

Hongshun Yao

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Research Interests

- Quantum Information, Quantum Machine Learning, Quantum Simulation, Near-term Quantum Algorithms

Education

- **M.Sc** **Department of Mathematics, Beihang University**
GPA:3.2 *2019–2022*
Major: Abstract Algebra, Computable Theory, Modern Optimization Theory, Statistical Machine Learning, etc.
- **B.S.** **Department of Mathematics, Nanjing University of Aeronautics and Astronautics**
GPA:3.9, 3/60 *2015–2019*
Major: Mathematical Analysis, Advanced Algebra, Optimization Theory, Machine Learning, etc.

Experience

- **Research Intern** **Institute for Quantum Computing, Baidu Research**
Mentor: Dr. Xin Wang *Aug 2021 – April 2023*
 - Focus on communication over quantum channels, expressivity and generalization of QNNs, how to encode classical information on quantum computers, and how to design practical quantum simulation algorithms, leading to one paper [1] and six patents [2-7].
 - Participate in the development of the platform Paddle Quantum [8], responsible for adding fisher information functions, data coding tutorials, and model library related modules.
- **Teaching Assistant** **Department of Mathematics, Beihang University**
Supervisor: Prof. Baoshan Wang *Sep 2020 – Jan 2021*
 - Abstract Algebra, responsible for answering questions and checking exercises after class.
- **Research Intern** **Beijing DeepGlint Technology Co., Ltd**
Mentor: Dr. Debing Zhang *March 2019 – July 2019*
 - Focus on improving the quality of face data clustering using machine learning algorithms.

Publications

- Zhan Yu[†], **Hongshun Yao**[†], Mujin Li, Xin Wang. Power and limitations of single-qubit native quantum neural networks. [†] indicates equal contribution. (NeurIPS 2022)

Patents

- Xin Wang, Ruilin Ye, Guangxi Li, **Hongshun Yao**. Classical data processing methods, computing devices and storage media, CN114818970B, Granted, 2023.
- Xin Wang, **Hongshun Yao**, Quantum communication implementation method and device, electronic device and medium, CN115941059A, Published, 2023.
- Xin Wang, **Hongshun Yao**, Xuanqiang Zhao. Training methods, data processing methods, devices and media for quantum neural networks, CN115374948A, Published, 2022.
- Xin Wang, **Hongshun Yao**, Mujin Li, Zhan Yu. Quantum circuit operation methods and devices, electronic devices and media, CN115018078A, Published, 2022.
- **Hongshun Yao**, Xin Wang. Determination methods, model processing methods, devices, equipment and

storage media, CN114580643A, Published, 2022.

- Xin Wang, **Hongshun Yao**, Sizhuo Yu, Xuanqiang Zhao. Quantum neural network training method and device, electronic device and medium, CN114219076A, Published, 2021.

Honors

- Graduate Scholarship, Beihang University, 2019-2021.
- First Class Scholarship, Nanjing University of Aeronautics and Astronautics, 2015-2018.
- National Inspirational Scholarship, Nanjing University of Aeronautics and Astronautics, 2016.

Reference

- [1] Zhan Yu, **Hongshun Yao**, Mujin Li, Xin Wang. Power and limitations of single-qubit native quantum neural networks[J]. arXiv preprint arXiv:2205.07848, 2022.
- [2] Xin Wang, Ruilin Ye, Guangxi Li, **Hongshun Yao**. Classical data processing methods, computing devices and storage media, CN114818970B, Granted, 2023.
- [3] Xin Wang, **Hongshun Yao**, Quantum communication implementation method and device, electronic device and medium, CN115941059A, Published, 2023.
- [4] Xin Wang, **Hongshun Yao**, Xuanqiang Zhao. Training methods, data processing methods, devices and media for quantum neural networks, CN115374948A, Published, 2022.
- [5] Xin Wang, **Hongshun Yao**, Mujin Li, Zhan Yu. Quantum circuit operation methods and devices, electronic devices and media, CN115018078A, Published, 2022.
- [6] **Hongshun Yao**, Xin Wang. Determination methods, model processing methods, devices, equipment and storage media, CN114580643A, Published, 2022.
- [7] Xin Wang, **Hongshun Yao**, Sizhuo Yu, Xuanqiang Zhao. Quantum neural network training method and device, electronic device and medium, CN114219076A, Published, 2021.
- [8] [Paddle Quantum: Python-based quantum machine learning platform.](#)