

Kun Fang

Postdoctoral Researcher

*Department of Applied Mathematics
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PERSONAL DETAILS

Date of Birth	December 1992
Place of Birth	Jingmen, Hubei, China
Nationality	Chinese
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RESEARCH INTERESTS

Quantum information theory, Quantum Shannon theory, Entanglement theory,
Resource theory, Optimization theory, Semidefinite programming, Nonlocal game

RESEARCH POSITIONS

11/2018— **Postdoctoral Researcher**

Department of Applied Mathematics and Theoretical Physics, University of Cambridge
Advisor: Dr. Hamza Fawzi

EDUCATION

2015-2018 **Ph.D. in Quantum Information Theory**

Thesis: Distillation and Simulation in Quantum Information

Supervisors: Prof. Runyao Duan and Prof. Mingsheng Ying

September 2015 - October 2018, University of Technology Sydney, Australia.

2011-2015 **Bachelor in Mathematics**

September 2011 - June 2015, Wuhan University, China.

REFEREED CONFERENCE TALKS

The Conference on Quantum Information Processing (**QIP**) is the premier and most competitive conference in quantum information science (2 talks). The Conference on the Theory of Quantum Computation, Communication and Cryptography (**TQC**) is the second largest conference in the field (1 talk). The Asian Quantum Information Science Conference (**AQIS**) is an international leading conference (1 long talk + 3 short talks). The IEEE International Symposium on Information Theory (**ISIT**) is the main event in information theory (2 talks). In the following list, (*) indicates delivery by my co-author.

09/2018* **Distillation of quantum coherence in non-asymptotic settings**

- AQIS 2018 contributed talk
Nagoya University, Nagoya, Japan
- 07/2018 **Quantum channel simulation and the channel's smooth max-information**
TQC 2018 contributed talk
Centre for Quantum Software and Information, University of Technology Sydney, Australia
- 06/2018* **On finite blocklength converse bounds for classical communication over quantum channels**
ISIT 2018 contributed talk
Talisa Hotel in Vail, Colorado, USA
- 06/2018 **Quantum channel simulation and the channel's smooth max-information**
ISIT 2018 contributed talk
Talisa Hotel in Vail, Colorado, USA
- 01/2018 **Efficiently computable upper bounds for quantum communication**
QIP 2018 contributed talk
QuTech, Delft University of Technology, Netherlands
- 01/2018* **On converse bounds for classical communication over quantum channels**
QIP 2018 contributed talk
QuTech, Delft University of Technology, Netherlands
- 09/2017 **Non-asymptotic entanglement distillation**
AQIS 2017 long talk, top 10 %
Centre for Quantum Technologies, National University of Singapore, Singapore
- 09/2017 **Semidefinite programming converse bounds for quantum communication**
AQIS 2017 contributed talk
Centre for Quantum Technologies, National University of Singapore, Singapore
- 09/2017* **Approximate broadcasting of quantum correlations**
AQIS 2017 contributed talk
Centre for Quantum Technologies, National University of Singapore, Singapore

INVITED AND WORKSHOP TALKS

- 07/2018 **Quantum channel simulation and the channel's smooth max-information**
Workshop: Beyond i.i.d. in Information Theory
University of Cambridge, UK
- 06/2018 **Distillation of quantum coherence**
Workshop: Rocky Mountain Summit on Quantum Information
JILA, University of Colorado Boulder, USA
- 01/2018 **Non-asymptotic entanglement distillation**
Quantum Correlations Group Seminar
University of Nottingham, UK
- 11/2017* **Evaluating communication capabilities of quantum channels**
International Workshop on Quantum Computing and Quantum Information Processing
Academy of Mathematics and Systems Science, Chinese Academy of Sciences, China

PUBLICATIONS AND PREPRINTS

- (1) **Probabilistic distillation of quantum coherence**
K. Fang, X. Wang, L. Lami, B. Regula, and G. Adesso
presented as a contributed talk at AQIS 2018
Physical Review Letters **121**, 070404 (2018); arXiv:1804.09500.
- (2) **One-shot coherence distillation**
B. Regula, K. Fang, X. Wang, and G. Adesso
presented as a contributed talk at AQIS 2018
Physical Review Letters **121**, 010401 (2018); arXiv:1711.10512.
- (3) **Semidefinite programming converse bounds for quantum communication**
X. Wang, K. Fang, and R. Duan
presented as a contributed talk at **QIP 2018**
IEEE Transactions on Information Theory (in press, 2018); arXiv:1709.00200.
- (4) **Using and reusing coherence to realize quantum processes**
M. Díaz, K. Fang, X. Wang, M. Rosati, M. Skotiniotis, J. Calsamiglia, and A. Winter
Quantum **2**, 100 (2018); arXiv:1805.04045.
- (5) **Approximate broadcasting of quantum correlations**
W. Xie, K. Fang, X. Wang, and R. Duan
presented as a contributed talk at AQIS 2017
Physical Review A **96**, 022302 (2017); arXiv:1705.06071.
- (6) **Quantum channel simulation and the channel's smooth max-information**
K. Fang, X. Wang, M. Tomamichel, and M. Berta
presented as contributed talks at ISIT 2018, TQC 2018, Beyond IID 2018
Proceedings of ISIT 2018; arXiv: 1807.05354.
- (7) **On finite blocklength converse bounds for classical communication over quantum channels**
X. Wang, K. Fang, and M. Tomamichel
presented as a contributed talk at ISIT 2018
Proceedings of ISIT 2018.
- (8) **Non-asymptotic entanglement distillation**
K. Fang, X. Wang, M. Tomamichel, and R. Duan
presented as a **long talk** at AQIS 2017
arXiv:1706.06221.
- (9) **On converse bounds for classical communication over quantum channels**
X. Wang, K. Fang, and M. Tomamichel
presented as a contributed talk at **QIP 2018**
arXiv:1709.05258.
- (10) **Quantum advantages in Hypercube game**
X. He, K. Fang, X. Sun, and R. Duan
arXiv:1806.02642.

PROFESSIONAL SERVICE

- Conference reviewer for Conference on Quantum Information Processing (QIP), Asian Quantum Information Science Conference (AQIS); Journal reviewer for Journal of Mathematical Physics, IEEE Transactions on Information Theory.

- Coordinator of International Workshop on Quantum Computing and Quantum Information Processing (QCQIP) 2017, Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC) 2018.

ACADEMIC VISIT

- 2018 **Quantum Correlations Group in School of Mathematical Sciences**
 Hosted by: Prof. Gerardo Adesso.
 University of Nottingham, January 26 - January 31.
- 2018 **Department of Computing, Imperial College London**
 Hosted by: Dr. Mario Berta.
 Imperial College London, January 22 - January 25.
- 2018 **Centre for the Mathematics of Quantum Theory (QMATH)**
 Hosted by: Prof. Matthias Christandl.
 University of Copenhagen, January 8 - January 12.
- 2017 **Academy of Mathematics and Systems Science (AMSS)**
 Hosted by: Prof. Xiaoming Sun.
 Chinese Academy of Sciences, November 1 - November 21.

REFERENCES

Prof. Runyao Duan

Founding Director of Baidu Institute for Quantum Computing
 Baidu, Inc., Beijing, 100085, China
 ARC Future Fellow and Professor
 Director of Centre for Quantum Software and Information
 University of Technology Sydney, NSW 2007, Australia
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Prof. Mingsheng Ying

Distinguished Professor
 Research Director of Centre for Quantum Software and Information
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Dr. Marco Tomamichel

ARC DECRA fellow and Senior Lecturer
 University of Technology Sydney
 NSW 2007, Australia
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More references upon request.