Yahui Sun

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Research Interests

- Program Analysis
- Programming Languages
- Software Engineering
- Distributed Computing

Education

2018-2021 **M.S. Computer Science**, *Texas A&M University (TAMU), CSE Department*.
GPA - 4.0/4.0

Thesis Efficient Commutativity Order Violation Prediction (Advisor: Professor Jeff Huang)

2014-2018 **B.E. Software Engineering**, *Wuhan University, School of Computer Science*.
GPA - 3.64/4.0

Experience

2020 **Research Intern**, *Microsoft*, Redmond, WA.

Hosted by Dr. David Tarditi.

- **Checked C - adding memory safety to C.** Improved static analysis and diagnostic messages of the Checked C compiler. Evaluated Checked C on MUSL, a widely-used C runtime.

2018-present **Research Assistant**, *Parasol Lab, Texas A&M*, College Station, TX.

Worked with Professor Jeff Huang on program analysis and model checking for concurrent programs.

- **On-the-fly predictive analysis for concurrency bugs.**Proposed an online predictive analysis algorithm to detect concurrent use-after-free bugs in C/C++ programs. Implemented in ThreadSanitizer and evaluated on Chromium benchmarks. First-authored paper [1] currently in submission to PLDI'21.
- **Stateless model checking with commutativity aware partial order reduction.** Developed an partial order reduction algorithm that exploits commutative actions on concurrent objects, achieving exponential speedup on selected SV-COMP C benchmarks. Draft paper in preparation.
- **Static analysis for data races in Go.** Led a team of undergraduate and master's students to develop a static race detector for Go programs.

2018 **Software Engineer Intern**, *RussellCloud*, Shanghai.

2018 **Software Engineer Intern**, *Eyepetizer*, Beijing.

2018 **Software Engineer Intern**, *Baidu*, Beijing.

Manuscripts

Two paper drafts in submission or in preparation.

[1] *Efficient Commutativity Order Violation Prediction*. Yahui Sun, Andreas Tsouloupas, Jeff Huang. *In submission* to PLDI'21.

[2] *Exploiting Semantic Commutativity in Stateless Model Checking*. Yahui Sun, Jeff Huang. *In preparation.*

Awards

PLMW 2020 Selected for *Programming Languages Mentoring Workshop (PLMW)* at OOPSLA'20

PLMW 2020 Selected for PLMW at POPL'20

2015-2017 Merit scholarships at Wuhan University.

Research Mentoring

Mentored 3 undergraduate students from TAMU and University of Crprus.

- Andrew Chin (B.S. honours, TAMU, advised on his undergraduate thesis.)
- Andreas Tsouloupas (Summer REU coauthored [1])]
- Matthew Davis (B.S. honours)

Teaching Experience

2019 TA for CSCE 221: Data structures and algorithms, TAMU

2017 TA for Compiler Design, Wuhan University

Service to Professional Community

AEC Artifact Evaluation Committee: CGO 2020, PLDI 2019

Co-reviewer Conference/journal co-reviewer

- PLDI 2019
- ICSE 2018,2019,2020
- PPoPP 2019
- OOPSLA 2019,2020
- FSE 2019,2020
- TOSEM, TSE (journal)

Open-source Software Contributions

New bugs found My work on dynamic program analysis uncovered over 10 concurrency bugs in popular Go projects such as Kubernetes, CockroachDB and Etcd.

Checked C I contributed to the Checked C compiler at Microsoft.

NCMC Implementation of commutativity-aware partial order reduction for multithreaded Java programs based on JMCR.

Skills

Proficient in C/C++, Go, Python

Familiar with Javascript, Java, Bash, Rust, Awk, Ruby, PHP, Lisp

Frameworks LLVM, Clang, libFuzzer, D3, VueJS, Java Spring