Chenyuan Yang

cy54@illinois.edu | yangchenyuan.github.io

RESEARCH INTEREST

My research focuses on enhancing the *reliability* of software systems, such as machine learning models, compilers, and operating system kernels. To achieve this, I employ a combination of *testing*, *analysis*, and *verification* techniques, with a particular emphasis on leveraging the power of *large language models* (LLMs).

To date, my work has uncovered over **400 previously unknown bugs** in widely-used machine learning systems, including PyTorch, TensorFlow, JAX, as well as **16 CVEs** for the Linux kernel and over **130 bugs** for Clang/GCC.

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 - Jul. 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] **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]

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

[3] **Automated Proof Generation for Rust Code via Self-Evolution**
The Thirteenth International Conference on Learning Representations (ICLR) 2025.
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]

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

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

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

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

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

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

[10] **Free Lunch for Testing: Fuzzing Deep-Learning Libraries from Open Source**
44th IEEE/ACM International Conference on Software Engineering (ICSE) 2022.
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: Fuzzing DL libraries

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

Awards

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