

EDUCATION

- **Yao Class, IIS, Tsinghua University** Sept. 2020 to July 2024 (Expected)
Undergraduate in Computer Science and Technology; GPA: 3.90 / 4.00 (equivalent 100-point value: 94 / 100), Major GPA: 3.99 / 4.00 (equivalent 100-point value: 97 / 100) Beijing, China
 - Related course: Algorithm Design, Theory of Computation, Database Systems, Computer Architecture, and more.
 - Received A+ grades in 14 courses, including all aforementioned courses.
- **Guangzhou No.2 High School** Sept. 2017 to July 2020
Olympiad in Informatics Training Team Guangzhou, China
 - Participated in Olympiad in Informatics and was selected for the Chinese National Training Team.

PUBLICATIONS

- Unless stated otherwise, author names are in **alphabetical order**.
- Maximal k -Edge-Connected Subgraphs in Almost-Linear Time for Small k [arxiv]
Thatchaphol Saranurak and **Wuwei Yuan**.
European Symposium on Algorithms (ESA), 2023.

RESEARCH & WORK EXPERIENCE

- **Theory of Computation Laboratory, the University of Michigan** Feb. 2023 to July 2023
Visiting Scholar. Advised by Prof. Thatchaphol Saranurak Ann Arbor, Michigan, USA
 - Conducted research on graph algorithms, especially expanders and dynamic graph algorithms.
 - Designed the first almost-linear time algorithm for computing the maximal k -edge-connected subgraphs for $k = \log^{o(1)} n$.
- **Shanghai Qi Zhi Institute** July 2022 to Aug. 2022
Research Intern. Advised by Prof. Huanchen Zhang Shanghai, China
 - Designed LSM-Tree on tiered storage devices.
 - Developing data structures and algorithms separating data between fast disks and slow disks to increase overall performance.
 - Designed and implemented an in-memory simulator that simulates the RocksDB efficiently.

COMPETITIVE PROGRAMMING

- CCF Collegiate Computer System & Programming Contest: **Gold medal, 2nd place** Oct. 2023
- Baidu Astar Programming Contest: **13th place** Nov. 2022
- International Collegiate Programming Contest, Asia Hefei Regional Contest: **Gold medal, 10th place** Nov. 2022
- China Collegiate Programming Contest (Guangzhou), **Gold medal, 6th place** Nov 2022
- Jingdong Programming and Algorithm Design Contest: **1st place** June 2022
- China Computer Federation Certified Software Professional: **1st place** (twice) Dec. 2020 and Dec. 2021
- International Collegiate Programming Contest, Asia Shanghai Regional Contest: **Gold medal, 16th place** Nov. 2021
- International Collegiate Programming Contest, Asia Jinan Regional Contest: **Gold medal, 2nd place** Dec. 2020
- IIS - Haihua AI Challenge - Garbage Classification - Youth Track: **2nd place** Jan. 2020 to May 2020
- Baidu Astar Programming Contest: **10th place** Oct. 2019
- National Olympiad in Informatics, China: **Gold medal, 14th place** (twice) July 2018 and July 2019
- China Team Selection: **Gold medal** May 2019
- Asia-Pacific Informatics Olympiad: **International Gold medal, 3rd place (official)** May 2018
- Tsinghua University Programming Contest: **Gold medal, 2nd place** May 2018
- National Olympiad in Informatics Winter Camp, China: **Gold medal** Feb. 2017

HONORS AND AWARDS

- Comprehensive Excellence Scholarship, Tsinghua University Nov. 2023
- Academic Excellence Scholarship, Tsinghua University Nov. 2023
- Yao Award (Recognition Prize), IIS, Tsinghua University Sept. 2023
- Comprehensive Excellence Scholarship, Tsinghua University Oct. 2022
- Academic Excellence Scholarship, Tsinghua University Oct. 2021
- Sports Excellence Scholarship, Tsinghua University Oct. 2021
- Tsinghua Xuetao Talent Program Scholarship, Tsinghua University Sept. 2020
- Freshman Scholarship, Tsinghua University Sept. 2020

OPEN SOURCE PROJECTS

- Contributed to the shortest cycle section of the OI Wiki on the topic of graph theory.

