

# Zirui Liu

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## EDUCATION

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### Peking University

B.S. in Computer Science, Yuanpei College

Beijing, China

**Aug 2016 - Jul 2021 (Expected)**

- **Overall GPA: 3.79/4.0** (Top 10%)
- **Course Highlights:** Data Structure and Algorithm (91.5), Practice of Data Structure and Algorithm (93), Practice of Programming in C&C++ (91), Advanced Mathematics (95), Advanced Algebra (94), Linear Algebra (94), Set Theory and Graph Theory (92), Statistics (98)
- **Technical Skills:** C&C++, Python, Golang, Matlab, OpenGL, L<sup>A</sup>T<sub>E</sub>X
- **Awards:** Award for Academic Excellence (2018-2019, Top 15%), Kwang-Hua Scholarship (2016-2017, Top 10%), Award for Contribution in Student Organizations (2016-2017), Freshman Scholarship (2016)

## RESEARCH INTEREST

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My research interests lie in the general area of Computer Network, particularly in Network Measurement, Streaming Algorithms and P2P Network Broadcast, as well as the application of the Coding Theory to Networks. I also have a keen interest in Ray Tracing Rendering.

## RESEARCH EXPERIENCE

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### Institute of Network Computing and Information Systems

*Research Intern*

*Supervised by Prof. Tong Yang*

- **Coded Blockchain with Less Broadcast Traffic** Dec 2019 - Present
  - We aim to apply the Coding Theory to improve the broadcast traffic in Blockchain networks.
  - Responsible for investigating and implementing the Codes to be applied.
- **Twin-Prime Hash Table (TPT)** Oct 2019 - Present
  - We proposed a new kind of hash table based on Twin-Prime
  - TPT significantly outperforms state-of-the-art in fields including constant hash table, multi-set conciliation, memorization of streaming data, packet loss detection, etc.
- **One Slow Memory Access Hash Table (OMH)** Sept 2019 - Present
  - We proposed a new kind of hash table OMH, which is deployed in the fast-slow hierarchical memories.
  - OMH builds exclusive fingerprints in the fast memory to guide query in the slow memory.

## COURSE PROJECTS

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- **A Monte Carlo Sampling Ray-Tracing Renderer** Jul 2019
  - It supports the mixture of direct light sampling and random sampling, and some features like noise texture, contoured volume and BVH are added.
- **An Exploration of Maximum Clique Problem using Local Search Algorithm** Dec 2018
  - Implemented and improved [NuMVC](#) algorithm of Prof. Shaowei Cai.
  - This project got the highest scores in the final assignment of Practice of Data Structure and Algorithm course (2018 Fall).

## TEACHING EXPERIENCE

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### Peking University

Course: Rapid Prototyping in Innovations

Instructor: Prof. Jiang Chen

Sept 2018 - Dec 2018

Role: Teaching Assistant

## EXTRACURRICULAR ACTIVITIES

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[Linux Club of Peking University \(LCPU\)](#) , director

Sept 2019 - Present

[Lee Shiu Leadership Programme](#) at NUS and CUHK

Jul 2018

Softball team of Yuanpei College

Sept 2019 - Present