

# Zerui Cheng

Fourth-year Undergraduate,  
Majoring in Computer Science,  
Member of the Honored [Yao Class](#) Program,  
IIIS, Tsinghua University

Cell: (+86)-13717671266  
Website: <https://www.zerui-cheng.com>  
E-mail: [marco.cheng712@gmail.com](mailto:marco.cheng712@gmail.com)  
Google scholar page: [Click the Link](#)

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## Education

**B.Eng. , Aug 2019 - Jul 2023 (expected)**

Tsinghua University

Current Cumulative GPA: 3.9/4.0

Majoring in Computer Science, member of the honored undergraduate CS program [Yao Class](#) founded by Turing Award winner Andrew.C.Yao

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## Research Interests

I'm broadly interested in various areas, including but not limited to:

- **Blockchains and Cryptocurrencies**
- **Mechanism Design and Incentive Design**
- **Applied Cryptography**

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## Research Experience

### Research Intern

Affiliation: UC Berkeley

**Mar 2022 - Aug 2022**

Advisor: [Prof. Dawn Song](#)

Worked on the design and implementation of "zkBridge", the first ever trustless cross-chain bridge secured by cryptographic guarantee.  
Co-authored the paper "zkBridge: Trustless Cross-chain Bridge Made Practical".

### Research Intern

Affiliation: Duke University

**Feb 2022 - Aug 2022**

Advisor: [Prof. Fan Zhang](#)

Worked on designing, analyzing and simulating side contracts against EIP-1559 of Ethereum. Still in progress now, and results will hopefully come out soon.

### Summer Research Intern

Affiliation: Shanghai Qizhi Institute

**Jul 2021 - Aug 2021**

Advisor: [Prof. Zhixuan Fang](#)

Worked on theoretical modeling and mathematical analysis (using queueing theory) of transaction waiting time on popular blockchains (e.g., Bitcoin).

## Student Research Training Program Oct 2020 - Feb 2022

Affiliation: Tsinghua University

Advisor: [Prof. Zhixuan Fang](#)

Worked on two projects during the period of time:

1. Analysis of multi-agent selfish mining on Bitcoin by theory and simulation.
2. Mechanism design and implementation of CrowdMine, a new protocol aimed on re-utilizing computation power for useful work in Proof-of-Work blockchains.

Co-first author of the paper "Crowdsourcing Work as Mining: A Decentralized Computation and Storage Paradigm".

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### Papers

#### **zkBridge: Trustless Cross-chain Bridge Made Practical**

*[Published in ACM CCS 2022]*

Tiancheng Xie, Jiaheng Zhang, **Zerui Cheng**, Fan Zhang, Yupeng Zhang, Yongzheng Jia, Dan Boneh, Dawn Song

#### **Crowdsourcing Work as Mining: A Decentralized**

**Computation and Storage Paradigm** *[In submission, WWW 2023]*

Canhui Chen\*, **Zerui Cheng\***, Shutong Qu, Zhixuan Fang [\*: equal contribution]

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### Other Projects

#### **Design and Analysis of Side Contracts against EIP-1559 From Theory, Simulation, and Empirical View**

Feb 2022 till now

In-progress research project during internship, advised by Prof. Fan Zhang

#### **An Algorithm for Graph Matching with Restrictions on Edge Weights, Based on Number Theory, Linear Algebra and Randomization** ([link](#))

May 2021 - June 2021

<Numerical Analysis> course project, instructed by Prof. Wenjian Yu

#### **A Survey on Blockchain System and Related Cryptographic Methods** ([link](#))

Apr 2021 - June 2021

<Fundamentals of Crypto> course project, instructed by Prof. Yilei Chen

#### **Game-Theoretic Analysis of Multi-Agent Selfish Mining in Bitcoin** ([link](#))

Oct 2020 - May 2021

Students' Research Training Project, advised by Prof. Zhixuan Fang

Presented at Rump Session on IC3 Blockchain Summer Camp 2022

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### Scholarships

#### **Yao Award** ([Intro to the Prize](#))

Sep 2022

#### **Scholarship for Comprehensive Excellence in All Aspects**

Oct 2022

#### **Scholarship for Excellence in Academic Achievements**

Oct 2021

#### **Scholarship for Excellence in Scientific and Technological Innovation**

Oct 2021

**Scholarship for Excellence in Voluntary Work and Social Activities** **Oct 2020**

**Xuetang Scholarship (Tuition Fee Exemption)**  
**Annual, from 2019**

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**Honors / Awards**

ICPC is short for International Collegiate Programming Contest  
CCPC is short for Chinese Collegiate Programming Contest

**Winner of IC3 Blockchain Camp Hackathon** **Aug 2022**  
Project: Optimal Wallet Design for Client Security, led by Ittay Eyal and Roi Bar-Zur

**155th worldwide (top 0.5%) in Google CodeJam**  
**Jun 2022**

**Gold Award in CCPC (Harbin Site)** **Nov 2021**  
Leader of Team “Safety Car”, 7<sup>th</sup> place nationwide

**Gold Award in ICPC (Yinchuan Site)** **May 2021**  
Member of Team “Tsar Bomba”, 5<sup>th</sup> place nationwide

**Silver Award in ICPC (East Continental Final)** **Apr 2021**  
Member of Team “Tsar Bomba”, 40<sup>th</sup> place worldwide

**First Prize in China Collegiate Mathematical Contest**  
**Dec 2020**

**Gold Award in CCPC (Changchun Site)** **Nov 2020**  
Member of Team “Tsar Bomba”, 8<sup>th</sup> place nationwide

**Second Place in “Leetcode Cup” National Programming Contest**  
**Oct 2019**

**Silver Medal in National Olympiad in Informatics**  
**Jul 2018**

**Gold Medal in CTSC (Chinese Team Selection Contest) for Informatics**  
**May 2018**

**Bronze Medal in APIO (Asia-Pacific Informatics Olympiad)**  
**May 2018**

**Gold Medal in National Olympiad in Informatics Winter Camp**  
**Feb 2018**

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**Social Work / Activities**

**Vice President, IIIS Students Union** From Oct 2021 till now

**Deputy Secretary, IIIS Youth League Committee**  
Oct 2021 - Feb 2022

**League Branch Secretary of Yao Class 92**

From Sep 2021 till now

**Problem Setter of Chinese National Olympiad in Informatics**

Jul 2021

**Volunteer of the 110th Anniversary of Tsinghua University**

Apr 2021

**Member, Organization Department of IIIS Students Union**

Aug 2020 - Sep 2021

**Member, Contest Stuff Department of THU Algorithm Association**

Jul 2020 - Feb 2022

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**Skills**

**Programming Skills**

**Most Proficient:** C/C++

**Frequently Used:** Python, Solidity

**Also familiar with:** Golang, Matlab, SQL, Verilog, gnark, ZoKrates

**Language Skills**

Chinese (native), English (111pts in TOEFL iBT, R30 L27 S24 W30)

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**Last Revised on:** Nov 12, 2022

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