

Yuanhao Wang | Curriculum Vitae

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Education

- **Tsinghua University** 2016 – Present
 - Institute for Interdisciplinary Information Sciences, Fourth year undergraduate, Ranked 1/38
 - Enrolled in Andrew Chi-Chih Yao's computer science pilot class
- **Affiliated High School of South China Normal University** 2013 – 2016
 - Outstanding graduate

Research Experience

- **Minimax Optimization by Following the Ridge**
 - Completed when visiting University of Toronto, advised by Jimmy Ba
 - Proposed an algorithm that locally converges to and only converges to local minimax, the notion of local optimality in minimax optimization; empirically helps the convergence of GANs
 - Results accepted to the NeurIPS 2019 Bridging Game Theory and Deep Learning Workshop (oral)
- **Distributed Bandits with Near-optimal Regret and Efficient Communication**
 - Advisor: Liwei Wang
 - Studied protocols for multiplayer multi-armed bandits and linear bandits
 - In both settings, achieved near-minimax-optimal regret using very little communication
 - Invited talk at Machine Learning Theory Workshop at Peking University
- **Sample Complexity of Q-learning in Infinite Horizon**
 - Course project of the Machine Learning course by Liwei Wang
 - Improved sample complexity bound for **infinite horizon** reinforcement learning from $\tilde{O}(\epsilon^{-4})$ to $\tilde{O}(\epsilon^{-2})$
 - Results accepted to NeurIPS 2019 OptRL Workshop
- **Entanglement Properties of IBM's Quantum Device**
 - Advisors: Bei Zeng, Zhangqi Yin and Ying Li
 - Prepared graph states remotely on IBM's quantum processor *ibmqx5*. Experimentally demonstrated its ability to generate 16-qubit fully entangled states.
 - Results published in npj Quantum Information

Publications & Manuscripts

Yuanhao Wang*, Guodong Zhang*, and Jimmy Ba. On Solving Minimax Optimization Locally: A Follow-the-Ridge Approach. *arXiv preprint arXiv:1910.07512*, 2019.

Yuanhao Wang*, Jiachen Hu*, Xiaoyu Chen, and Liwei Wang. Distributed Bandit Learning: Near-Optimal Regret with Efficient Communication. *arXiv preprint arXiv:1904.06309*, 2019.

Kefan Dong*, **Yuanhao Wang***, Xiaoyu Chen, and Liwei Wang. Q-learning with UCB Exploration is Sample Efficient for Infinite-Horizon MDP. *arXiv preprint arXiv:1901.09311*, 2019.

Yuanhao Wang, Ying Li, Zhang-qì Yin, and Bei Zeng. 16-qubit IBM universal quantum computer can be fully entangled. *npj Quantum Information*, 4(1):46, 2018.

Achievements

Academic Achievements.....

- **GPA:** 3.91/4.0; **Ranking:** 1/38.

Awards.....

- **Yao Award (Silver Medal)**, 2019
- **Toyota Scholarship**, 2019
- **National Scholarship in China** (1.5%), 2018
- **9th of December Scholarship**, among top 40 Tsinghua sophomores, 2017
- **Gold Medal in Chinese Physics Olympiad**, National Top 50, 2015
- **Silver Medal in International Olympiad on Astronomy and Astrophysics**, Global Top 15, 2015

Standardized Test Scores.....

- **TOEFL:** Reading: 30/30; Listening: 30/30; Speaking: 27/30; Writing: 25/30; Sum: 112/120.
- **GRE:** Verbal reasoning: 170/170; Quantitative reasoning: 170/170; Analytical Writing: 4.5/6.0

Skills

- **Coding:** Python, MATLAB, C++ & $\text{\LaTeX}$
- **Languages:** English (fluent); Chinese (native)

Selected Courses

Advanced Theoretical Computer Science	A+	Numerical Analysis	A
Algorithm Design	A	Basic Topology	A
Theory of Computation	A	Mathematics for Computer Science	A
Machine Learning	A	Advanced Computer Graphics	A
Artificial Intelligence: Principles and Techniques	A	Statistical Inference	A-

Other Experiences

- I am taking a minor in statistics since my 2nd year, which requires two additional courses per semester.
- In my 3rd year, I launched a weekly reading group on machine learning and probability theory with several fellow undergraduates. We read books such as *High-Dimensional Probability* by Roman Vershynin.
- I am an amateur astronomer, and co-discoverer of 5 supernovae (2017lf, 2017cbr, 2017coa, 2017gut and 2017hjs). I had been the president for Tsinghua Astronomy Society for one year.
- I spent 3 weeks at Oxford University as part of the Tsinghua University Distinguished Students' Programme in Jul 2017.
- I attended the NTU-Tsinghua Theoretical Computer Science Winter School in Jan 2019.