

# Zerui Cheng

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## EDUCATION

<b>Princeton University, Electrical and Computer Engineering</b>	Aug 2023 - Now
<i>Ph.D. student, working on blockchains and AI, Advisor: Prof. Pramod Viswanath</i>	<i>Current GPA: 4.00/4.00</i>
<b>Tsinghua University, “Yao Class” Honored Program</b>	Aug 2019 - Jun 2023
<i>B.Eng. with Hons in Computer Science, summa cum laude, “Yao Award” recipient</i>	<i>GPA: 3.91/4.00</i>

## PAPERS

- 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*.
- Canhui Chen\*, **Zerui Cheng\***, Shutong Qu, and Zhixuan Fang. “Crowdsourcing Work as Mining: A Decentralized Computation and Storage Paradigm”, In *Proceedings of the 7th Asia-Pacific Workshop on Networking*, pp. 174-175. 2023 (\* denotes co-first author).
- 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).

## INDUSTRIAL EXPERIENCE

<b>PolyHedra, Intern</b>	Jul 2023 - Dec 2023
Intern at polyhedra.network.	
Working on the implementation of cross-chain bridges backed by zero-knowledge proof.	
Collaborating closely with Tiancheng Xie.	
<b>Sentient, AI Fellow</b>	May 2024 - Now
AI Fellow at sentient.foundation.	
Working on intellectual property protection of machine learning models.	
Collaborating closely with Prof. Sewoong Oh and Prof. Pramod Viswanath.	

## ACADEMIC HONORS AND AWARDS

<b>First-year Fellowship for Graduate student at Princeton University</b>	Aug 2023
<b>Excellent Diploma Thesis Award at Tsinghua University</b>	Jun 2023
5 out of 94 are selected in Yao Class.	
<b>Yao Class Departmental summa cum laude</b>	Jun 2023
23 out of 94 students are selected in Yao Class.	
<b>Yao Award (the most prestigious honor for a Yao Class student)</b>	Sep 2022
Bronze Medal (Top 6 in Yao Class), with winning rate $\leq 10\%$	
<b>Scholarship for Comprehensive Excellence in All Aspects</b>	Sep 2022
<b>Scholarship for Excellence in Academic Achievements</b>	Sep 2021
<b>Scholarship for Excellence in Scientific and Technological Innovation</b>	Sep 2021
<b>Scholarship for Excellence in Social Activities and Voluntary Work</b>	Sep 2020
<b>Xuetang Scholarship (Tuition Fee Exemption for Undergraduate Study)</b>	Annual, 2019 - 2023
Only awarded to a small portion of selected students in “Xuetang program”.	

## OFFICIAL COMPETITIVE PROGRAMMING CONTESTS

<b>22<sup>nd</sup> Place in ICPC<sup>1</sup> North America Championship</b>	May 2024
Member of team “Princeton-1”. Final scoreboard: <a href="https://image.icpc.global/nac2024/scoreboard/index.html">https://image.icpc.global/nac2024/scoreboard/index.html</a>	
Awardee of “First Solution in the Contest” “First solve of Problem D” (prize: \$3000).	
<b>3<sup>rd</sup> Place in ICPC<sup>2</sup> Greater New York Regional Contest</b>	Oct 2023
Member of team “Princeton-1”. Final scoreboard: <a href="http://acmgnyr.org/year2023/scoreboard_final/index.html">http://acmgnyr.org/year2023/scoreboard_final/index.html</a>	
The only team in Princeton that qualified for ICPC North America Championship 2024.	
<b>Silver Medal in CCPC<sup>3</sup> Mianyang Site</b>	Oct 2022
<b>Gold Medal in CCPC Harbin Site</b>	Nov 2021
7 <sup>th</sup> place out of 240 participating teams nationwide.	
<b>Gold Medal in ICPC Yinchuan Regional Contest</b>	May 2021
5 <sup>th</sup> place out of 511 participating teams nationwide.	
<b>Silver Medal in ICPC East-Asia Continental Final</b>	Apr 2021
<b>Gold Medal in CCPC Changchun Site</b>	Nov 2020
8 <sup>th</sup> place out of 324 participating teams nationwide.	
<b>Two Silver Medals in CCF NOI (Chinese National Olympiad in Informatics)</b>	Jul 2017, Jul 2018
65 <sup>th</sup> place nationwide in 2018, while unfortunately 64 gold medals were set.	
<b>Gold Medal in CTSC (Chinese Team Selection Contest) for Informatics 2018</b>	May 2018
14 <sup>th</sup> place out of 544 participants nationwide.	
<b>First Place in Anhui Provincial Team Selection Contest for CCF NOI 2018</b>	Apr 2018
<b>Gold Medal in CCF NOI Winter Camp 2018</b>	Jan 2018
12 <sup>th</sup> place out of 587 participants nationwide.	

