Zhaienhe ZHOU

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Education

2022.9 – 2026.7 (expected) **University of Science and Technology of China (USTC)**, Hefei
Bachelor of Engineering in Computer Science
School of the Gifted Young, Advisor: Xue Chen

Grade: GPA(overall): **3.74/4.3**, Score: **88.68**

Selected awards:
- Highest Honor, 13th place in **ICPC 2024 World Finals** (top 1%)
- Gold Medal, 5th place in **ICPC 2024 Asia-East Continent Final** (top 1%)
- Gold Medal, 2nd place in ICPC 2024 Nanjing Regional (top 1%)
- Bronze Medal, National Olympiad in Informatics 2021

Selected courses: Foundations of Algorithms (100/100), Combinatorics (98/100), Data Structure (97/100), Computer Programming (H) (97/100), Linear Algebra (90/100), Operations Research (90/100), Probability Theory (90/100), Compiler Principles (90/100), Graph Theory (88/100), Computational Method (87/100), Graduate Optimization Algorithms (taking)

Publications

- Xue Chen, Wenxuan Shu, and **Zhaienhe Zhou**. *Algorithms for Sparse LPN and LSPN Against Low-Noise*. 38th Annual Conference on Learning Theory (COLT 2025), to appear. (Authors listed alphabetically.) [arXiv:2407.19215]
- **Zhaienhe Zhou** and Zeyu Guo. *Improved Decoding of Tanner Codes*. 2025 IEEE International Symposium on Information Theory (ISIT 2025), to appear. [arXiv:2501.12293]

Research Experiences

2024.8 **Improved Decoding of Tanner Codes**, *Research Assistant*
Advisor: Zeyu Guo (Assistant Professor, Department of Computer Science and Engineering, Ohio State University)
- Improved previous decoding algorithm via weighted voting, extending the decoding regime from $\delta d_0 > 3$ to $\delta d_0 > 2$.
- Enhanced the deterministic decoding radius to αN.
- Derived tighter upper bounds for the distance of Tanner codes using the size-expansion tradeoff.
- Studied foundational works and recent advancements in Expander, Tanner, and Ins-del codes.

2024.2 – present **Algorithms for Sparse LPN and LSPN Against Low-noise**, *Research Assistant*
Advisor: Xue Chen (Research Professor, Department of Computer Science, USTC)
- Present a LSPN algorithm that runs in time $O(\eta \cdot n/k)^k$. Improving the state-of-the-art for LSPN in a wide range of parameters.
- Presented a learning algorithm for sparse LPN with time complexity $e^{\tilde{O}(\eta \cdot n^{\frac{1+\delta}{2}})}$ and sample complexity $m = n^{O(1)+(\frac{k}{2})(1-\delta)}$.
- Our approach is based first on domain reduction using the knowledge of sparsity, followed by Gaussian elimination or BKW.
- Investigated previous LSPN and Sparse LPN algorithms.

2023.9 – 2024.1 **Expansion on Regular Graph**, *Research Assistant*
Advisor: Xue Chen (Research Professor, Department of Computer Science, USTC)
- Investigated lower bounds on graph expansion using the second eigenvalue and girth methods.
- Explored enhancements to the girth method for stronger expansion bounds.

Other Experience

2024.7 **"Beauty of Computational Theory" Summer School**, *Student*, hosted by Nanjing University
- Learned about topics like boolean function analysis, MCMC, random walk, differential privacy, etc.
- Excelled in the final exam, earning direct access to the graduate program interview.

2024.7 **Video Encoding and Decoding Algorithm**, *Intern*
Advisor: Chaoyi Han (one of *Huawei TopMinds*, Multimedia group, Huawei)
- Studied H.265 standards and implementation, read x265 source code, wrote documentation, and summarized the rate control algorithms in ABR & CRF modes.
- Investigated JND-related papers, replicated the experiments, and analyzed the results.

Teaching Experiences

2024.2 – 2024.6 **Teaching Assistant**, Foundations of Algorithms, USTC
Designed lab assignments and conducted weekly office hours.

2024.1 – 2024.2 **Competition Coach**, TopsCoding, Winter 2024 Course
Presented tutorials on string algorithms and number theory.

Awards

Competitive Programming

2024 Gold Medal, 5th place, ICPC Asia-East Continent Final

2024 Gold Medal, 2nd place in ICPC Nanjing Regional, 12th place in ICPC Hongkong Regional

2024 Gold Medal, 2nd place, CCPC Harbin Regional

2024 Highest Honor, 13th place, ICPC World Finals Astana (solved the same number of problems as the 12th place bronze medal team)

2024 Gold Medal, 10th place, ICPC Asia-East Continent Final

2023 Gold Medal, 6th place in ICPC Hangzhou Regional, 6th place in ICPC Xian Regional

2023 Gold Medal, 17th place, ICPC Asia-East Continent Final

2022, 2023 Gold Medal, 8th place in ICPC Xian Regional, 21th place in ICPC Shenyang Regional

2021 Bronze Medal, National Olympiad of Informatics of China

2020, 2021 First Prize, National Olympiad of Informatics in Provinces (Beijing)

2020 Silver Medal, Asia-Pacific Informatics Olympiad, China region

Math

2023 Second Prize, National College Student Mathematics Competition

Scholarships

2023, 2024 Silver Scholarship (top 10%), School of the Gifted Young, USTC

2022 Talent Program Scholarship, Talent Program in Computer Science (Hua Xia)

2022 Admission Scholarship, School of the Gifted Young, USTC

Activities

2022 – 2024 **Vice President**, Computer Programming Club, USTC.

2022 – 2024 **Member**, Publicity Department, Student Union of the School of the Gifted Young, USTC.

2023 **Top 19/300**, Short-distance (10 km) Marathon, USTC.

Skills

Language English (fluent, TOEFL: 102, GRE: Q170+V152+3), Chinese (native)

Programming C/C++, Python, Verilog, Javascript, LaTeX

Software Mathematica