SELECTED COURSE PROJECTS

- **Advanced Computer Graphics (Course Grade: A+)** Fall 2022
 - Implemented a multithreading path tracing renderer on CPU and used the bounding volume hierarchy structure and many optimization methods to accelerate ray intersection.
 - Implemented many features, including direct illumination, multiple importance sampling, normal mapping, microfacet material (metallic, roughness, clear coat, and anisotropy), and depth of field.
 - Build up a comprehensive scene to display the features above.
- **Fundamental of Parallel Computing (Course Grade: A+)** Spring 2022
 - Implemented a CPU single thread SGEMM (Single precision GEneral Matrix Multiplication) algorithm, achieving a speedup of $1.23\times$ over OpenBLAS on a Kunpeng920 CPU.
 - Implemented a GPU SGEMM algorithm, achieving a speedup of $1.03\times$ over cuBLAS on an NVIDIA P100 GPU.
 - Implemented a GPU SpMV (Sparse Matrix-Vector multiplication) algorithm based on the CSR-Adaptive algorithm, achieving a geometric mean speedup of $1.38\times$ over cuSPARSE on an NVIDIA P100 GPU.
 - The efficiency of the above algorithms far surpasses that of other students.
- **Database Systems (Course Grade: A+)** Fall 2021
 - Implemented a database from sketch, which supports insertion, update, query, deletion, indexing, join, and concurrent operations.
 - Implemented slotted pages that support variable-length tuples (strings) and duplicate keys.
- **Principles and Practice of Compiler Construction (Course Grade: A)** Fall 2019
 - Implemented new features, including abstract class, type deduction, first-class functions, and lambda expressions on the Decaf language, and some code optimization algorithms and register allocation algorithms.
- **Artificial Neural Network** Fall 2019
 - Designed and implemented a neural network based on multiple features, including rhythm and tempo, for music genre recognition, which outperformed the state-of-the-art method in terms of correctness.

SELECTED COURSE GRADES

- **Theoretical Computer Science**
 - Design and Analysis of Algorithms (Graduate Course) A+ • Algorithm Design and Complexity Analysis A+
 - Algorithm Design A+ • Mathematics for Computer Science A+
 - Theory of Computation A+ • Introduction to Computer Science A+
 - Fundamentals of Cryptography A
- **Computer Systems**
 - Advanced Computer Graphics A+ • Computer Architecture A+
 - Fundamental of Parallel Computing A+ • AI+X Computing Acceleration: From Algorithms Development, Analysis, to Deployment A+
 - Database Systems A+ • Principles and Practice of Compiler Construction A

• Mathematics and Others

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|---|----|---|---|
| • Mathematics for Artificial Intelligence | A+ | • Calculus A(2) | A |
| • Introduction to Artificial Intelligence | A+ | • Foundation of Object-Oriented Programming | A |
| • Introduction to Programming in C/C++ | A+ | • Project Management | A |
| • Abstract Algebra | A | | |

VOLUNTEER AND EXTRACURRICULAR ACTIVITIES

- Co-founded the departmental swimming team and swimming association. Organize weekly swimming activities and training. 2020 to 2022
- Member of the sports department of the departmental student union, responsible for organizing competition registrations and other activities. 2021 to 2022
- Organize self-study and seminar activities for classmates, up to 5 times per week. Gave several midterm and final review lectures of *Mathematics for Artificial Intelligence* and *Computer Architecture*. 2020 to 2022
- Member of Tsinghua University varsity swimming team. 2022 to 2022
- Champion of the 50 meters breaststroke, runner-up of the 200 meters individual medley, 4th place of the 50 meters freestyle, 5th place of the 100 meters breaststroke, 6th place of the 4×50m freestyle relay, and 7th place of the 6×50m freestyle relay at the Tsinghua University John Ma Cup Swimming Competitions. Mar. 2021, Nov. 2021 and Nov. 2023
- Member of Tsinghua University student running enthusiast association. Organize weekly running activities and training. 2021 to 2022
- Participated in half marathons. My half marathon personal best time is 2 hours and 14 minutes. April 2021
- Delegate of the Student Congress of the Computer Science and Technology Department. Spring 2021 and Spring 2022
- Delegate of the Student Congress of the Institute for Interdisciplinary Information Sciences. Spring 2022
- Other hobbies: cycling, triathlon, skiing, playing piano (with an amateur level 6 certification from China), drumming.

TALKS

- **Maximal k -edge-connected subgraphs in almost-linear time for small k**
 - ESA 2023 @ CWI, Amsterdam Sept. 2023
 - TUIQUN 2023 @ Online Sept. 2023

SKILLS

- **Programming Languages:** C & C++, CUDA, Python, Verilog, LaTeX
- **Languages:** Chinese (Native); English (Fluent - TOEFL iBT MyBest: 106 (R29, L29, S22, W26), CET4: 627)
- **Competitive Programming:** I participated in competitive programming. I learned some advanced topics in data structures, graph algorithms, string algorithms, dynamic programming, greedy algorithms, combinatorial mathematics, etc. I have a rating of 2554 (Grandmaster) on codeforces.com.