

Jixuan Ruan

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EDUCATION

University of Science and Technology of China(USTC)

Sep 2020 – Present

School of the Gifted Young, Senior Year

Huaxia Computer Science and Technology Talent Class

ACADEMIC PERFORMANCE

Overall GPA: 3.77 / 4.30 (Top 15%) **Core Course GPA:** 3.92 / 4.30

PUBLICATIONS

[**ASPLOS'24**] OnePerc: A Randomness-aware Compiler for Photonic Quantum Computing. Hezi Zhang, Jixuan Ruan, Hassan Shapourian, Ramana Rao Kompella, Yufei Ding.

RESEARCH EXPERIENCE

OnePerc

Under the Supervisor of Prof. Yufei Ding

University of California, San Diego

September 2023 – Present, Internship

In light of the significant challenges posed by fusion failure and photon loss, we have developed an innovative framework for the compilation process. Our approach is based on the construction of a robust logical hardware system implemented on a fusion-percolated square lattice. Within this framework, we seamlessly map quantum programs as graph states onto this logical hardware, providing the capability to efficiently store photon qubits in cache. This novel framework demonstrates remarkable improvements compared to previous fusion-centric approaches and notably reduces program depth when compared to the cluster mapping method.

My work could be checked on <https://github.com/Scarlett0815/OnePerc>.

Our paper titled "OnePerc: A Randomness-aware Compiler for Photonic Quantum Computing" has been admitted to the 2024 ASPLOS conference.

OneQ Optimization

Under the Supervisor of Prof. Yufei Ding

University of California, Santa Barbara

Jun 2023 – September 2023, Internship

We are developing a compiler-centric optimization framework tailored for photonic quantum computing. This advanced compiler excels in deploying quantum programs as graph states onto hardware powered by photonic quantum devices. My primary focus is on enhancing the performance of the foundational framework established by Picasso Lab, known as 'OneQ: A Compilation Framework for Photonic One-Way Quantum Computation.' This enhancement spans across three key dimensions: algorithmic improvements, diversification of resource states, and increased alignment with physical realism.

My work could be checked on <https://github.com/Scarlett0815/OneQ-Optimization>.

Build a VR Office system based on Oculus

Under the Supervisor of Prof. Kai Xing

University of Science and Technology of China

Jul 2022 – Aug 2022, Part-time

I took part in a small group consisted of several students interested in VR to build a office system based on Oculus. In this office system, we added the gesture recognition to Oculus and freed customers from the handlers. In addition, we realized 3 basic functions, which are 3D Object Importing, Remote Control as well as Model Plane.

Our work could be seen on <https://github.com/OSH-2022/VR-fancy-office>.

USTC Robo Game

Under the Supervisor of Prof. Yuhu Li

University of Science and Technology of China

May 2022 – Nov 2022, Part-time

We have made a curling robot in 6 months, during which I was responsible for the recognition part as well as the tracking part. In this process, I used neural network to realized our recognition part for better robustness.

Our work could be seen on <https://github.com/WuTianming/robogame-code>.

SysYF Compiler Design

Under the Supervisor of Prof. Yu Zhang

University of Science and Technology of China

Dec 2022– Jan 2023, Coursework

I made a compiler based on LLVM architecture. I designed this compiler from the lexical level to the final back end. Also, I optimized the register allocation part using graph coloring methods.

My work could be checked on <https://github.com/Scarlett0815/compile/tree/master/compile.llvm/>.

Attack under Split Learning Architecture

Under the Supervisor of Prof. Xiangyang Li

University of Science and Technology of China

Aug 2022– Nov 2022, Part-time

We attempted to perform the classical attack methods on the split learning architecture and compare its influence with the one under the federated learning architecture. Later, we came up with methods to strengthen the attacking results.

HONORS AND AWARDS

Huaxia Computer Science Talent Class Scholarship	Dec 2023
Outstanding Student Scholarship Silver Award	Nov 2023
Huaxia Computer Science Talent Class Scholarship	Dec 2022
Outstanding Student Scholarship Gold Award	Nov 2022
The Second Prize in USTC RoboGame	Nov 2022
Special Award for Girls in USTC Programming Competition(div1)	Apr 2022
The Second Prize of the Undergraduate Mathematics Contest	Dec 2021
China Collegiate Programming Contests for Girls Bronze Award	Nov 2021
Outstanding Student Scholarship Bronze Award	Sep 2021
Rose Light Scholarship	Jul 2021
Freshman third-class scholarship	Dec 2020

SKILLS

Programming: C / C++, Python, Verilog, Java, Pascal, Basic, C#

Libraries: OpenCV, PyTorch, TensorFlow, Mxnet, NumPy, Pandas, Matplotlib

Languages: Chinese, English

TEACHING EXPERIENCE

Computer Programming A

University of Science and Technology of China

Organized by Prof. Jie Shen

2023 Fall

Topic: C Programming, Introduction to Basic Data Structure, Foundation of Basic Algorithms

RESEARCH INTEREST

Quantum Computing, Programming Language

Operating Systems, Computer Architecture, Security

EXTRACURRICULAR ACTIVITIES

Core Member in the Alumni Liaison Group of the Computer Science Department

Member of Debate Team of School of the Gifted Young

Commissary in Charge of General Affairs

PERSONAL HOBBIES

Sketching; Calligraphy; Piano; Novel Writing; Mountain Climbing

Notation: Some of my work could be checked on my personal website <https://scarlett0815.github.io/>