



# Xin Wang

Centre for Quantum Software and Information  
Faculty of Engineering and Information Technologies  
University of Technology Sydney  
NSW 2007, Australia

## PERSONAL DETAILS

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Time of Birth	June 1993
Place of Birth	Changzhou, Jiangsu, China
Nationality	Chinese
Email address	wangxinfelix@gmail.com
Homepage	xinwang.online

## RESEARCH INTERESTS

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Quantum Shannon Theory, Entanglement Theory, Optimization Theory, Quantum Cryptography, Quantum Gaussian Information, Quantum Computation.

## EDUCATION

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- 08/2014 – present **PhD in Quantum Information, University of Technology Sydney.**  
Supervisors: Prof. Runyao Duan and Prof. Andreas Winter (UAB)  
Thesis: Semidefinite Optimization for Quantum Information.
- 09/2010 – 06/2014 **Bachelor in Science, Mathematics Department, Sichuan University.**  
With a honor degree from the Wu Yuzhang Honors College of Sichuan University.  
Thesis: Quantum Zero-Error Communication.

## REFEREED CONFERENCE TALKS

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The Conference on Quantum Information Processing (QIP) is the most competitive and important conference in quantum information science (4 talks). AQIS is an international leading conference (2 long+5 short talks) and ISIT is the main event in information theory (3 talks). In the following list, (\*) indicates delivery by my co-author.

- 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.
- 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*, NUS, Singapore.

- 09/2017\* **AQIS 2017** (long talk, top 10% of all submissions), *Non-asymptotic entanglement distillation*, NUS, Singapore.
- 09/2017\* **AQIS 2017**, *SDP converse for quantum communication*, NUS, Singapore.
- 09/2017\* **AQIS 2017**, *Approximate broadcasting of quantum correlations*, NUS, 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

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- 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, Copenhagen.
- 11/2017 **Evaluating communication capabilities of quantum channels.**  
QCQIP 2017, AMSS.
- 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.
- 12/2015 **Activated zero-error classical communication of quantum channels.**  
Sydney Quantum Information Theory Workshop, UTS, Sydney.

## PUBLICATIONS

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I have 8 papers published in refereed journals, 6 papers published in peer-reviewed conference proceedings and 8 preprint papers (available at arXiv).

### PEER-REVIEWED JOURNAL ARTICLES

- (J1) **X. Wang**, W. Xie, and R. Duan, *Semidefinite programming strong converse bounds for classical capacity*, IEEE Transactions on Information Theory 64(1): 640-653, (Contributed talk QIP 2017).
- (J2) **X. Wang** and R. Duan, *Irreversibility of Asymptotic Entanglement Manipulation Under Quantum Operations Completely Preserving Positivity of Partial Transpose*, Physical Review Letters 119, 180506 (Contributed talk QIP 2017).

- (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, *Improved semidefinite programming upper bound on distillable entanglement*, Physical Review A 94, 050301 (Rapid communication) (2016).
- (J5) **X. Wang** and R. Duan, *Nonadditivity of Rains bound for distillable entanglement*, Physical Review A 95, 062322 (2017).
- (J6) 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*, to appear in Communications in Mathematical Physics.
- (J7) 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).
- (J8) W. Xie, K. Fang, **X. Wang**, and R. Duan, *Approximate broadcasting of quantum correlations*, Physical Review A 96, 022302 (2017).

PEER-REVIEWED JOURNAL ARTICLES

- (C1) **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).
- (C2) **X. Wang** and R. Duan, *A semidefinite programming upper bound of quantum capacity*, Proceedings of IEEE International Symposium on Information Theory (ISIT 2016).
- (C3) **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).
- (C4) **X. Wang**, Kun Fang, and Marco Tomamichel, *On finite blocklength converse bounds for classical communication over quantum channels*, to appear in Proceedings of the IEEE International Symposium on Information Theory (ISIT 2018).
- (C5) K. Fang, **X. Wang**, M. Tomamichel, and M. Berta, *Quantum Channel Simulation and the Channel's Smooth Max-Information*, to appear in Proceedings of the IEEE International Symposium on Information Theory (ISIT 2018).
- (C6) W. Xie, **X. Wang**, and R. Duan, *Converse bounds for classical communication over quantum broadcast channels and quantum multi-access channels*, to appear in Proceedings of the IEEE International Symposium on Information Theory (ISIT 2018).

## PREPRINTS

- (P1) **X. Wang**, K. Fang, and M. Tomamichel, *On converse bounds for classical communication over quantum channels*, submitted to IEEE Transactions on Information Theory, available at arXiv:1709.05258, (**Contributed talk QIP 2018**).
- (P2) **X. Wang**, K. Fang, and R. Duan, *Semidefinite programming converse bounds for quantum communication*, submitted to IEEE Transactions on Information Theory, available at arXiv:1709.00200, (**Contributed talk QIP 2018**).
- (P3) K. Fang, **X. Wang**, M. Tomamichel, and R. Duan, *Non-asymptotic entanglement distillation*, 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.
- (P5) B. Regula, K. Fang, **X. Wang**, and G. Adesso, *One-shot coherence distillation*, available at arXiv:1711.10512.
- (P6) L. Lami, B. Regula, **X. Wang**, R. Nichols, A. Winter, and G. Adesso, *Gaussian quantum resource theories*, available at arXiv:1801.05450.
- (P7) W. Xie, **X. Wang**, and R. Duan, *Converse bounds for classical communication over quantum networks*, available at arXiv:1712.05637.
- (P8) S. Liu, **X. Wang**, L. Zhou, J. Guan, Y. Li, Y. He, R. Duan, and M. Ying, *Q|SI): A Quantum Programming Environment*, available at arXiv:1710.09500. (Technique report of the project “Q|SI): A Quantum Programming Environment” [link].)

## PROFESSIONAL SERVICE

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- Reviewer for the following journals
  - Communications in Mathematical Physics
  - IEEE Transactions on Information Theory
- Reviewer for the following conferences
  - Conference on Quantum Information Processing (QIP).
  - Asian Quantum Information Science Conference (AQIS)
  - IEEE Information Theory Workshop (ITW)
- Coordinator of the following conferences or workshops
  - QIP 2015 (Sydney)
  - Workshop on Quantum Computing and Quantum Information Processing 2017.

## AWARDS AND SCHOLARSHIPS

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2017	UTS FEIT Higher Degree by Research Publication Award
2014	Australian Research Council Discovery Scholarship (until 2017)
2014	UTS International Research Scholarship (until 2018)

- 2013            Comprehensive Merit Scholarship, Sichuan University
- 2011            Excellent Student, Sichuan University

## **ACADAMIC VISITS**

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- 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).

## **REFERENCES**

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### **Prof. Runyao Duan**

ARC Future Fellow and Professor  
Director of Center for Quantum Software and Information  
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### **Prof. Andreas Winter**

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### **Dr. Marco Tomamichel**

ARC DECRA fellow and Senior Lecturer  
University of Technology Sydney  
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(More references upon request.)