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: formal verification, parallel program, program analysis

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

Efficient May-happen-in-parallel Analysis for parallel program Jan. 2022 - Now

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

- Proposed, proved and implemented an $O(V+E)$-worst-case fast algorithm (previously $O(V^3)$) for May-happen-in-Parallel (MHP) analysis in async/finish parallelism based on a sub-problem of CFL-reachability

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

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

- Designed a semantics framework extended from 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
- Formalized (in Coq) 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.

- Formally proved Propositional Dynamic Logic(PDL, a derivation from general modal 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

- Formally proposed and proved correctness of a method for synthesizing a safe and maximally-permissive supervisor for Timed Discrete Event System (a control model which models time into automata)

Teaching Experience

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

Selected Courses and Projects

Graduate Courses: 2021 - Present, Georgia Tech

- **[Ongoing] High Performance Computer Architecture**: with Labs simulating pipe-lined CPU (including bypassing, branch-prediction, super-scalar, out-of-order-execution etc.)
- **Compiler Design:** middle/back-end optimization of modern compiler (LLVM) with project on dynamic array bound checking and project on loop dependence testing
- **Software Analysis and Testing**
- **[Ongoing, minor] Measure Theory**

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

Undergraduate Project: Interpreter for "SimPL" Programming Language Spring 2020

- Implemented an interpreter (type inference/checking and evaluation) of a simplified dialect of ML following given semantic specification (using Java)

Skills

Programming Experiences:

- **Coq**: long-term research projects on Mathematical Logic and CompCert Certified compiler
- **C/C++**: course and research 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 end-to-end formally verified C compiler)
- **VST** (Verified Software Tool-chian in Coq, a separation logic based verification tool for C programs)

Languages: Standard Mandarin (Native), Sichuanese Mandarin (Fluent), English (Fluent)

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