

Yanning Chen

✉ self@lightquantum.me | 🌐 [@PhotonQuantum](https://lightquantum.me) | 🌐 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: mainly work with Rust, Coq, OCaml; comfortable with C/C++, Python, Java, Haskell, Golang

Research Experience

University of California, Santa Barbara

September 2023 - Present

Optimizing Compiler for ZK circuits, advised by Prof. Yu Feng

- Proposed a *optimization oriented* multi-layer domain-specific language for ZK circuits.
- Implemented 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.