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Contact Information

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Employment

- April 2018 – Present: Associate professor
  Department of Computer Science and Technology, Nanjing University

- Sept.2016-Feb.2018: Hatree Postdoctoral fellow
  Joint Center for Quantum Information and Computer Science, University of Maryland.
  Supervisors: Andrew Childs and Jacob Taylor

- Sept. 2015-Aug. 2016: Postdoctoral fellow
  Institute for Quantum Computing, University of Waterloo
  Supervisors: Debbie Leung and Ashwin Nayak

- Sept. 2014-Aug. 2015 Postdoctoral fellow
  Centrum Wiskunde & Informatica
  Supervisor: Ronald de Wolf

- Dec. 2013-Jul. 2014: Research associate
  Centre for Quantum Technologies, National University of Singapore.
  Supervisor: Rahul Jain

Education

- Dec. 2008 – Nov. 2013: Ph.D. in computer science
  Centre for Quantum Technologies, National University of Singapore.
  Supervisors: Rahul Jain and Miklos Santha
  Thesis: *Studies in communication complexity and semidefinite programs*.

- Sept. 2006 - Nov. 2008: Graduate student in computer science
  Institute of Software, Chinese Academy of Sciences
  Supervisor: Angsheng Li

- Sept. 2003 - June 2006: B.S. in mathematics.
  Department of Mathematics, East China Normal University

- Sept. 2002 - June 2003:
  Department of Mathematics, Shanghai University of Electric Power

Professional activities

- **Program Committee:** QIP 2018, TQC 2021, TQC 2022, QIP2023, QIP2024, TQC 2024, AQIS 2024, ALT 2025, QIP 2025.

Publications

1. Sirui Bai, Xinyu Fu, Xudong Wu, Penghui Yao, Chaodong Zheng, Almost Optimal Algorithms for Token Collision in Anonymous Network. The International Symposium on Distributed Computing (DISC) 2024.
2. Zhenyu Chen, Lijinzhi Lin, Xiaodie Lin, Zhaohui Wei, Penghui Yao, The Generations of Classical Correlations via Quantum Schemes. IEEE Transactions on Information Theory, vol. 70, no. 6, pp. 4160-4169, June 2024.
3. Yangjing Dong, Penghui Yao, Communication Complexity of Common Randomness Generation with Isotropic States. IEEE Transactions on Information Theory, vol. 70, no. 8, pp. 5681-5691, Aug. 2024.
4. Nai-Hui Chia, Honghao Fu, Fang Song, Penghui Yao, A Cryptographic Perspective on the Verifiability of Quantum Advantage. 24th Asian Quantum Information Science Conference (AQIS) 2024.
5. Yangjing Dong, Honghao Fu, Anand Natarajan, Minglong Qin, Haochen Xu, Penghui Yao, The Computational Advantage of MIP* Vanishes in the Presence of Noise. The Computational Complexity Conference (CCC), 2024.
6. Chuhan Lu, Minglong Qin, Fang Song, Penghui Yao, Mingnan Zhao, Quantum Pseudorandom Scramblers. The 27th Annual Conference on Quantum, Information Processing (QIP), 2024. The 22nd Theory of Cryptography Conference (TCC) 2024.
7. Ziyi Guan, Yunqi Huang, Penghui Yao, Zekun Ye, Quantum and Classical Communication Complexity of Permutation-Invariant Functions. The 41st International Symposium on Theoretical Aspects of Computer Science (STACS), Leibniz International Proceedings in Informatics (LIPIcs), Volume 289, pp. 39:1-39:19, Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2024.
8. Supartha Podder, Penghui Yao, Zekun Ye, On the Fine-Grained Query Complexity of Symmetric Functions. The 48th International Symposium on Symbolic and Algebraic Computation (ISSAC), Leibniz International Proceedings in Informatics (LIPIcs), Volume 283, pp. 55:1-55:18, Schloss Dagstuhl – Leibniz-Zentrum für Informatik, 2023.

9. Zongbo Bao, Penghui Yao, On Testing and Learning Quantum Junta Channels. The 36th Annual Conference on Learning Theory (COLT), vol195:1–31,2023.

10. Minglong Qin, Penghui Yao, Decidability of fully quantum nonlocal games with noisy maximally entangled states. The 26th Annual Conference on Quantum, Information Processing (QIP), 2023，In Proceedings of 50th International Colloquium on Automata, Languages, and Programming (ICALP), Leibniz InternationalProceedings in Informatics (LIPIcs), page 97:1--97:20, 2023.

11. Xudong Wu, Penghui Yao, Quantum Complexity of Weighted Diameter Radius in CONGEST Networks. In Proceedings of the 2022 ACM Symposium on Principles of Distributed Computing (PODC), page 120-130, 2022.

12. Penghui Yao, Yitong Yin, Xinyuan Zhang , Polynomial-Time Approximation of Zero-Free Partition Functions . In Proceedings of 49th International Colloquium on Automata, Languages, and Programming (ICALP), Leibniz International Proceedings in Informatics (LIPIcs), page 108:1--108:20, vol 229, 2022.

