project Starline, Google May 2023 - August 2023
Hosted by Srinivas Kaza and Lukas Murmann
Topic: JAXGL – Integrate High Performance Graphics Primitives into ML

Research Assistant at PL/FM/SE Group, UIUC May 2021 - Present
Advised by Prof. Lingming Zhang
Topic: Intersection of machine learning and software systems

Research Assistant at SPAR Group, Nanjing University Aug. 2020 - Apr. 2021
Advised by Prof. Yanyan Jiang
Topic: Testing

Awards

Travel Grant for ASPLOS 2025 Apr. 2025
OpenAI Researcher Access Program ($5,000) May 2024
SIGSOFT CAPS Travel Grant for ESEC/FSE 2022 Sept. 2022
China National Scholarship | *Top 0.2%* Oct. 2020
Special Scholarship for Undergraduates in Basic Science, Nanjing University | *1/24* Nov. 2021
Elite Program First-class Scholarship, Nanjing University Oct. 2019

Talks

Next-Generation Fuzzing: Leveraging LLMs for Deep Learning and Compiler Systems Nov 2024
- CS 6158 Fall 2024, Cornell University

Fuzzing Automatic Differentiation in Deep-Learning Libraries May 2023
- Advanced Software Technologies Lab, ETH Zurich

Fuzzing Deep-Learning Libraries via Automated Relational API Inference Sept. 2022
- Software Engineering Retreat, University of Illinois at Urbana-Champaign

Free Lunch for Testing: Fuzzing Deep-Learning Libraries from Open Source May 2022
- iSE symposium, Nanjing University

Service

- Program Committee/Reviewer: TOSEM, ICLR'25
- Artifact Evaluation Committee: PLDI'24, ISSTA'24

Teaching Experience

Teaching Assistant at Nanjing University Sept. 2021 - Jul. 2022
Problem Solving, a core course for the students in the elite program

Skill Stack

- **Common:** Python, C, TypeScript, docker, Vim, Git, SQL, LaTeX, libFuzzer
- **Machine Learning:** PyTorch, TensorFlow, JAX