

JIAWEI LIU

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RESEARCH INTEREST

My research aims at making infrastructure software *fast*, *reliable* and *easy-to-use*. I focus on computer systems and its programming and reliability support. Specifically, I am interested in using software analysis techniques to make machine learning systems reliably fast.

EDUCATION

University of Illinois at Urbana-Champaign, IL, US
Ph.D. in Computer Science; GPA: 4.0/4.0

Aug. 2021 - Present
Advisor: [Lingming Zhang](#)

Tongji University, Shanghai, China
B.Eng. in Computer Science

Sept. 2017 - Jul. 2021

PUBLICATION

Pre-print | **Finding Deep-Learning Compilation Bugs with NNSmith**

Jiawei Liu, Jinkun Lin, Fabian Ruffy, Cheng Tan, Jinyang Li, Aurojit Panda, Lingming Zhang. [\[paper\]](#)

OOPSLA '22 | **Coverage-Guided Tensor Compiler Fuzzing with Joint IR-Pass Mutation**

Jiawei Liu, Yuxiang Wei, Sen Yang, Yinlin Deng, Lingming Zhang. [\[code\]](#) [\[artifact\]](#) [\[paper\]](#)

ACMMM'21 OSC | **Fast and Flexible Human Pose Estimation with HyperPose**

Yixiao Guo, Jiawei Liu, Guo Li, Luo Mai, Hao Dong. [\[code\]](#) [\[paper\]](#)

PROFESSIONAL EXPERIENCES

Intern at [OctoML](#)

Advised by: [Dr. Yuchen Jin](#), [Dr. Sunghyun Park](#), [Prof. Tianqi Chen](#)

May. 2022 - Aug. 2022
Topic: *Dataflow Pattern Language*

Research Assistant at [PL/FM/SE Group](#), UIUC

Advised by: [Prof. Lingming Zhang](#)

Apr. 2021 - Present
Topic: *Fuzzing*

Intern at DAMO Academy, Alibaba-Inc

Advised by: [Dr. Yuanwei Fang](#), [Prof. Yuan Xie](#)

Mar. 2021 - Aug. 2021
Topic: *GNN Serving*

Research Assistant at NYU Systems Group

Advised by: [Prof. Jinyang Li](#)

Jul. 2020 - Mar. 2021
Topic: *Video Analytics*

Research Assistant at Hyperplane Lab, Peking University

Advised by: [Prof. Hao Dong](#), [Prof. Luo Mai](#)

Jan. 2020 - Aug. 2020
Topic: *Pose Estimation Systems*

Intern at AI Lab, ByteDance Ltd.

Advised by: Guanzhe Huang, [Dr. Chuanxiong Guo](#)

Feb. 2020 - Jul. 2020
Topic: *DNN Serving*

NOTABLE ACHIEVEMENTS

Qidi Innovation Scholarship of Tongji University (Top 1%)

Oct. 2020

Selected Entrant for 2020 [Google](#) Machine Learning Winter Camp

Dec. 2019

Winner of International Data Science Hackathon (Chinese Region), [Covestro](#) [\[news\]](#)

Nov. 2019

National 2nd Prize and Province-level 1st Prize in RoboMaster, [DJI Inc.](#)

Aug. 2019

National 2nd Prize (0.75~3.84%) and Province-level 1st Prize of Chinese Modeling Contest

Nov. 2018

OPEN-SOURCE CONTRIBUTIONS

I embrace and grow with open-source communities.

I lead the [HyperPose](#) (**1200+** stars) project to support performance-critical computer vision applications. I also actively contribute to [TVM](#). For example, I implemented the [dataflow pattern language](#) of [Relax](#) IR.

Existing machine learning systems leverage optimization techniques to exploit every bit of performance – my research facilitates the correctness of those non-trivial optimizations, helping detect and fix over **110** real-world bugs for existing deep learning frameworks (over **70** fixed). Notably, my work [TZER](#) has detected **49** bugs in [TVM](#). In addition, my newer work [NNSMITH](#), a general graph-level fuzzer, has detected **65** bugs for [TVM](#), [TensorRT](#), [ONNXRuntime](#) and [PyTorch](#).

TALKS

Coverage-Guided Tensor Compiler Fuzzing with Joint IR-Pass Mutation

- SAMPL Lunch Talks, University of Washington May 2022
- UIUC Software Engineering Seminar, University of Illinois at Urbana-Champaign April 2022

STUDENT MENTORING

Yuxiang Wei (Summer 2021) Undergraduate at Tongji Univ. → UIUC Ph.D.

Sen Yang (Summer 2021) Graduate at Fudan Univ. → Yale Ph.D.

SKILL STACK

Familiar with code optimization, parallel programming, automated testing, visualization and machine learning.

Common: C++ (primary), Python, Go, Rust, Docker, Shell, Git, SQL, \LaTeX , Grafana, GDB

High-Perf. Computing: LLVM, CUDA, C++ Thread Library, gRPC, Kafka, Protobuf, Thrift, OpenMP

Machine Learning & Systems: PyTorch, TensorRT, TensorFlow, TVM, ONNX, OpenCV

System Correctness: Z3, Dafny, LLVM Sanitizers, Valgrind