Zhiqiang Zang

Education

- 2018–2024 **Ph.D.**, *The University of Texas at Austin (UT Austin)*, Austin, TX, USA. Software Engineering and Systems Advisor: Milos Gligoric
- 2014–2018 **B.E.**, *Beijing University of Posts and Telecommunications (BUPT)*, Beijing, China. Telecommunication Engineering

Publications

- [7] Zhiqiang Zang, Fu-Yao Yu, Aditya Thimmaiah, August Shi, and Milos Gligoric. Java JIT Testing with Template Extraction. In International Conference on the Foundations of Software Engineering, page to appear, 2024.
- [6] Zhiqiang Zang, Aditya Thimmaiah, and Milos Gligoric. JOG: Java JIT Peephole Optimizations and Tests from Patterns. In International Conference on Software Engineering, Tool Demonstrations Track, pages 11–15, 2024.
- [5] Zhiqiang Zang, Aditya Thimmaiah, and Milos Gligoric. Pattern-Based Peephole Optimizations with Java JIT Tests. In *International Symposium on Software Testing and Analysis*, pages 64–75, 2023.
- [4] Zhiqiang Zang, Fu-Yao Yu, Nathaniel Wiatrek, Milos Gligoric, and August Shi. JAttack: Java JIT Testing using Template Programs. In International Conference on Software Engineering, Tool Demonstrations Track, pages 6–10, 2023.
- [3] Zhiqiang Zang, Nathaniel Wiatrek, Milos Gligoric, and August Shi. Compiler Testing using Template Java Programs. In International Conference on Automated Software Engineering, pages 23:1–23:13, 2022. ACM SIGSOFT Distinguished Paper Award.
- [2] Pengyu Nie, Marinela Parovic, Zhiqiang Zang, Sarfraz Khurshid, Aleksandar Milicevic, and Milos Gligoric. Unifying Execution of Imperative Generators and Declarative Specifications. In International Conference on Object-Oriented Programming, Systems, Languages, and Applications, pages 217:1–217:26, 2020.
- Ben Buhse, Thomas Wei, Zhiqiang Zang, Aleksandar Milicevic, and Milos Gligoric. VeDebug: Regression Debugging Tool for Java. In *International Conference on Software Engineering, Tool Demonstrations Track*, pages 15–18, 2019.

Patents

 Hiroaki Yoshida, Zhiqiang Zang, Mukul R. Prasad. Generation of Software Program Repair Examples. US11099817B1. Aug 24, 2021.

Industry Experience

Feb 2024–Present **Research Scientist**, *Meta Platforms*, Menlo Park, CA, USA. Worked on Al infra efficiency.

- May-Aug 2023 **Software Engineer Intern**, *Uber Technologies*, San Francisco, CA, USA. Supported contracts in a Go static analyzer called NilAway (https://github.com/uber-go/ nilaway) to reduce false positive errors.
- May-Aug 2022 **Software Engineer Intern**, *Meta Platforms*, Bellevue, WA, USA. Migrated a large-scale data analytic engine onto a new environment to improve performance and maintainability.
- May–Aug 2020 **Research Intern**, *Fujitsu Laboratories of America*, Sunnyvale, CA, USA Remote. Improved software program repair examples by minimizing buggy/fixed pairs of programs.
- Jul-Aug 2019 **Software Engineer Intern**, *NIO*, Beijing, China. Developed and improved a physical and visual simulator for autonomous vehicles (Unreal Engine).

Selected Projects

- JAttack https://github.com/EngineeringSoftware/jattack A template-based compiler testing framework that 1) accepts as input a template Java program written in a domain-specific language in Java; 2) executes the template to generate concrete programs and 3) tests Java JIT compilers using the generated programs. JavaParser, OW2 ASM, DSL, JIT, Java. Team Project. Discovered CVEs: CVE-2020-14792, CVE-2022-21305, CVE-2023-22044, CVE-2023-22045.
 - JOG https://github.com/EngineeringSoftware/jog A framework that facilitates developing Java JIT peephole optimizations: 1) accepts as input a pattern written in the same way that tests are written; 2) translates the pattern into C/C++ code as a JIT optimization pass, and generates Java tests for the optimization; 3) detects shadow relation between a pair of optimizations. JavaParser, Z3, DSL, JIT, Java. Team Project. 7 pull requests have been integrated into the master branch of OpenJDK.
- VeDebug https://github.com/EngineeringSoftware/VeDebug A Java debugging tool that 1) automatically sets breakpoints where the current execution diverges from the previously captured one, and 2) provides video player features e.g., speed up/slow down the replay. Bytecode instrumentation(OW2 ASM, javaagent), Java. Team project.

Honors & Awards

- 2022 ACM SIGSOFT Distinguished Paper Award [3], ASE 2022
- 2017 Outstanding Undergraduate Award Finalist, BUPT
- 2015–2016 Qualcomm Innovation Scholarship, BUPT
- 2014–2015 Qualcomm Innovation Scholarship, BUPT

Presentations

- Jul 2023 Pattern-Based Peephole Optimizations with Java JIT Tests [5] at ISSTA 2023, Seattle, WA, USA
- Oct 2022 Compiler Testing using Template Java Programs [3] at ASE 2022, Oakland Center, MI, USA

Teaching Experience

- Fall 2023 Teaching Assistant, UT Austin, ECE 382V: Programming Paradigms (26 students)
- Sep 2022 Guest lecture, Compiler Testing using Template Java Programs [3], UT Austin, ECE 382V: Software Tests in the Era of Nondeterminism
- Fall 2021 Teaching Assistant, UT Austin, EE 379K: Programming Paradigms (38 students)

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Spring 2021	Teaching Assistant, UT Austin, EE 360T: <i>Software Testing</i> (101 students)
Mar 2021	Guest lecture, (JIT) Compiler Testing, UT Austin, EE 360T: Software Testing
Spring 2020	Teaching Assistant, UT Austin, EE 312H: <i>Software Design and Implementation I</i> (35 students)
Fall 2019	Teaching Assistant, UT Austin, EE 312: Software Design and Implementation I (60 students)
Spring 2019	Teaching Assistant, UT Austin, EE 422C: <i>Software Design and Implementation II</i> (172 students)
	Professional Service
CGO 2024	Artifact evaluation committee member, <i>International Symposium on Code Generation and Optimization</i>
ICSE 2023	External reviewer, International Conference on Software Engineering

- ICSE 2022 External reviewer, International Conference on Software Engineering
- ASE 2021 External reviewer, International Conference on Automated Software Engineering
- ISSTA 2020 Artifact evaluation committee member, International Symposium on Software Testing and Analysis
- ISSTA 2020 External reviewer, International Symposium on Software Testing and Analysis

Technical Skills

o Programming Languages: Java (everyday), Bash (everyday), Python, C, Go

o Tools: Emacs (everyday), Git (everyday), OW2 ASM, JavaParser