Ruqing Yang

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Research Interests

I am broadly interested in the implementation and optimization of programming languages.

Education

Hong Kong University of Science & Technology **Aug. 2023 - June 2025 (expected)**
M. Phil. in *Computer Science and Engineering* *Hong Kong S.A.R., China*

- Advisor: Lionel Parreaux

Zhejiang University **Sep. 2019 - June 2023**
B. Eng. in *Computer Science and Technology* *Hangzhou, China*

- GPA: 3.84/4.0
- A/A+ Courses: Programming Language Principles, Compilation Principles, Data Structure and Algorithm, etc.

Projects

MLScript **Autumn 2023 - Now**

- This is an ongoing project in HKUST TACO Lab.
- Designed an ANF-based IR with join points support and integrated it into MLsript compiler.
- Implemented an optimizer based on it. It contains a non-duplicate partial inliner leveraging function splitting.
- Implemented a C++ backend. Using a universal object representation, and reference counting for memory management.

Calocom **Spring 2022**

- A coursework for the course *Compilation Principle*.
- Designed and implemented a programming language with functional features like algebraic data type, closure, and pattern matching.
- Topics include: type checking, closure conversion, LLVM-based code generation

SyOC **Spring 2022 - Summer 2022**

- This is an optimizing compiler for SysY (a subset of C) language.
- Typical dataflow analysis: immediate dominator analysis, iterated domination frontier analysis for SSA construction.
- Optimizations like constant propagation, CFG simplification, and dead code elimination.

MMM **Autumn 2024 - Now**

- A small compiler for the functional MiniMoonBit language.
- Do selective CPS transformation and thunking on function calls to avoid stack overflow in the JavaScript backend.
- Implemented an efficient native backend with tree-pattern covering instruction selector and chordal graph coloring register allocator.
- Optimizations like lambda lifting, loop invariant code motion, local value numbering, and guaranteed tail recursion elimination.

Experience

Undergraduate Teaching Assistant, ***Principles of Programming Languages*** **Sept. 2022 - Jan. 2023**

Remote Research Intern, ***hosted by Yizhou Zhang*** **Sept. 2022 - Jan. 2023**

Teaching Assistant, ***Programming with C++*** **Jan. 2024 - June 2024**

Student Volunteer, ***ICFP 2024*** **Sept. 2024**

Skills

Programming Languages: OCaml, Rust, C/C++, Scala, Java, Python, etc.
Proof Assistant: Coq