Mingrui Jing, (M.Sc. of Physics)

mingruij0031@gmail.com johning0031@126.com WeChat:JohnningJing
@MingruiJing

Employment History

2022 – 2023 **Intership Researcher.** Institute for Quantum Computing, Baidu Research, Beijing.
Working on: Quantum machine learning, trainability of quantum neural networks and quantum information theory.
Mentor: Prof. Xin Wang
Research Project:
1st. *Explaining and resolving trainability issues in scalable quantum neural networks*;
2nd. *Designing quantum algorithms solving quantum state learning and quantum many-body physics*;
3rd. *Studying on circuit knitting, non-local simulations and LOCC protocols.*
Development Project:
1st. *Participating in developing Paddle-Quantum, quantum machine learning platform and GitHub launching. Particularly in speeding up and new functionality development.*

2021 – 2022 **Lab Demonstrator.** Physics 1 and 2, School of Physics, The University of Melbourne.

2018 – 2020 **Victorian Certificate of Education (VCE) Tutor.** Le-Learning Institution, Melbourne, VIC, Australia.

2016 – 2017 **Math and Science Teacher.** GAPPER International Voluntary Project.

Education

2020 – 2021 **M.Sc. Physics, University of Melbourne**
GPA: 85.4 (First Class Honours)
Topic: on Quantum Computing research with Prof. Lloyd Hollenberg.
Thesis title: *New pathways towards quantum sequence alignment with quantum neurons and quantum machine learning.*

2016 – 2019 **Bachelor of Sci., University of Melbourne**
GPA: 83.3 (First Class Honours)
Major in: Mathematical Physics
Vacation research: *Laby Research Scholar on optic tweezers with Prof. Kenneth Crozier*

2023 – present **Ph.D student, HKUST (GZ)**
GPA: –
Major in: Artificial Intelligence
Research: *Quantum machine learning, quantum information theory, AI4Sci with Prof. Xin Wang*

Research Publications

1. Y.-A. Chen, C. Zhu, K. He, **M. Jing**, and X. Wang, "Virtual quantum markov chains," *IEEE Transactions on Information Theory*, 2025.

2. F. M. Creevey, **M. Jing**, and L. C. Hollenberg, "Implementation of a quantum sequence alignment algorithm for quantum bioinformatics," *arXiv preprint arXiv:2506.22775*, 2025.

3. **M. Jing**, E. Huang, X. Shi, S. Zhang, and X. Wang, "Quantum recurrent embedding neural network," *arXiv preprint arXiv:2506.13185*, 2025.

4. **M. Jing**, C. Zhu, and X. Wang, "Circuit knitting facing exponential sampling-overhead scaling bounded by entanglement cost," *Physical Review A*, vol. 111, no. 1, p. 012 433, 2025.

5. X. Wang, **M. Jing**, and C. Zhu, "Computable and faithful lower bound on entanglement cost," *Physical Review Letters*, vol. 134, no. 19, p. 190 202, 2025.

6. H. Yao, X. Liu, **M. Jing**, G. Li, and X. Wang, "Lcqnn: Linear combination of quantum neural networks," *arXiv preprint arXiv:2507.02832*, 2025.

7. **M. Jing**, G. Liu, H. Ren, and X. Wang, "Quantum sequential scattering model for quantum state learning," *Physical Review A*, vol. 109, no. 6, p. 062 425, 2024.

8. Y. Mo, C. Zhu, Z. Liu, **M. Jing**, and X. Wang, "Enhancement of nonstabilizerness within indefinite causal order," *Physical Review A*, vol. 109, no. 6, p. 062 428, 2024.

9. B. Zhao, **M. Jing**, L. Zhang, *et al.*, "Retrieving nonlinear features from noisy quantum states," *PRX Quantum*, vol. 5, no. 2, p. 020 357, 2024.

10. Y. Wang, C. Zhu, **M. Jing**, and X. Wang, "Ground state preparation with shallow variational warm-start," *arXiv preprint arXiv:2303.11204*, 2023.

11. H.-k. Zhang, C. Zhu, **M. Jing**, and X. Wang, "Statistical analysis of quantum state learning process in quantum neural networks," *Advances in Neural Information Processing Systems*, vol. 36, pp. 33 133–33 160, 2023.

Patents (under review)

2025.04.25 **Method, parameterized quantum circuit construction, device, storage and computational apparatus (202510039102.2)**
Inventor: **M. Jing**, X. Liu and X. Wang.

2023.01.20 **Method, apparatus, electronic device and medium for determining system characteristic information. (2022110585849)**
Inventor: **M. Jing**, C. Zhu and X. Wang.

2022.12.09 **Quantum circuit processing method, quantum state preparation method, device, apparatus and medium. (2022109941503)**
Inventor: X. Wang, **M. Jing**, and G. Liu.

2022.11.15 **Method for determining system feature information, electronic equipment and medium. (2022110649338)**
Inventor: X. Wang, **M. Jing**, and C. Zhu.

Skills

Languages — Strong reading, writing and speaking competencies in English, and Mandarin Chinese.

Coding — Python, Matlab, Mathematica, LaTeX, …

Misc. — Academic research, teaching, training, consultation, LaTeX typesetting and publishing.

Skills (continued)

Others — Organize and maintain QuAIR group WeChat Official Account and arrange 'Red Bird Quantum' Bilibili x Zoom quantum information live streaming.

Miscellaneous Experience

Awards and Achievements

2025 **QTML 2025 accepted short talk**.

2022 **Melbourne Research Scholarship**, University of Melbourne.

2020 **Science Graduate Scholarship**, University of Melbourne.

2019 **Laby Research Scholarship**, Machine Learning on nano-optical tweezers with Prof. Kenneth Crozier.

Certification

2021 **M.Sc. of Science (Physics) (with Distinction)**, University of Melbourne.

2019 **Outstanding Undergraduate Student Performance certificate from Faculty of Science**, University of Melbourne.

Journal Review

2023 **Subreviewer for Quantum journal, QCE, TQC, QTML, QCTIP, and AQIS conference.**

References

Prof. Xin Wang
Associate Professor at HKUST (GZ), AI thrust.
Staff Researcher – Institute for Quantum Computing at Baidu Research.
Baidu Technology Park, Haidian District, Beijing, 100193, CHINA
University of Technology Sydney
wangxinfelix@gmail.com
Relationship: Ph.D degree supervisor.

Prof. Lloyd C.L. Hollenberg
Director – IBM Quantum Hub @ The University of Melbourne Deputy Director, Centre of Excellence for Quantum Computation and Communication Technology.
University of Melbourne
Victoria 3010, AUSTRALIA
lloydch@unimelb.edu.au
Relationship: M.Sc. degree supervisor