

# Chencheng Mao

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## EDUCATION

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### University of Science and Technology of China

*B.Sc. in Computer Science;*

Anhui, China

*Sep 2020– Jul 2024*

- **GPA:** 3.50/4.30
- **Relevant coursework:** Syllabus of Digital Logic Lab (94/100), Function of Complex Variable B (92/100), Data Structure (91/100), Principles and Techniques of Compiler (90/100), Foundations of Algorithms (89/100)

## RESEARCH EXPERIENCE

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### Optimize ThreadSanitizer in Link Time(on going)

July 2023 – Present

*Research Assistant, Instructor: Prof.Chenxiong Qian*

*The University of Hong Kong (HKU)*

- Developed effective run-time algorithms to detect data races with less false positives, less overheads and more precise synchronization analysis.
- Optimized ThreadSanitizer in LLVM by executing compiler instrumentation module in link time and eliminated unnecessary instrumentation in the whole-program optimization.
- Designing Thread Sanitizer in the context of ThinLTO and FullLTO separately and evaluating the number of detected bugs and runtime overhead.

### Performance Analysis and Characterization of Homomorphic Encryption

Jan 2023 – Feb 2023

*Research Internship, Instructor: Prof.Huiyang Zhou*

*Remote/NC State University*

- Studied the code of open-source homomorphic encryption library HELib and perform experiments to evaluate the performance overheads.
- Learned database searching algorithms on homomorphically encrypted data.
- Designed SIMD operations to reduce the overhead of homomorphic encryption and optimized the performance overheads by adjusting the depth of the circuit

### Cminus-f Compiler Design and Optimization

Sept 2022 – Dec 2022

*Course Project, Instructor: Prof.Cheng Li*

*USTC*

- Completed a Cminus-f parser, including a flex-based lexer and a bison-based parser.
- Implemented the rudimentary Cminus-f compiler to automatically generate LLVM IR for the Cminus-f language.
- Adopted Global Value Numbering for optimization of redundancy elimination.

## PROJECTS

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### Cminus-f Compiler

[\[Link\]](#)

- Implemented various optimization methods, including SSA, global value numbering, and dead code elimination.
- Achieved a performance improvement of up to 20% compared to the baseline program.

### A Rudimentary Operating System

[\[Link\]](#)

- Utilized the QEMU bare-metal environment to create a functional operating system.
- Functions include: (1) VGA & serial output; (2) clock interrupt; (3) shell; (4) memory management and allocation; (5) process scheduling functionality

## SKILLS

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**Programming:** C, C++, Python, MySQL, C#, TeX

**Technologies:** Git, Docker, Vscode, Vivado

**Frameworks:** LLVM

**Languages:** Bilingual in English(TOFEL:105), Chinese