

Zerui CHENG

First year Ph.D. student at Princeton University
B.Eng. from Yao Class, IIIS, Tsinghua University in 2023
Research Interests: Blockchains, Web3 Technologies.

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EDUCATION BACKGROUND

2023.8 - now **Ph.D. in Electical and Computer Engineering, Princeton University**
Working in Prof. Pramod Viswanath's Research Group

2019.8 - 2023.6 **B.Eng. in Computer Science, Tsinghua University**
Member of the esteemed "Yao Class";
Graduated summa cum laude with excellent diploma thesis award;
Final cumulative GPA: 3.91/4.00.

RESEARCH EXPERIENCE

2023.2 - 2023.6 **Undergraduate Diploma Thesis, Tsinghua University**
Thesis advisor: Prof. Zhixuan Fang
Titled "LLM on Web 3.0: A Paradigm for Decentralized Inference in Large ML Models on Blockchains", also part of a research project collaborated with Prof. Pramod Viswanath's group at Princeton;
The diploma thesis also wins the Excellent Diploma Thesis Award (5 out of a total of 94 are selected in Yao Class).

2022.12 - now **Co-founder and Blockchain Researcher, zkzero.io (startup)**
Worked on the tokenomics design and analysis of our blockchain.
The paper "Proof-of-Proof: Designing a Deflationary Tokenomics and On-Chain Matching Mechanism for Decentralized Zero-Knowledge Proof Markets" is in submission now.

- 2022.2 - 2022.8 **Research Intern, University of California, Berkeley**
Advisor: Prof. Dawn Song
Mentored by Tiancheng Xie, worked on zero-knowledge proofs implementation, and co-authored the paper “zkBridge: Trustless Cross-chain Bridges Made Practical” (published in ACM CCS 2022).
- 2022.2 - 2022.8 **Research Intern, Duke University**
Advisor: Prof. Fan Zhang
Worked on designing, analyzing, and simulating side contracts between miners and users against EIP-1559 protocol on Ethereum.
- 2021.7 - 2021.8 **Research Intern, Shanghai Qizhi Institute**
Advisor: Prof. Zhixuan Fang
Worked on theoretical modeling and mathematical analysis (using queueing theory) of transaction waiting time on blockchains.
- 2020.10 - 2022.2 **Student Research Training Program, Tsinghua University**
Advisor: Prof. Zhixuan Fang
Worked on two projects during the program:
1. Analysis of multi-agent selfish mining on Bitcoin in both theory and simulation. The results are presented at the rump session of IC3 Blockchain Summer Camp in 2022.
2. Mechanism design and implementation a new protocol aimed at re-utilizing computation power for general and useful computation in PoW blockchains. The paper “Crowdsourcing Work as Mining: A Decentralized Computation and Storage Paradigm”, of which I am the co-first author, is published in APNET 2023 as a poster.

In addition, I was honored to serve as the reviewer for the top-tier journal **IEEE JSAC Special Issue on Intelligent Blockchains** and reviewed 2 papers.

PAPERS

- 2023.7** Suma Bhat, Canhui Chen, **Zerui Cheng**, Zhixuan Fang, Ashwin Hebbar, Sreeram Kannan, Ranvir Rana, Peiyao Sheng, Himanshu Tyagi, Pramod Viswanath, and Xuechao Wang. “SAKSHI: Decentralized AI Platforms”, in arXiv preprint arXiv:2307.16562.

- 2023.7** Shuhao Zheng, Ziyue Xin, Zonglun Li, **Zerui Cheng**, Jiaxuan Jiang, and Xue Liu. "Proof-of-Proof: Designing a Deflationary Tokenomics and On-Chain Matching Mechanism for Decentralized Zero-Knowledge Proof Markets", will appear soon.
- 2022.11** Tiancheng Xie, Jiaheng Zhang, **Zerui Cheng**, Fan Zhang, Yupeng Zhang, Yongzheng Jia, Dan Boneh, and Dawn Song. "zkBridge: Trustless cross-chain bridges made practical", in Proceedings of the 2022 ACM SIGSAC Conference on Computer and Communications Security (pp. 3003-3017).
- 2022.11** Canhui Chen*, **Zerui Cheng***, Shutong Qu, and Zhixuan Fang. "Crowdsourcing Work as Mining: A Decentralized Computation and Storage Paradigm", to appear in 7th Asia-Pacific Workshop on Networking (APNet 2023) as a poster. Also available at arXiv preprint arXiv:2211.06669.

