JIEFANG LIN

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EDUCATION

Southern University of Science and Technology Shenzhen, China

B.S. in Computer Science and Technology *Sep. 2020 - Jun. 2024 (expected)*
GPA: 3.82/4.0 (91.18/100, ranking top 10%)
Topic: Fuzzing; Symbolic Execution; Taint Analysis
Advisor: Prof. **Yuqun Zhang**

The University of Texas at Austin Austin, TX

Student Research Intern *Nov. 2023 - May. 2024 (expected)*
Topic: Parallel Software Testing; Test Flakiness
Advisor: Prof. **August Shi**

PUBLICATION

Test Scheduling Across Heterogeneous Machines While Balancing Runtime, Price, and Flakiness *OOPSLA' 2024*

Hengchen Yuan*, **Jiefang Lin***, August Shi, Wing Lam
Status: Submitted
* *denotes equal contribution.*

EXPERIENCE

Research and Improvement on the Integration of Directed Grey-box Fuzzing and Concolic Executor *Sep. 2022 - Present*
Undergraduate Researcher supervised by Prof. ***Yuqun Zhang*** *from SUSTech ARiSE Lab*

- Utilized dominator trees to simplify path computation and seed scheduling strategies in AFLGo; Introduced function pointer analysis to improve call graph precision in terms of function invocation relationships; Pruned the interprocedural control flow graph (ICFG) in the original program and redefine the seed rating function to enhance AFLGo.
- Introduced local symbolic solving to mitigate the "unsolvable" situation to some extent; Set thresholds in the hope of solving feasible paths branched from the current path to enhance SymCC.
- Designed comparative experiments on 20+ benchmarks with different configurations like standalone AFLGo, SymCC, hybrid AFLGo+SymCC, and our improved versions.

Balanced Test Scheduling Across Heterogeneous Machines *Jun. 2023 - Oct. 2023*
Remote Student Research Intern supervised by Prof. ***August Shi*** *from UT Austin and Prof.* ***Wing Lam*** *from GMU in UIUC+ Summer Program*

- Collected comprehensive testing data by running over 20,000 regression tests, with each case simulated 300 times across variable machine configurations to profile multiple aspects including average runtime, failure rate, and other characteristics.
- Designed custom optimization scheduling system using a genetic algorithm to select a near-optimal heterogeneous machine sequence and greedy algorithm to assign tests across the machines.
- Conducted extensive data analysis to solve the research question on the comparison between our approach and real-world benchmarks by customizing fitness functions to find configurable schedule tradeoffs between key metrics.

Investigate and Mitigate the Flakiness of Test Generation Tool *Nov. 2023 - Present*
On-campus Student Research Intern supervised by Prof. ***August Shi*** *from UT Austin August's Lab*

· This is an ongoing project where I am currently investigating the prevalence of flakiness in tests generated by automated tools such as Randoop and EvoSuite. The project involves comparing the distribution of root causes behind flaky tests produced by different test generation tools versus those manually written by developers.

Teaching Assistant at SUSTech

· Introduction to Java Programming A, Course#: **CS102A** *Sep. 2021 - Jan. 2022*
· Digital Logic, Course#: **CS207** *Sep. 2022 - Jan. 2023*
· Algorithm Design and Analysis, Course#: **CS208** *Jan. 2023 - Jun. 2023*

SELECTED PROJECT

SPL Compiler [repository] *Sep. 2022 - Dec. 2022*

· Designed a strongly typed C-like programming language from scratch, including defining syntax, typing rules, and language semantics. Formulated specifications for language features such as variables, functions, loops, pointers, and multi-dimensional arrays to enable complex application development.

HONORS AND AWARDS

Outstanding Student Assistant Award *Jan. 2023*
Meritorious Winner (Top 8%) in National Interdisciplinary Contest in Modeling *Mar. 2022*
Second-class Merit Student Scholarship at SUSTech (Top 15%) *Oct. 2021 & Oct. 2022*
Province-level 2nd Prize of Chinese Mathematical Modeling Contest *Oct. 2021 & Nov. 2022*

SKILLS

Programming Languages Python, Java, C/C++, MATLAB, Shell, JavaScript
Software & Tools Docker, Latex, SQL, Git, Markdown