ZITENG YANG

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EDUCATION

Georgia Institute of Technology (Georgia Tech), Atlanta, GA, USA   Aug. 2021 – Present

Ph.D. student in Computer Science, PLSE Lab at School of Computer Science

- Advised by *Vivek Sarkar*
- Research Interests: program verification and analysis, parallel program, compilers

Shanghai Jiao Tong University (SJTU), Shanghai, China   Sept. 2017 – Jul. 2021

B.E. in Computer Science and Technology, Department of Computer Science and Engineering

PUBLICATIONS

- **Z. Yang**, X. Yin and S. Li. "Maximally permissive supervisor control of timed discrete-event systems under partial observation," in 21st IFAC World Congress, 2020 **[Formal Control Theory]**

In submission

- **[*Co-first author, dictionary order]** Verification-aided Compiler Optimization **[Compiler Verification]**

RESEARCH PROJECTS

May-happen-in-parallel Analysis for parallel program via CFL-reachability   Currently

First Author   Advisor: *Vivek Sarkar*, School of Computer Science, Georgia Tech.

- Proposed an interprocedural analysis formulation for May-happen-in-Parallel (MHP) analysis via a sub-problem of CFL-reachability for which is more precise than previous ones
- Proposed and implemented an $O(V+E)$-worst-case faster algorithm based on this formulation (previously $O(V^3)$)
- Implemented the new MHP analysis algorithm on async/finish parallel model
- It can also apply to fork/join model as a future work)

Verification-aided Compiler Optimization in the CompCert Compiler   Apr. 2020 – Jun. 2021

First Author   Advisor: *Qinxiang Cao*, John Hopcroft Center for Computer Science, SJTU.

An expedition to implement a verified program's verified special new compiler optimization framework prototype:

- Designed a new semantics framework based on small step semantics in CompCert Certified Compiler, aiming for verifying new compiler optimization methods for certified program using hints of Hoare/Separation Logic assertions annotated in C program
- Designed and proved the correctness of the verification routine of backward simulation relation as well as the preservation of annotation's consistency between source and compiled program for the newly proposed optimization method

Modal Logic's Completeness Theory in Coq via Finite Model Methods   Nov. 2019 – Apr. 2020

Research Assistant   Advisor: *Qinxiang Cao*, John Hopcroft Center for Computer Science, SJTU.

Field: Formalization for pure Mathematical Theory

- Formally proved Propositional Dynamic Logic's completeness theorem in Coq via finite canonical model

Formal Control Theory of Timed Discrete-Event Systems   Aug. 2018 – Oct. 2019

First Author   Advisor: *Xiang Yin*, Department of Automation, SJTU.

Field: Formal methods in Automata & Control Theory

- Proposed a method for synthesizing a safe and maximally-permissive supervisor for Timed Discrete Event System, a finite-automata-style model which models time into automata, and formally proved the correctness;

Teaching Experience

[Incoming]**Teaching Assistant**, CS4510: Automata and Complexity, Georgia Tech, *Joseph Jaeger*   Fall 2022
Teaching Assistant, MA208: Discrete Mathematics, SJTU, lectured *Qinxiang Cao*   Fall 2020
Teaching Assistant, MA239: Discrete Mathematics (Honor), SJTU, lectured *Xiang Yin*   Fall 2020

Courses and Projects

Graduate Courses: 2021 - Present, Georgia Tech

- **Compiler Design:**
  - Topics and assignments around middle/back-end optimization of modern compiler
  - One project in dynamic array bound checking and another project in loop dependence testing
- **Software Analysis and Testing:** Topics and paper review around classical and cutting edge program analysis researches, with a self-proposed project

Selected Undergraduate Courses (Scored A):   2017 - 2021, SJTU

- Programming Languages (98/100), Computing Theory, Projects of Operating System (100/100), Linux Kernel, Cloud Computing, Database System Technology

Project: Interpreter for "SimPL" Programming Language   Spring 2020

- Implemented an interpreter in Java following given semantic specification of simplified dialect of ML
- Implemented type checking and evaluation

Project: Naive Airdrop   Fall 2019

- Designed a file synchronizing application from Android phone to PC within local area network with encryption in transfer, auto connection, changes detecting etc.

Project: Re-implementation of deque and map in STL   Fall 2018

- Re-implemented the *deque* and *map* template class in C++ Standard Template Library w.r.t. the interface

Skills

Programming Experiences:

- **Coq**: long-term research projects on Mathematical Logic and CompCert compiler
- **C/C++**: course projects (LLVM IR, Linux kernel, STL implementation, algorithm design)
- **Java**: Android & PC applications
- **Python**: course projects (machine learning)

Familiar Tools/Libraries:

- **LLVM IR**
- **CompCert Certified Compiler** (the first end-to-end formally verified C compiler)
- **VST** (Verified Software Tool-chian in Coq, a separation logic based tool to verify correctness of C programs)

Languages:

- Native: Standard Mandarin, Sichuanese Mandarin
- Fluent: English

Honors and Awards

- Rongchang Scholarship for Science and Technology Innovation, Finalist, 10,000 CNY (10 finalists and 10 winners, university-wide per year)   2020
- Undergraduate Excellent Scholarship, 500 CNY Third-class   2018
- 1st Prize in National High School Mathematics League in Provinces   2016