ACADEMIC HONORS/SCHOLARSHIPS

- 2023.8** | **First-year Fellowship for Ph.D. student at Princeton University**
- 2023.6** | **the Excellent Diploma Thesis Award at Tsinghua University**
(5 out of 94 are selected in Yao Class)
- 2023.6** | **Yao Class Departmental summa cum laude**
(23 out of 94 students are awarded the honor in Yao Class)
- 2022.9** | **Yao Award** (the most prestigious honor for a Yao Class student)
Bronze Medal (Of a total of 62 students in CS track, only 1 gold, 2 silvers, and 3 bronzes are given out, with winning rate $\leq 10\%$)
- 2022.9** | **Scholarship for Comprehensive Excellence in All Aspects**
- 2021.9** | **Scholarship for Excellence in Academic Achievements**
- 2021.9** | **Scholarship for Excellence in Scientific and Technological Innovation**
- Annual** | **Xuetang Scholarship (Tuition Fee Exemption for Undergraduate Study)**

COMPETITION HONORS/AWARDS

ICPC is short for International Collegiate Programming Contest,
while CCPC is short for Chinese Collegiate Programming Contest.

2022.11 | Silver Medal in CCPC (Mianyang Site) as team leader

2022.8 | Champion Team Member of IC3 Blockchain Summer Camp Hackathon
Project: "Optimal Wallet Design for Client Security"
Topic selected and team led by Ittay Eyal and Roi Bar-Zur.

2022.6 | 155th worldwide (top 0.5%) in Google CodeJam 2022

2021.11 | Gold Medal in CCPC (Harbin Site) as team leader
7th place out of 240 participating teams nationwide

2021.5 | Gold Medal in ICPC (Yinchuan Site) as team member
5th place out of 511 participating teams nationwide

2021.4 | Silver Medal in ICPC (East-Asia Continental Final) as team member

2020.12 | First Prize in China Collegiate Mathematical Contest

2020.11 | Gold Medal in CCPC (Changchun Site) as team member
8th place out of 324 participating teams nationwide

2019.10 | Second Place in "Leetcode Cup" National Programming Contest

2019.6 | 22th place in the National College Entrance Exam in Anhui
It's reported that more than 513,000 students participated in the exam.

2018.7 | Silver Medal in NOI (National Olympiad in Informatics)
65th place nationwide while unfortunately 64 gold medals were set.

2018.5 | Gold Medal in CTSC (Chinese Team Selection Contest) for Informatics
14th place out of 544 participants nationwide

2018.5 | Bronze Medal in APIO (Asia-Pacific Informatics Olympiad)

2018.4 | First Place in Anhui Provincial Team Selection Contest for NOI

2018.2 | Gold Medal in National Olympiad in Informatics Winter Camp
12th place out of 587 participants nationwide

For online competitive programming contests,
it's worth mentioning that,
On **HackerRank**, my rating is 2796.62,
which ranked 16th worldwide out of all 182,781 hackers as of Aug 15, 2023.
On **Codeforces**, my rating is 2230 and the highest ever rating has reached 2399.

SOCIAL WORK and ACTIVITIES

2023.1 | Participant of TV program <Super Brain> at Jiangsu Channel
Finished in final top50.

2022.10 - 2023.6 | President, Yao Class Students' Congress, Tsinghua University

2021.10 - 2022.9 | Deputy Secretary, Yao Class Youth League, Tsinghua University

2021.10 - 2022.9 | Vice President, Yao Class Students' Congress, Tsinghua University

2021.7 | Problem Setter, National Olympiad in Informatics

2021.4 | Volunteer of the 110th Anniversary of Tsinghua University

2020.8 - 2021.9 | Member, Organization Department, Yao Class Students Congress

2020.7 - 2022.2 | Member, Tsinghua University Algorithm Association
Problem setter and contest organizer of Tsinghua University Programming Contest (THUPC) in 2020 and 2021.

SKILLS

Programming Skills

Most Proficient: C/C++ Frequently Used: Python, Solidity

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

Language Skills

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

Last Revised on: Aug 15, 2023
