Ziteng Yang

cs.ziteng.yang@gmail.com · LinkedIn youngzt998.github.io/

Education

Georgia Institute of Technology (Georgia Tech), Atlanta, GA, USA 2021 – 2027 (expected)

Ph.D. student in Computer Science, minor in Mathematics, advised by Dr. *Vivek Sarkar*

- Research Area: Formal Verification (Proof Assistant), Compilers (including ML/Tensor Compiler)

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

B.E. in Computer Science, minor in Music.

Industrial Experience

Meta Platforms, Inc., Bellevue, WA, USA May. $\sim$ Aug. 2025

Compiler Engineer Internship at PL & Runtime Team

- Software development of Tensor compiler (***Triton*** open-source language & compiler)
- New support for source variable debug information lowering from top-level tensor kernels, through **python AST**, ***MLIR***, ***LLVM IR*** to GPU assembly (***Nvidia PTX*** , ***AMD GCN***) and debugger (***CUDA-GDB***);

Amazon Web Services, Inc. (AWS), Seattle, WA, USA Jan. $\sim$ May. 2025

Applied Scientist Internship at Automated Reasoning Group, team lead by Dr. *Daniel Kröning*.

- Formal verification of Tensor compiler (***AWS Neuron***) code base assisted by theorem prover (***Lean***) ;
- Additionally located & fixed 6 mis-compilation bugs in an unverified internal library; located & reduced a redundant computation from $O(NlogN)$ to $O(N)$

Research Papers

Z. Yang, J. Shirako, V. Sarkar, Fully Verified Instruction Scheduling, *OOPSLA'24*
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*

Research Experience

Doctorate Thesis: Correct Compilation in the Age of Parallel Computing 2021-now

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

- **Correctness of Tensor Programs & Compilers** (in progress)
- **Fully Verified Instruction Scheduling**:
  [OOPSLA'24] Built the first ever foundational formal theory to fully verify instruction scheduling passes in a verified compiler and achieved the first fully verified scheduling pass in CompCert.
  [In progress] Continuing on scaling up to inter-block scheduling, memory alias analysis, and linking.
- **Verified Linear Scan Register Allocation**: Incorporating and formally proving linear scan register allocation algorithm in CompCert addressing the problem that graph coloring register allocation requires either heavy work on proofs or heavy compile time during validation. (In progress.)

Bachelor Thesis on Formal Verification 2020 – 2021

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

- **Compiler Correctness for Annotation Verifier**: Designed and formalized (in Coq) a parameterized semantics & correctness framework to verify optimizations that use logical assertions annotated in C programs (VST-A) as hints based on CompCert framework, and proved that any optimization that preserved the validity of assertions inside programs preserved the semantics simulation relation.
- **Formalized Modal Logic**: Practice on Coq through formally proving completeness theorem of modal logic.

[IFAC'20] Formal Control Theory of Timed Discrete-Event Systems 2019

Advisor: Dr. *Xiang Yin*, Department of Automation, SJTU.

- Designed an algorithm for synthesizing a safe and maximally permissive supervisor for Timed Discrete Event System and mathematically proved its correctness, i.e. the language generated by the automata under synthesized supervisor is safe yet maximal.

Academic Services

PLDI 2025 Artifact Evaluation Committee (Reviewed 3 artifacts)

Teaching Experience

Teaching Assistant, CS6390 Programming Languages, Georgia Tech, by *Vivek Sarkar* Spring 2023
Teaching Assistant, CS4510 Automata and Complexity, Georgia Tech, by *Joseph Jaeger* Fall 2022
Teaching Assistant, MA208 Discrete Mathematics (IEEE Honor Class), SJTU, by *Qinxiang Cao* Fall 2020
Teaching Assistant, MA239 Discrete Mathematics (Zhiyuan Honor Class), SJTU, by *Xiang Yin* Fall 2020

Selected CS Courses and Projects

Selected Graduate Courses: 2021 - Present, Georgia Tech

- **High-Performance Computer Architecture**, with labs simulating CPU with bypassing, branch-prediction, super-scalar, out-of-order-execution, multi-level caches, DRAM, multi-processor, cache way-partition etc.
- **Compiler Design**, with labs on optimization techniques of compiler using LLVM IR
- **Software Analysis and Testing**, program analysis techniques, paper reviews and projects on static analysis
- **[Minor in math] Measure Theory**(= Real Analysis I), **Algebra**, etc.

Selected Undergraduate CS Courses and Projects: 2017 - 2021, SJTU

- **Courses**: Programming Languages, Computing Theory, Machine Learning, Linux Kernel, Information Security, Game Design, etc.
- **Interpreter of Programming Language (2020)**: Implemented interpreter for a typed functional language
- **Machine Learning Course Project (2020)**: i) Reproduction of paper on DeepMoji ii) Reinforcement learning on 2048-game; iii) Imitation learning of 2048-game from a trained model
- **Naive-Airdrop App (2019)**: Designed & implemented an encrypted file synchronizing application between Android and Windows PC within local area network with auto connection, changes detecting etc.
- **Linux Memory Management (2018)**: Implemented in Linux kernel: i)Page table remapping & page replacement algorithm ii)Page hot map collector; iii)out-of-memory evaluation strategy analysis
- **C++ STL (2018)**: Re-implemented C++'s std::deque and std::map.

Skills

Programming Lanugages & Software Tools:

- **C/C++, Python, Java**: skilled in industrial development and academic research
- **Lean 4, Rocq (previously Coq), OCaml, Z3 (SMT Solver)**: long-term research on formal verification
- **Tools / Libraries**: LLVM / MLIR (Compiler IR Tool-chain), Triton (Tensor Language & Compiler), GDB/LLDB/CUDA-GDB, CompCert (Certified C Compiler), VST (separating logic verification for C), Linux Kernel
- **Unity 5, Unreal Engine**: course projects experience on video game design
- **Logic Pro, Sibelius**: course projects experience on music composition

Honors and Scholarships

- Conference Travel & Registration Grant by PLMW@PLDI'22, San Diego 2022
- Rongchang Scholarship for Science and Technology Innovation, Finalist, 10,000 CNY (20 finalists/winners among university) 2020
- Undergraduate Excellence Scholarship, 500 CNY Third-class 2018