

Ge Bai

Assistant Professor, Thrust of Artificial Intelligence, Information Hub, The Hong Kong University of Science and Technology (Guangzhou)

Email: gebai@hkust-gz.edu.cn · Google Scholar: [usrPjHoAAAAJ](https://scholar.google.com/citations?user=usrPjHoAAAAJ)

Appointments

- **Assistant Professor**, Thrust of Artificial Intelligence, Information Hub, HKUST(GZ), Mar. 2025–present.
- **Post-doctoral Fellow**, Centre for Quantum Technologies, National University of Singapore, Feb. 2023–Jan. 2025.
- **Post-doctoral Fellow**, Dept. of Computer Science, The University of Hong Kong, Mar. 2022–Jan. 2023.
- **Research Assistant**, Dept. of Computer Science, The University of Hong Kong, Apr. 2021–Feb. 2022.

Education and Honors

- **Ph.D. in Computer Science**, The University of Hong Kong, 2016–2021 (supervisor: Prof. Giulio Chiribella).
- **B.Eng., Yao Class**, Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua University, 2012–2016.
- **Young Scientist Award**, Hong Kong Institution of Science, Dec. 2021.

Research Interests

Quantum information theory; quantum Bayes' rule, retrodiction and entropy; quantum machine learning; quantum verification, benchmarking and error correction.

Teaching at HKUST(GZ)

Undergraduate Courses

- **UFUG 1105 Honors Calculus I**, Fall 2025 (3 credits, 39 students).
- **AIAA 1010 Academic Orientation for AI Students**, Spring 2026 (1 credit, 53 students).
- **AIAA 4711 Introduction to Advanced Algorithmic Techniques**, Spring 2026 (3 credits, 16 students).

Postgraduate Courses

- **AIAA 5072 Quantum Computing**, Fall 2025 (3 credits, 22 students).

Mentorship at HKUST(GZ)

Ph.D. Students (as primary supervisor)

- Jiayi Zhao (AI, 2025) Ziao Tang (AI, 2025) Tengxiang Lin (AI, 2025)

Ph.D. Students (co-supervised)

- Jingu Xie (AI, 2026) Jiahan Chen (AI, 2025) Jizhe Lai (AI, 2025) Huicheng Zhang (AI, 2025)
Hongshun Yao (AI, 2024)

Red Bird M.Phil. Students

- Mingqian Liao (AI), 2025–2026 (co-supervised).

Services

University Services

- **Final Year Project Committee Member**, AI Thrust, 2026–present.

Professional Services

- **Program Committee Member**, Asian Quantum Information Science Conference (AQIS), 2025 and 2026. Reviewed 15–17 submissions per year.
- **Journal Referee**, *Physical Review Letters*, *Physical Review A*, *Quantum*, *International Journal of Quantum Information* (2025–2026).

Talks

Jun. 2026	26th Asian Quantum Information Science Conference (AQIS), Seoul, South Korea (long talk) “ <i>The Necessity of Extending Quantum Prior Beliefs</i> ”
Nov. 2025	Donghu Seminar on Quantum Computing and Quantum Information Theory, Wuhan University, China “ <i>Proper and improper mixed states serve as different prior beliefs for quantum state retrodiction</i> ”
Sep. 2025	HKUCS Seminar, The University of Hong Kong, Hong Kong, China “ <i>Quantum Bayes’ rule and Petz transpose map from the minimum change principle</i> ”
Apr. 2025	Seminar on Quantum Information and Optimization, Tianyuan Center for International Exchange in Mathematics, Kunming, China (invited speaker) “ <i>Observational entropy with general quantum priors</i> ”
Dec. 2023	Quantum Resources 2023, Singapore “ <i>Observational entropy with general quantum priors</i> ”
Oct. 2023	IPS Meeting 2023, Singapore “ <i>Observational entropy with general quantum priors</i> ”
Aug. 2019	19th Asian Quantum Information Science Conference (AQIS), Seoul, South Korea “ <i>Quantum compression of tensor network states</i> ”
Jul. 2019	Beyond i.i.d. in Information Theory, Sydney, Australia “ <i>Quantum compression of tensor network states</i> ”
Sep. 2018	18th Asian Quantum Information Science Conference (AQIS), Nagoya, Japan “ <i>Test one to test many: a unified approach to quantum benchmarks</i> ”
May 2018	Hong Kong–Shenzhen Workshop on Quantum Information Science, Shenzhen, China (invited talk) “ <i>Test one to test many: a unified approach to quantum benchmarks</i> ”
Jan. 2018	Hong Kong Workshop on Quantum Information and Foundations, Hong Kong, China (invited talk) “ <i>Test one to test many: a unified approach to quantum benchmarks</i> ”
Sep. 2017	17th Asian Quantum Information Science Conference (AQIS), Singapore (long talk) “ <i>Compression for quantum population coding</i> ”

Publications

Google Scholar (July 2026): 403 citations; h-index 11; i10-index 12.