## OTHER COMPETITIVE PROGRAMMING CONTESTS

<b>Finalist (Top 16 in the U.S.) of MIT Informatics Tournament Spring Invitational</b>	May 2024
Only top 16 contestants across the USA advance to the final. See <a href="https://codeforces.com/blog/entry/129342">https://codeforces.com/blog/entry/129342</a> for details.	
<b>1<sup>st</sup> place in Princeton Competitive Programming Club Spring Special Contest</b>	Feb 2024
See <a href="https://competitive-programming.cs.princeton.edu/hello.spring.24">https://competitive-programming.cs.princeton.edu/hello.spring.24</a> for details.	
<b>1<sup>st</sup> place in Princeton Computer Science Contest 2023</b>	Dec 2023
Member of team “temp name”. See <a href="https://princetonacm.github.io/coscon/">https://princetonacm.github.io/coscon/</a> for details.	
<b>124<sup>th</sup> worldwide (top 0.6%) in Meta HackerCup 2023</b>	Nov 2023
Scoreboard: <a href="https://www.facebook.com/codingcompetitions/hacker-cup/2023/round-3/scoreboard">https://www.facebook.com/codingcompetitions/hacker-cup/2023/round-3/scoreboard</a>	
<b>155<sup>th</sup> worldwide (top 0.5%) in Google CodeJam 2022</b>	Jun 2022
<b>Second Place in “Leetcode Cup” National Programming Contest</b>	Oct 2019

## OTHER COMPETITION HONORS/AWARDS

<b>Champion of IC3 Blockchain Summer Camp Hackathon</b>	Aug 2022
Member of project “Client Security”.	
Event Website: <a href="https://www.initc3.org/events/2022-08-01-ic3-blockchain-camp-2022">https://www.initc3.org/events/2022-08-01-ic3-blockchain-camp-2022</a>	
<b>First Prize in China Collegiate Mathematical Contest</b>	Dec 2020
<b>22<sup>th</sup> place (out of ~513,000) in the National College Entrance Exam in Anhui Province</b>	Jun 2019

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ICPC is short for International Collegiate Programming Contest.

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CCPC is short for Chinese Collegiate Programming Contest.

## RESEARCH EXPERIENCE AND PROJECTS

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- Undergraduate Diploma Thesis, Tsinghua University** | *Advisor: Prof. Zhixuan Fang* Feb 2023 - Jun 2023
- Worked on designing a decentralized platform on top of blockchains for fair and transparent AI service, mainly exploring how to leverage techniques in cryptography (zero-knowledge proof) to deliver trust in the platform, namely “Proof-of-Inference” (PoI).
  - Wins the “Excellent Diploma Thesis Award” of Tsinghua University (only 5 out of 94 in Yao Class).
  - As part of the “SAKSHI” project, collaborated with a set of perfect talents from across the world, and co-authored the whitepaper “SAKSHI: Decentralized AI Platforms” for the project (live on ArXiv in July 2023).
- Research Intern, University of California, Berkeley** | *Advisor: Prof. Dawn Song* Jan 2022 - Aug 2022
- Mentored by Dawn’s Ph.D. student Tiancheng Xie (CTO of Polyhedra).
  - Worked on cross-chain bridge protocol design and implementation with zero-knowledge proofs.
  - Collaborated with a set of fantastic people from both industry and academia, and learned quite a lot.
  - Co-authored the paper “zkBridge: Trustless Cross-chain Bridges Made Practical” (published in ACM CCS 2022).
- Research Intern, Duke University** | *Advisor: Prof. Fan Zhang* Jan 2022 - Aug 2022
- Worked on designing, analyzing, and simulating side contracts against EIP-1559 protocol on Ethereum.
  - Used C++ , Python to interact with an Ethereum full node, do data analysis, and simulate the protocol.
- Student Research Training Program, Tsinghua University** | *Advisor: Prof. Zhixuan Fang* Sep 2021 - Feb 2022
- Worked on mechanism design and implementation of a new protocol aimed at re-utilizing computation power for general and useful computation in PoW blockchains.
  - Collaborated with Canhui, Ph.D. student in Prof. Fang’s group, and Shutong, one of my best friends during my undergraduate, on both protocol design and prototype implementation.
  - 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.
- Research Intern, Shanghai Qizhi Institute** | *Advisor: Prof. Zhixuan Fang* Jul 2021 - Aug 2021
- Worked on modeling and mathematical analysis (using queueing theory) of blockchain transaction waiting time.
- Student Research Training Program, Tsinghua University** | *Advisor: Prof. Zhixuan Fang* Oct 2020 - Jun 2021
- Worked on analysis of multi-agent selfish mining on Bitcoin in both theory and simulation.
  - The results were presented at IC3 Blockchain Summer Camp in 2022.

## SOCIAL WORK AND ACTIVITIES

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- Participant of TV program “Super Brain” broadcast at Jiangsu Channel** Jan 2023  
Only Top 50 across China can appear at the final stage.
- President, Yao Class Students’ Congress, Tsinghua University** Oct 2022 - Jun 2023  
Organized regular social activities for Yao Class students.  
Connected students with leading tech companies and investment companies.  
Took responsibility for managing the money and accounts of Yao Class Students’ Congress.  
Held the yearly Students’ Congress work report to all students, and led the yearly new member recruitment.
- Deputy Secretary, Yao Class Youth League, Tsinghua University** Oct 2021 - Sep 2022  
Attended bi-weekly meetings hosted by Tsinghua University, and delivered announcements from university to students.  
Also did a lot of statistical work and paperwork for Yao Class students.
- Vice President, Yao Class Students’ Congress, Tsinghua University** Oct 2021 - Sep 2022  
Took responsibility for departmental public space management (noise control, access control, regular cleaning, etc.)
- Problem Setter, Chinese National Olympiad in Informatics** Jul 2021  
Set the problem “Quantum communication”, the first problem in Day 2’s contest.  
Received a lot of positive feedback from contestants.  
Voted as the best problem in the whole contest from the post-contest survey.
- Volunteer of the 110<sup>th</sup> Anniversary of Tsinghua University** Apr 2021
- Member, Organization Department, Yao Class Students Congress** Aug 2020 - Sep 2021
- Member, Tsinghua University Algorithm Association** Jul 2020 - Feb 2022  
Problem setter and contest organizer of Tsinghua University Programming Contest (THUPC) in 2020 and 2021.

## SKILLS

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### **Spoken Languages:**

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

### **Programming Languages:**

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

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