

YINLIN DENG

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RESEARCH INTERESTS

My research interest lies broadly in the intersection of software engineering and machine learning. I am interested in developing intelligent analysis, testing, verification, and synthesis techniques to improve the reliability, robustness, and performance of software systems, especially for machine learning systems.

Currently, I focus on testing machine learning libraries, which serve as the foundation for building, training, and deploying deep learning models. My previous work has helped to find **353** real-world bugs in popular open-source deep learning libraries including [PyTorch](#), [TensorFlow](#), [JAX](#), and [OneFlow](#).

EDUCATION

University of Illinois Urbana-Champaign (UIUC)

Ph.D. student in Computer Science

Advisor: [Prof. Lingming Zhang](#)

Illinois, USA

Aug. 2021–present

Peking University

B.Sc. in Computer Science, Turing Class

Beijing, China

Sept. 2017–June 2021

PUBLICATIONS

Top Leaderboard Ranking = Top Coding Proficiency, Always? EvoEval: Evolving Coding Benchmarks via LLM [\[paper\]](#)[\[webpage\]](#)[\[code\]](#)

Chunqiu Steven Xia*, **Yinlin Deng***, Lingming Zhang.

Preprint, March 2024.

NExT: Teaching Large Language Models to Reason about Code Execution [\[paper\]](#)

Ansong Ni, Miltiadis Allamanis, Arman Cohan, **Yinlin Deng**, Kensen Shi, Charles Sutton, Pengcheng Yin.

Preprint, April 2024.

ExeDec: Execution Decomposition for Compositional Generalization in Neural Program Synthesis [\[paper\]](#)

Kensen Shi, Joey Hong, **Yinlin Deng**, Pengcheng Yin, Manzil Zaheer, Charles Sutton.

The Twelfth International Conference on Learning Representations (ICLR 2024 Oral).

White-box Compiler Fuzzing Empowered by Large Language Models [\[paper\]](#)

Chenyuan Yang, **Yinlin Deng**, Runyu Lu, Jiayi Yao, Jiawei Liu, Reyhaneh Jabbarvand, Lingming Zhang.

Preprint, Oct 2023.

Large Language Models are Edge-Case Generators: Crafting Unusual Programs for Fuzzing Deep Learning Libraries [\[paper\]](#)

Yinlin Deng, Chunqiu Steven Xia, Chenyuan Yang, Shizhuo Dylan Zhang, Shujing Yang, Lingming Zhang.

46th IEEE/ACM International Conference on Software Engineering (ICSE 2024).

Large Language Models are Zero-Shot Fuzzers: Fuzzing Deep-Learning Libraries via Large Language Models [\[paper\]](#)[\[code\]](#)

Yinlin Deng, Chunqiu Steven Xia, Haoran Peng, Chenyuan Yang, Lingming Zhang.

32nd ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA 2023).

Fuzzing Automatic Differentiation in Deep-Learning Libraries [\[paper\]](#)[\[code\]](#)

Chenyuan Yang, **Yinlin Deng**, Jiayi Yao, Yuxing Tu, Hanchi Li, Lingming Zhang.

45th IEEE/ACM International Conference on Software Engineering (ICSE 2023).

Fuzzing Deep-Learning Libraries via Automated Relational API Inference [\[paper\]](#) [\[code\]](#)

Yinlin Deng*, Chenyuan Yang*, Anjiang Wei, Lingming Zhang.

30th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2022).

Free Lunch for Testing: Fuzzing Deep-Learning Libraries from Open Source [\[paper\]](#)[\[code\]](#)

Anjiang Wei, **Yinlin Deng**, Chenyuan Yang, and Lingming Zhang.

44th IEEE/ACM International Conference on Software Engineering (ICSE 2022).

Coverage-Guided Tensor Compiler Fuzzing with Joint IR-Pass Mutation [\[paper\]](#)[\[code\]](#)[\[artifact\]](#)

Jiawei Liu, Yuxiang Wei, Sen Yang, **Yinlin Deng**, and Lingming Zhang.

Proceedings of the ACM on Programming Languages 6 (OOPSLA1 2022).

** denotes equal contribution*

PROFESSIONAL EXPERIENCE

Student Researcher at Google DeepMind

May 2023–Dec. 2023

Topic: Program synthesis with large language models

Manager: Charles Sutton, Mentor: Kensen Shi

Research Intern at Fujitsu Research of America

May 2022–Aug. 2022

Topic: Feature engineering for Automated Machine Learning (AutoML)

Manager: Mukul Prasad, Mentor: Mehdi Bahrami

Research Intern at Microsoft Research, Asia

June 2020–Jan. 2021

Topic: Table range detection for [Spreadsheet Intelligence](#)

Manager: Shi Han, Mentor: Xiao Lv

STEP Intern at Google

July 2019–Sept. 2019

Topic: Static deep learning model compression for [Federated Learning](#)

HONORS & AWARDS

- Two Sigma PhD Fellowship 2024
- SIGSOFT CAPS Travel Grant for ICSE 2024
- NSF travel award for ICSE 2023
- SIGSOFT CAPS Travel Grant for ESEC/FSE 2022
- Gold Medal in the ICPC Asia-East Continent Final Contest 2019
- Gold Medal in the ICPC Asia Regional Contest Nanjing Site 2019
- Most innovative project in Google AI/ML Winter Camp Beijing Site 2019
- Merit student in Peking University 2017
- Silver Medal in the National Olympiad in Informatics (NOI) 2015