Zihan Hu

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Education

- **Tsinghua University** — Beijing, China
  Bachelor in Computer Science — *Sep. 2019 - Present*
  - Yao Class, Institute for Interdisciplinary Information Sciences (IIIS), led by Prof. Andrew Yao.
  - GPA: 3.97/4.00; Rank: 1/30.
  - TOEFL: 106 (Speaking: 25); GRE: 331 + 3.5.
- **Zhilin High School** — Wenzhou, China
  Member of Special Pilot Class — *Sep. 2016 - June 2019*
  - Two-time first prize winner of Chinese National High School Mathematics Contest.
  - Top 0.1% among 315,000 examinees in Chinese College Entrance Examination, Zhejiang Province.

Relevant Courses

• Calculus (1)	A^+	• Algorithm Design	A	• General Physics (1), (2)	A, A^+
• Linear Algebra	A	• Theory of Computation	A^+	• The Physics of Information	A^+
• Abstract Algebra	A	• Logic, Computation and Games	A	• Introduction to Databases	A^+
• Discrete Mathematics (1)	A^+	• Fundamentals of Cryptography	A	• Fundamentals of Digital Electronics	A
• Mathematics for Computer Science (By Prof. Andrew Yao)	A^+	• Quantum Computer Science	A^-	• Computer Architecture	A
		• Quantum Communication & Crypto	A^+	• Operating System	A

Research Experience

- **Post-Quantum Lattice-Based Cryptography** — Tsinghua University
  Mentor: Yilei Chen — *Feb. 2021 - Nov. 2021*
  - The existence of worst-case to average-case reduction makes lattice-based cryptography considered resistant to classical attacks, or even to quantum attacks. However, the hardness of the underlying lattice problems in quantum setting has not been well studied.
  - Following ideas of reductions between lattice problems, we attempted to solve standard lattice problems via quantum algorithms.
  - Collaborate with Yilei Chen, Qipeng Liu and Yaxin Tu.
  - Brainstorm, formula derivation, experiments and proofreading.

Course Projects

- **Non-Black-Box Simulation** — *May 2021 - June 2021*
  - Course project of *Fundamentals of Cryptography*.
  - A review for the paper *How to Go Beyond the Black-Box Simulation Barrier* [Bar01].
  - Learned how to take advantage of knowing the malicious verifier's code.
  - Gained a better understanding of Zero-Knowledge Proof.
- **System Lab** — *Mar. 2021 - June 2021*
  - Course project of *Computer Architecture*.
  - Used assembly language to write a simple Gaussian-like filter with 3×3 kernel matrix and optimized its performance.
  - Implemented a 5-stage pipelined RISC-V processor with hazard detection and branch prediction.
  - Implemented caches with various replacement policies.
- **Propositional Dynamic Logic (PDL)** — *Oct. 2020 - Nov. 2020*
  - Course project of *Logic, Computation and Games*.
  - Learned the connection between PDL and Public Announcement Language (PAL).
  - Used PDL to derive some recursion axioms of PAL, one of which is equivalent to but simpler than the axiom shown in the class.

Honors and Awards

- **Yao Award** | Institute for Interdisciplinary Information Sciences — *2022*
- **Comprehensive Excellence Scholarship** | Tsinghua University — *2021*
- **Academic Excellence Scholarship** | Tsinghua University — *2020*
- **Sports Excellence Scholarship** | Tsinghua University — *2020*
- **Chinese Mathematical Olympiad, Silver Medal** | Chinese Mathematical Society — *2018*
- **Chinese Girls' Mathematical Olympiad, Gold Medal** | Chinese Mathematical Society — *2018*
  - Ranked 3rd among all the contestants.
  - Invited to participate in CMO.

Student Activities

- Class Leader | Yao Class 91, Tsinghua University — *Sep. 2020 - Sep. 2021*
- Participated in many volunteer projects such as animal protection and volunteer of Undergraduate Admissions Office.
- Keen on a variety of sports, especially middle-distance and long-distance running.
  - Placed 3rd in the Women's 800m and 4th in Women's 1500m in annual sport meet on campus.
  - Top 30 in Tsinghua University Mini Marathon (4.2 km) and Campus Marathon (10 km) among thousands of female participants.