13. Srinivasan Arunachalam, Oded Regev, Penghui Yao, On the Gaussian surface area of spectrahedral, GAFA Seminar Notes. To appear.

14. Xiaodie Lin, Zhaohui Wei, Penghui, Yao, Quantum and Classical Hybrid Generations for Classical Correlations. IEEE Transactions on Information Theory, Vol:68, Issue 1, pages: 302-310, 2022.

15. Srinivasan Arunachalam, Penghui Yao, Positive spectrahedrons: Geometric properties, Invariance principles and Pseudorandom generators. In Proceedings of the 54th Annual ACM SIGACT Symposium on Theory of Computing (STOC) Pages 208–221, 2022.

16. Minglong Qin, Penghui Yao, Nonlocal games with noisy maximally entangled states are decidable. SIAM Journal of Computing, 50 (6),　page: 1800-1891, 2021.

17. (By contribution) Aonan Zhang, Hao Zhan, Junjie Liao, Kaimin Zheng, Tao Jiang, Minghao Mi, Penghui Yao, Lijian Zhang, Quantum verification of NP problems with single photons and linear optics. Light: Science & Applications, 10, 169 2021.

18. Changsheng Wang, Xudong Wu, Penghui Yao, Complexity of Eccentricities and All-Pairs Shortest Paths in the Quantum CONGEST Model. SPIN, vol 11, no. 3, page 2140007, 2021.

19. Penghui Yao, A doubly exponential upper bound on noisy EPR states for binary games. The 23rd Annual Conference on Quantum Information Processing (QIP), 2020.

20. Anurag Anshu, Penghui Yao, On the Compression of Messages in the Multi-Party Setting. IEEE Transactions on Information Theory, Vol:66, Issue 4, pages: 2091-2114, 2020.

21. Anurag Anshu, Ankit Garg, Aram Harrow and Penghui Yao, Expected communication cost of distributed quantum tasks. IEEE Transactions on Information Theory, Vol:64, Issue 11, pages: 7395-7423, 2018.

22. Debbie Leung, Ashwin Nayak, Ala Shayeghi, Dave Touchette, Penghui Yao and Nengkun Yu, Capacity Approaching Codes for Low Noise Interactive Quantum

Communication. In the proceedings of The 49th ACM Symposium on Theory of Computing (STOC), pages: 339-352, 2018. Accepted by The 21st Annual Conference on Quantum Information Processing (QIP), 2018. Journal version appear in IEEE Transactions on Information Theory, Vol 67, Issue 8, pages: 5443 – 5490, 2022.

23. Anurag Anshu, Dave, Touchette, Penghui Yao, Nengkun Yu, Exponential separation between quantum communication and classical information complexity. In the proceedings of The 49th ACM Symposium on Theory of Computing (STOC), pages: 277-288, 2017. Accepted by The 20th Annual Conference on Quantum Information Processing (QIP), plenary talk, 2017.

24. Anurag Anshu, Ankig Garg, Aram W. Harrow, Penghui Yao, *Lower bound on expected communication cost of quantum Huffman coding*. In proceedings of 11th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC), 2016.

25. Rahul Jain, Zhaohui Wei, Penghui Yao, Shengyu Zhang, Multipartite quantum correlation and communication complexities. Computational Complexity, pages: 1-30, 2016.

26. Penghui Yao, *Parity decision tree complexity and 4-Party communication complexity of XOR functions are polynomially Equivalent*. Chicago Journal of Theoretical Computer Science, Article 12, 2016.

27. Anurag Anshu, Rahul Jain, Priyanka Mukhopadhyay, Ala Shayeghi, Penghui Yao, *A new operational interpretation of relative entropy and trace distance between quantum states*. IEEE Transactions on Information Theory, Vol 62, Issue: 12, pages: 7566-7577, 2016.

28. Rahul Jain, Attila Pereszlényi and Penghui Yao, *A parallel repetition theorem for entangled two-player one-round games under product distributions*. In proceedings of the 29th IEEE Conference on Computational Complexity (CCC), pages: 209-216, 2014.

29. Rahul Jain, Attila Pereszlényi and Penghui Yao, *A direct product theorem for the two-party bounded-round public-coin communication complexity*. In proceedings of The 53rd Annual IEEE Symposium on Foundations of Computer Science (FOCS), pages: 167-176, 2012. Invited to a special issue of Algorithmica, 76(3), 720-748, 2016.

30. Rahul Jain and Penghui Yao, *A parallel approximation algorithm for positive semidefinite programming*. In proceedings of The 52nd Annual IEEE Symposium on Foundations of Computer Science (FOCS), pages: 463 – 471, 2011.

31. Pascal Koiran, Jürgen Landes, Natacha Portier and Penghui Yao, *Adversary lower bounds for nonadaptive quantum algorithms*. In Proceedings of 15th Workshop on Logic, Language, Information and Computation (Wollic), pages: 226-237, LNCS 5110, 2008. Long paper in Journal of Computer and System Sciences, 76(5): pages: 347-355, August 2010 (special issue on Wollic'08).

Manuscript

1. Xiaodi Wu, Penghui Yao, Henry Yuen, *Raz-McKenzie simulation with the inner product.* ECCC TR17-010.