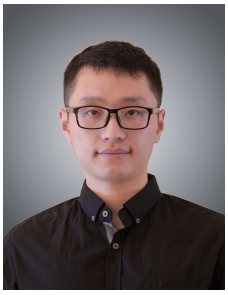

Xin Wang

Hartree Postdoctoral Fellow

QuICS, 3100 Atlantic Building
University of Maryland, College Park, MD 20742
Email: wangxinfelix@gmail.com
Homepage: xinwang.online

Research interests

Quantum Information, Entanglement Theory, Optimization, Quantum Computation, Quantum Communication, Quantum Resource Theories, Quantum Programming.

Research Positions

09/2018 – present **Hartree Postdoctoral Fellow**
Joint Center for Quantum Information and Computer Science (QuICS)
University of Maryland, College Park, MD.

Education

08/2014 – 08/2018 **Ph.D. in Quantum Information, University of Technology Sydney.**
Supervisors: Prof. Runyao Duan and Prof. Andreas Winter (external supervisor)
Thesis: Semidefinite Optimization for Quantum Information.
(2018 Chancellor's List for Outstanding Thesis)

09/2010 – 06/2014 **Bachelor of Science, Mathematics Department, Sichuan University.**
With a honor degree from the Wu Yuzhang Honors College of Sichuan University.

Honors and Awards

2018 QuICS Hartree Fellowship, University of Maryland, College Park.
2018 Outstanding Self-financed Overseas Student Scholarship (500 recipients among all the self-financed overseas students from China; Awarded by China Scholarship Council)
2018 Chancellor's List for Outstanding Thesis (top seven outstanding theses across UTS)
2018 UTS Post Thesis Publication Award.
2017 FEIT Higher Degree by Research Publication Award.
2017 UTS Faculty of Engineering and Information Technology Scholarship.
2014 Australian Research Council Discovery Scholarship.
2014 UTS International Research Scholarship.
2010 Wu Yuzhang Honors (top 1.5% of ten thousand freshmen in Sichuan University).

Refereed conference talks

The Conference on Quantum Information Processing (QIP) is the premier and most competitive conference in theoretical aspects of quantum information science and features only the most important advances each year (5 talks). AQIS (2 long+6 short talks) and TQC (1 talk) are both international leading conferences in the field of quantum information science, and ISIT is the main event in information theory (6 talks). In the following list, (*) indicates delivery by my co-author.

01/2019 **QIP 2019**, *Entanglement cost of quantum state preparation and channel simulation*, JILA, University of Colorado Boulder, USA.

02/2019* **SQuInT 2019**, *Exact entanglement cost of quantum states and channels under PPT-preserving operations*, CQuIC, Albuquerque, New Mexico, USA.

03/2019 **APS March meeting**, *Entanglement cost of quantum state preparation and channel simulation*, APS March meeting, Boston, USA.

01/2018 **QIP 2018**, *On converse bounds for classical communication over quantum channels*, QuTech, Delft University of Technology, Netherlands.

01/2018* **QIP 2018**, *Efficiently computable upper bounds for quantum communication*, QuTech, Delft University of Technology, Netherlands.

07/2018* **TQC 2018**, *Quantum Channel Simulation and the Channel's Smooth Max Information*, UTS, Sydney, Australia.

09/2018* **AQIS 2018**, *Distillation of quantum coherence in non-asymptotic settings*, Nagoya University, Nagoya, Japan.

06/2018 **ISIT 2018**, *On finite blocklength converse bounds for classical communication over quantum channels*, Vail, Colorado, USA.

06/2018 **ISIT 2018**, *Converse bounds for classical communication over quantum broadcast channels and quantum multi-access channels*, Vail, Colorado, USA.

06/2018* **ISIT 2018**, *Quantum Channel Simulation and the Channel's Smooth Max Information*, Vail, Colorado, USA.

01/2017 **QIP 2017**, *Asymptotic entanglement manipulation under PPT operations: new SDP bounds and irreversibility*, Microsoft Research, Redmond, USA.

01/2017 **QIP 2017**, *Semidefinite programming strong converse bounds for quantum channel capacities*, Microsoft Research, Redmond, USA.

09/2017 **AQIS 2017** (**long talk, top 10%** of all submissions), *Irreversibility of Asymptotic Entanglement Manipulation Under PPT Operations*, Centre for Quantum Technologies, National University of Singapore, Singapore.

09/2017* **AQIS 2017** (**long talk, top 10%** of all submissions), *Non-asymptotic entanglement distillation*, Centre for Quantum Technologies, National University of Singapore.

09/2017* **AQIS 2017**, *Semidefinite programming converse for quantum communication*, Centre for Quantum Technologies, National University of Singapore.

09/2017* **AQIS 2017**, *Approximate broadcasting of quantum correlations*, Centre for Quantum Technologies, National University of Singapore.

06/2017 **ISIT 2017**, *Semidefinite programming converse bounds for classical communication over quantum channels*, RWTH Aachen University, Aachen.

08/2016 **AQIS 2016**, *Separation between quantum Lovász number and entanglement-assisted zero-error classical capacity*, Academia Sinica, Taipei.

