

# Yuyang (Peter) RONG

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## EDUCATION

### UC Davis

Sep 2019 - Jun 2024

*Ph.D. candidate in Computer Science*

*Davis, CA*

- Research interests: Software security, compiler validation, LLM in software engineering
- Skills: **C/C++/Rust (9/10)**, **Python (8/10)**, **LLVM (IR, CodeGen)**, GitHub, Jira, Docker, German
- Community impacts: **LLVM contributor**. Bug fixes in backends, e.g. X86, AArch64, etc.
- Leadership & project management: Managing six students and three projects in parallel

### ShanghaiTech University

Sep 2015 - Jun 2019

*B.E. Computer Science and Technology*

*Shanghai, China*

- GPA 3.79/4 (Rank: 5/124)    Excellent Undergraduate of Shanghai (2019)    Scholarship of Shanghai (2016)

## EXPERIENCE

### Advanced Micro Devices, Inc. (AMD)

Jul 2023 - Dec 2023

*Research Intern*

*San Jose, CA*

- Focused on developing a scheduling algorithm based on reinforcement learning for AI Engine (AIE).
- Preliminary results show that the new algorithm can reduce 5% cycles in the generated assembly code.
- Implemented GitHub Action script for weekly fuzzing of AIE, cooperated with DevOps to deploy the fuzzer.

### Advanced Micro Devices, Inc. (AMD)

Jun 2022 - Dec 2022

*Research Intern*

*San Jose, CA*

- Focused on testing compiler backend (CodeGen) of AI Engine (AIE).
- Implemented and open-sourced [IRFuzzer](#) in 2000 LoC C++ to accommodate for the compiler infrastructure.
- Found over 40 missing features in AIE. Found **74 confirmed bugs in LLVM**, **44 fixed**, [bug tracker](#).
- Lightning talk accepted to 2022 LLVM Developer's Meeting, [recording](#).

### Bytedance Ltd.

Jun 2020 - Sep 2020

*Research Intern*

*Mountain View, CA*

- Focused on optimizing fuzzer Angora's gradient solver and alleviate its branch collision problem.
- Implemented a fuzzer [Valkyrie](#) with a runtime in ~2000 LoC in C++ and a gradient solver in ~3000 LoC in Rust.
- Found six bugs in open-source libraries, improved branch coverage by 41% compared to Angora.

### Bytedance Ltd.

Sep 2018 - Aug 2019

*Research Intern*

*Beijing, China*

- Assigned to maintain [Angora](#) and use it to find integer bugs in Bytedance's codebase.
- Implemented a sanitizer as an LLVM pass w/ runtime library using ~1500 LoC in C++ and ~2000 LoC in Rust.
- Identified **8 crashing and 166 non-crashing bugs**. [CVE-2020-18869](#) and [CVE-2020-18871](#) assigned.

## SELECTED PUBLICATIONS

### Code Representation Pre-training with Complements from Program Executions

2024

*The International Conference on Learning Representations (ICLR)*

*Under peer review*

### IrFuzzer: Specialized Fuzzing for LLVM Backend Code Generation

2024

*International Conference on the Foundations of Software Engineering (FSE)*

*Under peer review*

### Understanding Programs by Exploiting Fuzzing Test Cases

2023

*Association for Computational Linguistics (ACL)*

### Valkyrie: Improving Fuzzing Performance Through Principled Techniques

2022

*Software Quality, Reliability, and Security (QRS)*

*(Best paper award)*

### An Inexact First-order Method for Constrained Nonlinear Optimization

2022

*Optimization Methods and Software*

### IntEgrity: Finding Integer Errors by Targeted Fuzzing

2020

*Security and Privacy in Communication Networks (SecureComm)*

## TEACHING

### ECS153: Computer Security

*(Best TA award)* Spring 2023

### ECS032A: Introduction to Programming

Fall 2020