Personal Information

Full Name: *Penghui Yao*
Nationality: *Chinese*

Contact Information

Department of Computer Science and Technology, Nanjing University, 163 Xianlin Avenue, Qixia District, Nanjing, Jiangsu, 210023, China
Email: phyao1985@gmail.com

Employment

- 2024 - present: Professor
  Department of Computer Science and Technology, Nanjing University

- 2018 - 2024: Associate professor
  Department of Computer Science and Technology, Nanjing University

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

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

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

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

Education

- 2008 - 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*.

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

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

- 2002 - 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, AQIS 2025.

Publications

1. Anurag Anshu, Yangjing Dong, Fengning Ou, Penghui Yao, On the Computational Power of QAC0 with Barely Superlinear Ancillae. QIP 2025, STOC 2025.
2. Sirui Bai, Xinyu Fu, Xudong Wu, Penghui Yao, Chaodong Zheng, Almost Optimal Algorithms for Token Collision in Anonymous Network. DISC 2024.
3. Zhenyu Chen, Lijinzhi Lin, Xiaodie Lin, Zhaohui Wei, Penghui Yao, The Generations of Classical Correlations via Quantum Schemes. IEEE Transactions on Information Theory, 2024.
4. Yangjing Dong, Penghui Yao, Communication Complexity of Common Randomness Generation with Isotropic States. IEEE Transactions on Information Theory, 2024.
5. Nai-Hui Chia, Honghao Fu, Fang Song, Penghui Yao, A Cryptographic Perspective on the Verifiability of Quantum Advantage. AQIS 2024.
6. Yangjing Dong, Honghao Fu, Anand Natarajan, Minglong Qin, Haochen Xu, Penghui Yao, The Computational Advantage of MIP* Vanishes. CCC 2024, QIP 2025.
7. Chuhan Lu, Minglong Qin, Fang Song, Penghui Yao, Mingnan Zhao, Quantum Pseudorandom Scramblers. QIP 2024, TCC 2024.
8. Ziyi Guan, Yunqi Huang, Penghui Yao, Zekun Ye, Quantum and Classical Communication Complexity of Permutation-Invariant Functions. STACS, 2024, IEEE Transactions on Information Theory 2025.
9. Supartha Podder, Penghui Yao, Zekun Ye, On the Fine-Grained Query Complexity of Symmetric Functions. ISAAC, 2023.
10. Zongbo Bao, Penghui Yao, On Testing and Learning Quantum Junta Channels. COLT 2023, Transactions on Pattern Analysis and Machine Intelligence 2025.
11. Minglong Qin, Penghui Yao, Decidability of fully quantum nonlocal games with noisy maximally entangled states. QIP 2023, ICALP 2023.

12. Xudong Wu, Penghui Yao, Quantum Complexity of Weighted Diameter Radius in CONGEST Networks. PODC 2022.
13. Penghui Yao, Yitong Yin, Xinyuan Zhang , Polynomial-Time Approximation of Zero-Free Partition Functions . ICALP 2022.
14. Srinivasan Arunachalam, Oded Regev, Penghui Yao, On the Gaussian surface area of spectrahedral, GAFA Seminar Notes.
15. Xiaodie Lin, Zhaohui Wei, Penghui, Yao, Quantum and Classical Hybrid Generations for Classical Correlations. IEEE Transactions on Information Theory 2022.
16. Srinivasan Arunachalam, Penghui Yao, Positive spectrahedrons: Geometric properties, Invariance principles and Pseudorandom generators. STOC 2022.
17. Minglong Qin, Penghui Yao, Nonlocal games with noisy maximally entangled states are decidable. SIAM Journal of Computing 2021.
18. (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.
19. 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.
20. Penghui Yao, A doubly exponential upper bound on noisy EPR states for binary games. QIP 2020
21. Anurag Anshu, Penghui Yao, On the Compression of Messages in the Multi-Party Setting. IEEE Transactions on Information Theory 2020.
22. Anurag Anshu, Ankit Garg, Aram Harrow and Penghui Yao, Expected communication cost of distributed quantum tasks. IEEE Transactions on Information Theory 2018.
23. Debbie Leung, Ashwin Nayak, Ala Shayeghi, Dave Touchette, Penghui Yao and Nengkun Yu, Capacity Approaching Codes for Low Noise Interactive Quantum Communication. STOC 2018, QIP 2018. IEEE Transactions on Information Theory 2022.
24. Anurag Anshu, Dave, Touchette, Penghui Yao, Nengkun Yu, Exponential separation between quantum communication and classical information complexity. STOC 2017, QIP plenary talk, 2017.
25. Anurag Anshu, Ankig Garg, Aram W. Harrow, Penghui Yao, Lower bound on expected communication cost of quantum Huffman coding. TQC 2016.
26. Rahul Jain, Zhaohui Wei, Penghui Yao, Shengyu Zhang, Multipartite quantum correlation and communication complexities. Computational Complexity. 2016.
27. 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.
28. 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 2016.

29. Rahul Jain, Attila Pereszlényi and Penghui Yao, A parallel repetition theorem for entangled two-player one-round games under product distributions. CCC 2014.
30. Rahul Jain, Attila Pereszlényi and Penghui Yao, A direct product theorem for the two-party bounded-round public-coin communication complexity. FOCS, 2012. Invited to a special issue of Algorithmica, 2016.
31. Rahul Jain and Penghui Yao, A parallel approximation algorithm for positive semidefinite programming. FOCS, 2011.
32. Pascal Koiran, Jürgen Landes, Natacha Portier and Penghui Yao, Adversary lower bounds for nonadaptive quantum algorithms. Wollic 2008. Long paper in Journal of Computer and System Sciences, 2010 (special issue on Wollic'08).

Manuscript

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