08/2016* **AQIS 2016**, *Improved Semidefinite Programming Upper Bound on Distillable Entanglement and Non-additivity of Rains' Bound*, Academia Sinica, Taipei.

08/2016* **AQIS 2016**, *Tripartite-to-bipartite entanglement transformation by SLOCC and the classification of matrix spaces*, Academia Sinica, Taipei.

07/2016 **ISIT 2016**, *A semidefinite programming upper bound of quantum capacity*, Universitat Pompeu Fabra, Barcelona.

07/2016 **ISIT 2016**, *On the quantum no-signalling assisted zero-error simulation cost of non-commutative bipartite graphs*, Universitat Pompeu Fabra, Barcelona.

Invited and Workshop Talks/Seminars

12/2018 **Semidefinite optimization for quantum information**.
Center for Computation and Technology, Louisiana State University, USA.

12/2018 **Quantification and manipulation of quantum coherence**.
Department of Physics and Astronomy, Louisiana State University, USA.

06/2018 **Quantum state redistribution with and without communication**.
Rocky Mountain Summit on Quantum Info, University of Colorado, Boulder, USA.

06/2018 **Semidefinite optimization for quantum information**.
UTS:QSI Seminar, University of Technology Sydney, Sydney, Australia.

01/2018 **Asymptotic entanglement manipulation under PPT operations**.
Maths Seminar, University of Nottingham, UK.

01/2018 **Semidefinite optimization for quantum information processing**.
GAMP/QMATH Lecture, University of Copenhagen, Denmark.

11/2017 **Evaluating communication capabilities of quantum channels**.
QCQIP 2017, AMSS, Beijing, China.

07/2017 **Semidefinite programming strong converse bounds for channel capacities**.
Beyond i.i.d. in Information Theory Workshop, NUS, Singapore.

06/2017 **Strong converse bounds for communication over quantum channels**.
Quantum Information Seminar, SUSTech, Shenzhen, China.

12/2015 **Activated zero-error classical communication of quantum channels**.
Sydney Quantum Information Theory Workshop, UTS, Sydney, Australia.

Publications

I have 14 papers published in refereed journals, 7 papers published in peer-reviewed conference proceedings and 4 preprint papers under review. I published 3 papers in Physical Review Letters (premier journal in physics), 4 papers in IEEE Transactions on Information Theory (premier journal in information theory), and 1 paper in Communications in Mathematical Physics (premier journal in mathematical physics). My publications are also available on arXiv and Google Scholar.

Peer-reviewed Journal Articles

(J1) **X. Wang**, K. Fang, and R. Duan, *Semidefinite programming converse bounds for quantum communication*, IEEE Transactions on Information Theory (in press), **(Contributed talk QIP 2018)**.

(J2) **X. Wang**, K. Fang, and M. Tomamichel, *On converse bounds for classical communication over quantum channels*, IEEE Transactions on Information Theory (in press), **(Contributed talk QIP 2018)**.

(J3) **X. Wang** and R. Duan, *Separation between quantum Lovász number and entanglement-assisted zero-error classical capacity*, IEEE Transactions on Information Theory 64(3): 1454-1460 (2018).

(J4) **X. Wang** and R. Duan, *Irreversibility of Asymptotic Entanglement Manipulation Under Quantum Operations Completely Preserving Positivity of Partial Transpose*, Physical Review Letters 119, 180506 (2017), **(Contributed talk QIP 2017)**.

(J5) **X. Wang**, W. Xie, and R. Duan, *Semidefinite programming strong converse bounds for classical capacity*, IEEE Transactions on Information Theory 64(1): 640-653 (2018), **(Contributed talk QIP 2017)**.

(J6) K. Fang, **X. Wang**, L. Lami, B. Regula, and G. Adesso, *Probabilistic distillation of quantum coherence*, Physical Review Letters 121, 070404 (2018).

(J7) Y. Li, Y. Qiao, **X. Wang**, and R. Duan, *Tripartite-to-bipartite Entanglement Transformation by Stochastic Local Operations and Classical Communication and the Classification of Matrix Spaces*, Communications in Mathematical Physics 358(2): 791-814 (2018).

(J8) L. Lami, B. Regula, **X. Wang**, R. Nichols, A. Winter, and G. Adesso, *Gaussian quantum resource theories*, available at Physical Review A 98, 022335 (**Editors' Suggestion**) (2018).

(J9) B. Regula, K. Fang, **X. Wang**, and G. Adesso, *One-shot coherence distillation*, Physical Review Letters 121, 010401 (2018).

(J10) M. G. Díaz, K. Fang, **X. Wang**, M. Rosati, M. Skotiniotis, J. Calsamiglia, A. Winter, *Using and reusing coherence to realize quantum processes*, Quantum 2, 100 (2018).

(J11) **X. Wang** and R. Duan, *Nonadditivity of Rains bound for distillable entanglement*, Physical Review A 95, 062322 (2017).

(J12) Y. Li, **X. Wang**, R. Duan, *Indistinguishability of bipartite states by positive-partial-transpose operations in the many-copy scenario*, Physical Review A 95, 052346 (2017).

