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## Personal Information

Full Name: *Penghui Yao*

Nationality: *Chinese*

## 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

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- 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

## Research interests

Quantum information theory, quantum computing, computational complexity, analysis of Boolean functions

## Publications

1. Xudong Wu, Penghui Yao, Quantum Complexity of Weighted Diameter and Radius in CONGEST Networks. In Proceedings of the 2022 ACM Symposium on Principles of Distributed Computing (PODC'22). Association for Computing Machinery, New York, NY, USA, to appear.
2. 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 2022), Leibniz International Proceedings in Informatics (LIPIcs), page 108:1--108:20, vol 229, 2022.
3. Minglong Qin, Penghui Yao, Nonlocal games with noisy maximally entangled states are decidable. *SIAM Journal of Computing*, 50 (6), page: 1800-1891, 2021.
4. (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*.
5. Penghui Yao, A doubly exponential upper bound on noisy EPR states for binary games. The 23rd Annual Conference on Quantum Information Processing (QIP), 2020.
6. Anurag Anshu, Penghui Yao, On the Compression of Messages in the Multi-Party Setting. *IEEE Transaction on Information Theory*, Vol:66, Issue 4, pages: 2091-2114, 2020.
7. Anurag Anshu, Ankit Garg, Aram Harrow and Penghui Yao, Expected communication cost of distributed quantum tasks. *IEEE Transaction on Information Theory*, Vol:64, Issue 11, pages: 7395-7423, 2018.
8. 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 Transaction on Information Theory*, Vol 67, Issue 8, pages: 5443 – 5490, 2022.

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9. 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.
  10. 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.
  11. Rahul Jain, Zhaohui Wei, Penghui Yao, Shengyu Zhang, Multipartite quantum correlation and communication complexities. *Computational Complexity*, pages: 1-30, 2016.
  12. 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.
  13. Anurag Anshu, Rahul Jain, Priyanka Mukhopadhyay, Ala Shayeghi, Penghui Yao, *A new operational interpretation of relative entropy and trace distance between quantum states*. *IEEE Transaction on Information Theory*, Vol 62, Issue: 12, pages: 7566-7577, 2016.
  14. 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.
  15. 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.
  16. 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.
  17. 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.

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## **Professional activities**

- **Program Committee:** QIP 2018, TQC 2021, TQC 2022, QIP2023

## **Awards**

- Dean's Graduate Research Excellence and Research Achievement Awards, School of Computing, NUS. 2011
- Dean's Graduate Research Excellence and Research Achievement Awards, School of Computing, NUS. 2012