# Mingrui Jing, (M.Sc. of Physics)

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# **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			
	M Sa Dhysias University of Melhourne		
2020 - 2021	CDA: Se. 4 (Eiget Class Honouro)		
	Topics on Quantum Computing research with Prof. Lloyd Hollenhard		
	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, quantum entangle- ment with Prof. Xin Wang		

### **Research Publications**

1

**M. Jing**, G. Liu, H. Ren, and X. Wang, "Quantum sequential scattering model for quantum state learning," *Phys. Rev. A*, vol. 109, p. 062 425, 6 2024. *O* DOI: 10.1103/PhysRevA.109.062425.

2	<b>M. Jing</b> , C. Zhu, and X. Wang, "Circuit knitting faces exponential sampling overhead scaling bounded by entanglement cost," <i>arXiv preprint arXiv:2404.03619</i> , 2024.
3	Y. Mo, C. Zhu, Z. Liu, <b>M. Jing</b> , and X. Wang, "Enhancement of nonstabilizerness within indefinite causal order," <i>Phys. Rev. A</i> , vol. 109, p. 062 428, 6 2024. <i>International Contexport of the second secon</i>
4	B. Zhao, <b>M. Jing</b> , L. Zhang, <i>et al.</i> , "Retrieving nonlinear features from noisy quantum states," <i>PRX Quantum</i> , vol. 5, p. 020 357, 2 2024. <i>O</i> DOI: 10.1103/PRXQuantum.5.020357.
5	YA. Chen, C. Zhu, K. He, <b>M. Jing</b> , and X. Wang, "Virtual quantum markov chains," <i>arXiv preprint arXiv:2312.02031</i> , 2023.
6	X. Wang, <b>M. Jing</b> , and C. Zhu, "Computable and faithful lower bound for entanglement cost," <i>arXiv preprint arXiv:2311.10649</i> , 2023.
7	Y. Wang, C. Zhu, <b>M. Jing</b> , and X. Wang, <i>Ground state preparation with shallow variational warm-start,</i> 2023. arXiv: 2303.11204 [quant-ph].
8	HK. Zhang, C. Zhu, <b>M. Jing</b> , and X. Wang, "Statistical analysis of quantum state learning process in quantum neural networks," vol. 36, A. Oh, T. Naumann, A. Globerson, K. Saenko, M. Hardt, and S. Levine, Eds., pp. 33 133–33 160, 2023. <i>O</i> URL: https:

//proceedings.neurips.cc/paper\_files/paper/2023/file/68efc144ad3b41108f779b51b9fb1300Paper-Conference.pdf.

### Patents (under review)

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, <b>M. Jing</b> , and G. Liu.	e,
2022.11.15	<b>Method for determining system feature information, electronic equipment and medium. (2022110649338)</b> Inventor: X. Wang, <b>M. Jing</b> , and C. Zhu.	
Skills		
Languages Coding Misc.	<ul> <li>Strong reading, writing and speaking competencies in English, and Mandarin Chinese.</li> <li>Python, Matlab, Mathematica, &amp;TEX,</li> <li>Academic research, teaching, training, consultation, &amp;TEX typesetting and publishing.</li> </ul>	

# **Miscellaneous Experience**

#### Awards and Achievements

- 2022 **Melbourne Research Scholarship**, University of Melbourne.
- 2020 **Science Graduate Scholarship**, University of Melbourne.

# Miscellaneous Experience (continued)

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		<b>Outstanding Undergraduate Student Performance certificate from Faculty of Science</b> , University of Melbourne.
lourna	l Re	view

### 2023 Subreviewer for Quantum journal, QTML, QCTIP and AQIS conference.

### References

Prof. Xin Wang	Prof. Lloyd C.L. Hollenberg
Associate Professor at HKUST (GZ), AI thrust.	Director - IBM Quantum Hub @ The University
Staff Researcher – Institute for Quantum Computing	of Melbourne Deputy Director, Centre of Excel-
at Baidu Research.	lence for Quantum Computation and Communica-
Baidu Technology Park, Haidian District, Beijing,	tion Technology.
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Relationship: Ph.D degree supervisor.	Relationship: M.Sc. degree supervisor