Journal Articles

- [J1] M. Liu, V. Scarani, and **G. Bai**, “Proper and improper mixed states serve as different prior beliefs for quantum state retrodiction,” *Phys. Rev. Lett.* **136**, 060203 (2026).
- [J2] **G. Bai**, F. Buscemi, and V. Scarani, “A quantum entropy production operator,” *J. Phys. A: Math. Theor.* **59**, 295301 (2026).
- [J3] **G. Bai**, F. Buscemi, and V. Scarani, “Quantum Bayes’ rule and Petz transpose map from the minimum change principle,” *Phys. Rev. Lett.* **135**, 090203 (2025).
- [J4] **G. Bai**, D. Šafránek, J. Schindler, F. Buscemi, and V. Scarani, “Observational entropy with general quantum priors,” *Quantum* **8**, 1524 (2024).
- [J5] **G. Bai** and I. Marvian, “Synthesis of energy-conserving quantum circuits with XY interaction,” *Quantum Sci. Technol.* **9**, 045049 (2024).
- [J6] F. Shi, **G. Bai**, X. Zhang, Q. Zhao, and G. Chiribella, “Graph-theoretic characterization of unextendible product bases,” *Phys. Rev. Research* **5**, 033144 (2023).
- [J7] Y. D. Wu, Y. Zhu, **G. Bai**, Y. Wang, and G. Chiribella, “Quantum similarity testing with convolutional neural networks,” *Phys. Rev. Lett.* **130**, 210601 (2023).
- [J8] Y. Zhu, **G. Bai**, Y. Wang, T. Li, and G. Chiribella, “Quantum autoencoders for communication-efficient cloud computing,” *Quantum Mach. Intell.* **5**, 27 (2023).
- [J9] Y. Zhu, Y. D. Wu, **G. Bai**, D. S. Wang, Y. Wang, and G. Chiribella, “Flexible learning of quantum states with generative query neural networks,” *Nat. Commun.* **13**, 6222 (2022).
- [J10] **G. Bai**, Y. D. Wu, Y. Zhu, M. Hayashi, and G. Chiribella, “Quantum causal unravelling,” *npj Quantum Inf.* **8**, 69 (2022).
- [J11] Y. D. Wu, **G. Bai**, G. Chiribella, and N. Liu, “Efficient verification of continuous-variable quantum states and devices without assuming identical and independent operations,” *Phys. Rev. Lett.* **126**, 240503 (2021).
- [J12] **G. Bai**, Y. Yang, and G. Chiribella, “Quantum compression of tensor network states,” *New J. Phys.* **22**, 043015 (2020).

(2020).

- [J13] **G. Bai** and G. Chiribella, “Test one to test many: a unified approach to quantum benchmarks,” *Phys. Rev. Lett.* **120**, 150502 (2018).
- [J14] Y. Yang, **G. Bai**, G. Chiribella, and M. Hayashi, “Compression for quantum population coding,” *IEEE Trans. Inf. Theory* **64**(7), 4766–4783 (2018).
- [J15] X. Yuan, **G. Bai**, T. Peng, and X. Ma, “Quantum uncertainty relation using coherence,” *Phys. Rev. A* **96**, 032313 (2017).

Conference Papers

- [C1] J. Chen, C. Zhu, **G. Bai**, and X. Wang, “Triage: an adaptive parallel window decoding scheduler for real-time fault-tolerant quantum computation,” to appear in *Proc. 53rd IEEE/ACM International Symposium on Computer Architecture (ISCA)*, 2026. arXiv:2605.04459.
- [C2] **G. Bai**, I. Damgård, C. Orlandi, and Y. Xia, “Non-interactive verifiable secret sharing for monotone circuits,” *AFRICACRYPT 2016*, pp. 225–244, 2016.
- [C3] **G. Bai**, H. Mou, Y. Hou, Y. Lyu, and W. Yang, “Android power management and analyses of power consumption in an Android smartphone,” *IEEE HPCC 2013*, 2013.

Preprints

- [P1] F. Shi, **G. Bai**, X. Zhang, Q. Zhao, and L. Li, “A minimum-cardinality genuinely unextendible product basis in three qutrits,” arXiv:2608.12785 (2026).
- [P2] K. He, Z. Tang, Z. Li, **G. Bai**, and X. Wang, “Logical entangling with phantom codes in hypergraph products,” arXiv:2607.12948 (2026).
- [P3] C. Zhu, Z. Tang, G. Zhen, Y. Li, **G. Bai**, and X. Wang, “Simulation of adjoints and Petz recovery maps for unknown quantum channels,” arXiv:2602.05828 (2026).
- [P4] M. Liu, **G. Bai**, and V. Scarani, “Unifying quantum smoothing theories with extended retrodiction,” arXiv:2510.08447 (2025).
- [P5] **G. Bai**, “Bayesian retrodiction of quantum supermaps,” arXiv:2408.07885 (2024).