

Zihan Hu

☎ +86 19801260391 ✉ huzh19@mails.tsinghua.edu.cn 🏠 zihanhu.cn

Research Interests

- ◇ **Theoretical Computer Science (TCS)**, especially the interplay between quantum computing, cryptography and complexity theory

Education

- ◇ **Tsinghua University** Aug. 2019 - Present
Bachelor in Computer Science (In Progress) Beijing, China
 - Yao Class, [Institute for Interdisciplinary Information Sciences \(IIIS\)](#), led by [Prof. Andrew Yao](#)
 - GPA: **3.97/4.0**, Major GPA: **4.0/4.0** (40% A+), Rank: **1/30**
 - TOEFL: 106, GRE: 331

Research Experience

- ◇ **Black-Box Separation for Public-Key Quantum Money** Jan. 2022 - Sep. 2022
Advisors: [Prof. Prabhanjan Ananth](#) and [Prof. Henry Yuen](#) UCSB (Remote)
 - Public-key quantum money scheme is a cryptographic protocol that allows a bank to issue banknotes that are publicly verifiable yet resistant to counterfeiting due to the laws of the physics. However, constructing provably secure public-key quantum money schemes based on well-studied assumptions remains challenging.
 - We ruled out the class of black-box constructions from collision-resistant hash functions to public-key quantum money schemes where the verification algorithm only makes classical queries to the hash functions.
 - My contribution includes extending our result to a more general case, deriving formal proofs, and writing.
- ◇ **Attempts to Quantumly Solve Standard Lattice Problems** June 2021 - Nov. 2021
Advisor: [Prof. Yilei Chen](#) Tsinghua University
 - A wide range of cryptographic protocols are based on the hardness of lattice problems. Despite a large number of studies, the quantum hardness of lattice problems still remains obscure.
 - We attempted to quantumly solve standard lattice problems by first modifying Regev's reduction to reduce the closest vector problem (a standard lattice problem) to a variant of learning with errors problem, and then solving the latter problem. We managed to close the first step but not the second. A summary of our partial results can be found on my homepage.
 - Collaborated with Prof. Yilei Chen, Dr. Qipeng Liu and Yaxin Tu.
 - My contribution includes brainstorm, formula derivation, and proofreading.

Publications

- ◇ On the (Im)plausibility of Public-Key Quantum Money from Collision-Resistant Hash Functions
Prabhanjan Ananth, [Zihan Hu](#), Henry Yuen Submitted

Honors and Awards

- ◇ [Yao Award](#), Recognition Prize | IIIS, Tsinghua University 2022
- ◇ Comprehensive Excellence Award | Tsinghua University 2021
- ◇ Academic Excellence Award | Tsinghua University 2020
- ◇ Sports Excellence Award | Tsinghua University 2020
- ◇ Chinese Mathematical Olympiad, Silver Medal | Chinese Mathematical Society 2018
- ◇ Chinese Girls' Mathematical Olympiad, Gold Medal (Rank 3) | Chinese Mathematical Society 2018

Extracurricular Activities

- ◇ Class Leader | Yao Class 91, Tsinghua University Sep. 2020 - Sep. 2021
- ◇ Keen on a variety of sports, especially middle-distance and long-distance running.