(J13) W. Xie, K. Fang, **X. Wang**, and R. Duan, *Approximate broadcasting of quantum correlations*, Physical Review A 96, 022302 (2017).

(J14) **X. Wang** and R. Duan, *Improved semidefinite programming upper bound on distillable entanglement*, Physical Review A 94, 050301 (**Rapid Communication**) (2016).

Peer-reviewed Conference Proceedings

(C1) **X. Wang**, Kun Fang, and Marco Tomamichel, *On finite blocklength converse bounds for classical communication over quantum channels*, in Proceedings of the IEEE International Symposium on Information Theory (ISIT 2018).

(C2) S. Liu, **X. Wang**, L. Zhou, J. Guan, Y. Li, Y. He, R. Duan, and M. Ying, *$Q|SI\rangle$: A Quantum Programming Environment*, in Symposium on Real-Time and Hybrid Systems. Lecture Notes in Computer Science, vol 11180 (2018).

(C3) K. Fang, **X. Wang**, M. Tomamichel, and M. Berta, *Quantum Channel Simulation and the Channel's Smooth Max-Information*, in Proceedings of the IEEE International Symposium on Information Theory (ISIT 2018).

(C4) W. Xie, **X. Wang**, and R. Duan, *Converse bounds for classical communication over quantum broadcast channels and quantum multi-access channels*, in Proceedings of the IEEE International Symposium on Information Theory (ISIT 2018).

(C5) **X. Wang**, W. Xie, and R. Duan, *Semidefinite programming converse bounds for classical communication over quantum channels*, Proceedings of the IEEE International Symposium on Information Theory (ISIT 2017).

(C6) **X. Wang** and R. Duan, *A semidefinite programming upper bound of quantum capacity*, Proceedings of IEEE International Symposium on Information Theory (ISIT 2016).

(C7) **X. Wang** and Runyao Duan, *On the quantum no-signalling assisted zero-error simulation cost of non-commutative bipartite graphs*, Proceedings of the IEEE International Symposium on Information Theory (ISIT 2016).

Preprints

(P1) **X. Wang** and M. M. Wilde, *Exact entanglement cost of quantum states and channels under PPT operations*, arXiv:1809.09592, **(Contributed talk at QIP 2019)**.

(P2) **X. Wang**, M. M. Wilde, and Y. Su, *Efficiently computable bounds for magic state distillation*, arXiv:1812.10145, submitted to Physical Review Letters.

(P3) K. Fang, **X. Wang**, M. Tomamichel, and R. Duan, *Non-asymptotic entanglement distillation*, submitted to IEEE Transactions on Information Theory, available at arXiv:1706.06221.

(P4) R. Duan and **X. Wang**, *Activated zero-error classical capacity of quantum channels in the presence of quantum no-signalling correlations*, available at arXiv:1510.05437.

ACADAMIC VISITS

2018	Department of Physics and Astronomy, Louisiana State University, hosted by Prof. Mark M. Wilde (December 3 - December 14).
2018	Quantum Correlations Group, University of Nottingham, hosted by Prof. Gerardo Adesso (January 26 - January 31).
2018	Department of Computing, Imperial College London, hosted by Prof. Mario Berta (January 22 - January 25).
2018	QMATH, University of Copenhagen, hosted by Prof. Matthias Christandl (January 8 - January 12).
2017	Institute for Interdisciplinary Information Sciences, Tsinghua University, hosted by Prof. Xiongfeng Ma (June 13 - June 21).
2017	Department of Physics, Southern University of Science and Technology, hosted by Prof. Man-Hong Yung (June 7 - June 12).

PROFESSIONAL SERVICE

Journal Referee	Communications in Mathematical Physics, IEEE Transactions on Information Theory, and Journal of Physics A: Mathematical and Theoretical.
Conference Referee	Conference on Quantum Information Processing (QIP), Asian Quantum Information Science Conference (AQIS), IEEE International Symposium on Information Theory (ISIT), and IEEE Information Theory Workshop (ITW).
Coordinator	The 18th Conference on Quantum Information Processing (QIP15), International Workshop on Quantum Computing and Information Processing 2017, The 13th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2018).

REFERENCES

Prof. Runyao Duan
Founding Director of Baidu Institute for Quantum Computing
Baidu, Inc., Beijing, 100085, China
ARC Future Fellow and Professor
Director of Center for Quantum Software and Information
University of Technology Sydney, NSW 2007, Australia
☎ +61 2 9514 4619
✉ duanrunyao@baidu.com or runyao.duan@uts.edu.au

Prof. Andreas Winter
ICREA Research Professor
ICREA & Universitat Autònoma de Barcelona
ES-08193 Barcelona, Spain
☎ +34 93 581 4736
✉ andreas.winter@uab.cat

Prof. Debbie Leung
Professor and University Research Chair
Institute for Quantum Computing
University of Waterloo
Waterloo, Ontario, Canada N2L 3G1
☎ +1 519 888 4567
✉ wcleung@uwaterloo.ca

(More references upon request.)