Yanning Chen

self@lightquantum.me | @PhotonQuantum | lightquantum.me

Education

Shanghai Jiao Tong University September 2019 - June 2024 (Expected)
B. Eng in Computer Science and Technology Shanghai, China

- GPA 87.6/100.0, Rank 37/107
- A/A+ Courses: Programming Languages, Program Analysis and Verification, Math Foundations of CS, etc.
- Programming Languages: Coq (2 years; research), Rust (2 years; hobby), OCaml (2 months; research), Python (4 years; not using recently), Golang (4 months; intern), C/C++ (CS154, CS2308), Java (CS383)

Research Experience

University of California, Santa Barbara September 2023 - Present
Optimizing Compiler for ZK circuits, advised by Prof. Yu Feng

- Proposed a *optimization oriented* stream-based domain-specific language for ZK circuits.
- Designed a compiler for the language, leveraging *program synthesis* to super-optimize the circuits.

Shanghai Jiao Tong University August 2021 - Present
Verification-aided Source Code Optimization, advised by Prof. Qinxiang Cao

- Designed an assertion language for specifying program state and properties based on *separation logic*.
- Implemented a *symbolic execution* engine for CompCert, and *verified* its soundness in Coq.
- Established a *verification framework* for compiler optimizations based on symbolic execution, and verified the *compiler correctness* property of alias analysis.

SJTU Participation in Research Program April 2020 - March 2021
Formal Semantics of Meta Programming in Functional Languages, advised by Prof. Qinxiang Cao

- Formalized the semantics of *Lambda Calculus with Constructors* in *Coq*.
- *Semi-automatic synthesis* of meta programs and *proof construction* for the simulation relation by *Ltac*.

Related Projects

SimPL Interpreter, *Interpreter for an ML-like Language* SimPL

- Defined the operational semantics and typing rules of a simplified dialect of ML.
- Supports lazy evaluation, HM type inference, and copy garbage collection.

Cierra Prover, *Deductive Prover for a Subset of C* SimpleXX/SimpleCompiler:cierra

- Automatic verification of annotated (require, ensure, invariants) C programs using *Hoare Logic* by *SMT solvers*.
- Winner of *Best Quality Award* in the *Open Source Promotion Plan* by ISCAS.

Magic in Ten Minutes, *Tutorial for "Black Magic" in Rust* magic-in-ten-mins-rs

- A tutorial catered for Rustaceans, offering insights into programming idioms, type system, computing theory, and formal verification.
- Topics include: GADT, co-ADT, HKT, CH-iso, CPS, and more.

Intern Experience

Linux Foundation September 2020 - December 2020
Mentee of CNCF LFX Mentorship Program Remote

- Proposed a *Role-Based Access Control* system for TiKV PD, the placement driver of a distributed key-value database.
- Implemented a prototype of the system and wrote a RFC for the community.

Open-Source Contributions

Shanghai Jiao Tong University Linux User Group July 2020 - Present
Leader, Mirror Maintainer sjtug

- Leads a team to maintain one of the biggest mirror services in China, serving 2 million requests per day.
- Organizes events and workshops to promote open-source culture.