Ziheng Liu

GitHub https://github.com/lzhfromustc

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PhD student with three years' experience in computer science research. Knowledge and interests in persistent memory, programming language and system.

Education

2021-09 - Current **Doctor of Philosophy: Computer Science**
University of California San Diego

2019-08 - 2021-05 **Doctor of Philosophy: Informatics**
Pennsylvania State University

(Transferred)

2014-08 - 2018-05 **Bachelor of Engineering: Nuclear Engineering**
University of Science and Technology of China

Publication

- **Who Goes First? Detecting Go Concurrency Bugs via Message Reordering**
  Ziheng Liu*, Yu Liang*, Shihao Xia*, Linhai Song and Hong Hu. *ASPLOS'2022*
  (equal contribution authors)*

- **Automatically Detecting and Fixing Concurrency Bugs in Go Software Systems**
  Ziheng Liu, Shuofei Zhu, Boqin Qin, Hao Chen and Linhai Song. *ASPLOS'2021* [pdf]

- **Algorithmic Profiling for Real-World Complexity Problems**
  Boqin Qin, Tengfei Tu, **Ziheng Liu**, Tingting Yu and Linhai Song. *TSE'2021* [pdf]

Research

2021 - Current **Dynamic Concurrency Bug Detection in Go**
Univ. of California San Diego, Penn. State Univ.

- Implemented an oracle to dynamically detect Go concurrency bugs
- Participated in building a fuzzer for Go programs
- Detected 146 previously unknown bugs in top Go projects on GitHub
- Committed patches for bugs to Docker, Kubernetes, grpc-go, etc.

(Accepted by *ASPLOS'2022*)

2021 - Current

Verification of Generic Go Programs

Univ. of California San Diego, Penn. State Univ.

- Implemented a verification tool upon GCatch *(see below)* for generic Go
- The tool able to verify progress and safety properties of channel and mutex
- Demonstrated the preservation of properties during generic translation

(Under submission)

2021 - Current

Comparison of Two Generic Translations of Go

Univ. of California San Diego, Penn. State Univ.

- Participated in the implementation of dictionary generic translation of Go
- Helped benchmark the difference of two generic translations

(Under submission)

2019 - 2020

Static Concurrency Bug Detection and Fixing for Go

Penn. State Univ.

- Developed GCatch, a static detection tool for channel blocking bugs in Go
- Implemented a set of five traditional checkers for Go concurrency bugs
- Designed GFix, a fixing tool for bugs found by GCatch
- Detected 268 previously unknown bugs in top Go projects on GitHub
- Most of the detected bugs confirmed and fixed, with patches from GFix

(Accepted by *ASPLOS'2021*) [pdf] [code]

2018 - 2019

Algorithmic Profiling for Real-World Complexity Problems

Penn. State Univ.

- Designed an algorithm to infer the complexity for a code region
- Evaluated the complexity of bugs in MySQL, GCC, Mozilla, etc.

(Accepted by *TSE'2021*) [pdf] [code]

Work Experience

2019-05 – 2019-08

Research Intern

ByteDance, Palo Alto

Languages

Go, Python, Rust, Haskell, C, C++, MATLAB, LaTeX