Hongshun Yao

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Research Interests

- Quantum Information Theory, Quantum Machine Learning, Artificial Intelligence

Education

- **Hong Kong University of Science and Technology (Guangzhou)** — **Guangzhou China**
  PhD of Artificial Intelligence, Information Hub — *2024–Present*
  Focus areas: Quantum Information Theory, Quantum Machine Learning
  Mentor: Prof. Xin Wang
- **Beihang University** — **Beijing China**
  Master of Science, Department of Mathematics — *2019–2022*
  Focus areas: Quantum Circuit Simulation, Quantum Algorithm
- **Nanjing University of Aeronautics and Astronautics** — **Nanjing China**
  Bachelor of Science, Department of Mathematics, GPA:3.9, 3/60 — *2015–2019*
  Major: Mathematical Analysis, Advanced Algebra, Optimization Theory, Machine Learning, etc.

Experience

- **Research Assistant** — **Hong Kong University of Science and Technology (Guangzhou)**
  Mentor: Prof. Xin Wang — *Aug 2023 – July 2024*
  - Focus on quantum information processing tasks and quantum neural networks (QNNs), such as quantum state purification, quantum virtual broadcasting, and generalization of QNNs.
- **Research Intern** — **Institute for Quantum Computing, Baidu Research**
  Mentor: Prof. 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 and six patents.
  - Participate in the development of the platform Paddle Quantum, responsible for adding fisher information functions, data coding tutorials, and model library related modules.

Services

- Reviewer: Quantum, Asian Quantum Information Science Conference (AQIS),

Publications

- **Hongshun Yao**†, Yu-Ao Chen†, Erdong Huang, Kaichu Chen, Xin Wang. Protocols and Trade-Offs of Quantum State Purification. arXiv:2404.01138
- **Hongshun Yao**†, Xia Liu†, Chengkai Zhu, Xin Wang. Optimal unilocal virtual quantum broadcasting. Physical Review A 110.1 (2024): 012458
- 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.

Referees

- Dr. Xin Wang, Associate Professor at the Thrust of Artificial Intelligence, Information Hub, Hong Kong University of Science and Technology (Guangzhou), China.
  ✉ *wangxinfelix@gmail.com*