

# Yuxiang Yang

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## Personal Statement

I am currently a Ph.D Student from Department of Computer Science, The University of Hong Kong. My supervisor is Prof. Giulio Chiribella. Before joining HKU, I worked in Prof. Chiribella's group in IIIS, Tsinghua University as a PhD student.

## Areas of interest

All theoretical aspects of quantum information and computation, especially [Data Compression](#), [Quantum Cloning](#) and [Quantum Metrology](#).

## Education

- 2015 - PHD STUDENT in Computer Science, Department of Computer Science, The University of Hong Kong.  
Supervisor: Giulio Chiribella.
- 2013 - 2015 PHD STUDENT in Physics, IIIS, Tsinghua University.  
Supervisor: Giulio Chiribella.
- 2009 - 2013 BACHELOR in Physics, Department of Physics, Tsinghua University.

## Honors, awards, and scholarships

- 2016 Hong Kong and China Gas Company Limited Postgraduate Scholarship, awarded by *Hong Kong and China Gas Company*.
- 2015-2016 Computer Science Postgraduate Scholarship, awarded by *Department of Computer Science, The University of Hong Kong*.
- 2015-2018 Postgraduate Scholarship, awarded by *The University of Hong Kong*.
- 2014

蒋南翔奖学金 (The Jiang Nan-Xiang Prize), a top honor of *Tsinghua University*.

2013 清华大学优良毕业生 (Excellent Graduate of *Tsinghua University*).

2013 叶启孙奖 (Chi-Sun YEH Prize for undergraduate research; the top honor for graduation from *the Department of Physics, Tsinghua University*).

2012 Prize for Academic Excellence, awarded by *Tsinghua University*.

2011 Prize for Academic Progress, awarded by *Tsinghua University*.

## Publications

### FEATURED

2016 **Yuxiang Yang**, Giulio Chiribella and Daniel Ebler.  
“Efficient quantum compression for ensembles of identically prepared mixed states.”  
*Phys. Rev. Lett.* **116**, 080501 (2016).

2013 Giulio Chiribella, **Yuxiang Yang** and Andrew Chi-Chih Yao.  
“Quantum replication at the Heisenberg limit.” *Nat. Comm.* **4**, 2915 (2013)  
Challenge the no-cloning theorem with super-replication, a phenomenon where quantum states are cloned at a quadratic rate with a vanishing error. See [a Nature Physics “News and View” by John Calsamiglla](#) commenting on this work.

### PUBLISHED

2016 Giulio Chiribella and **Yuxiang Yang**.  
“Quantum superreplication of states and gates.” *Front. Phys.* **11(3)**, 110304 (2016).

2015 Giulio Chiribella, **Yuxiang Yang** and Cupjin Huang.  
“Universal Superreplication of Unitary Gates.” *Phys. Rev. Lett.* **114**, 120504 (2015).

2014 **Yuxiang Yang**, Giulio Chiribella and Gerardo Adesso.  
“Certifying quantumness: Benchmarks for the optimal processing of generalized coherent and squeezed states.” *Phys. Rev. A* **90**, 042319 (2014).

2014 Giulio Chiribella and **Yuxiang Yang**.  
“Optimal asymptotic cloning machines.” (an **IOPselect**) *New J. Phys.* **16**, 063005 (2014)

2013 Xiao-Xiao Zhang, **Yu-Xiang Yang** and Xiang-Bin Wang.  
“Lossy quantum-optical metrology with squeezed states.” *Phys. Rev. A* **88**, 013838 (2013).

2013

**Yuxiang Yang** and Giulio Chiribella.

“Is Global Asymptotic Cloning State Estimation?” Proceedings of *8th Conference on the Theory of Quantum Computation, Communication and Cryptography*, Eds. Simone Severini and Fernando Brandao, Leibniz International Proceedings in Informatics, Vol. 22, pp. 220-234.

2013

Giulio Chiribella and **Yuxiang Yang**.

“Confusability graphs for symmetric sets of quantum states.” Proceedings of *the XXIX International Colloquium on Group-Theoretical Methods in Physics*, Nankai Series in Pure, Applied Mathematics and Theoretical Physics, V. 11, pp. 251-256.

#### PREPRINTS

2016

**Yuxiang Yang**, Giulio Chiribella, and Masahito Hayashi.

“Optimal compression for identically prepared qubit states.”  
Submitted to Physical Review Letters. Preprint at [arXiv:1606.02893](https://arxiv.org/abs/1606.02893).

2015

Giulio Chiribella and **Yuxiang Yang**.

“Optimal processing of quantum coherence at zero energy cost.”  
Submitted to Physical Review X. Preprint at [arXiv:1502.00259](https://arxiv.org/abs/1502.00259).

2014

Giulio Chiribella, Rui Chao and **Yuxiang Yang**.

“Superactivation of quantum gyroscopes.”  
Submitted to Nature Physics. Preprint at [arXiv:1411.3439](https://arxiv.org/abs/1411.3439).

#### Presentations

2016

Poster presentation at [The International Conference on Quantum Communication, Measurement and Computing \(QCMC2016\)](#), NUS, Singapore.

2015

Two contributed talks “Universal Superreplication and Compression of Unitary Gates.” and “Superactivation of quantum gyroscopes.” at [15th Asian Quantum Information Science Conference \(AQIS\)](#), Seoul, Korea.

2015

Poster presentation (awarded with travel grant) at [The XVIII Conference on Quantum Information Processing \(QIP\)](#), Sydney, Australia.

2014

Invited Talk “Quantum replication and the ultimate limits of quantum metrology.” at [Workshop on Quantum Metrology, Interaction, and Causal Structure 2014](#), Beijing, China.

2014

Poster presentation at [14th Asian Quantum Information Science Conference \(AQIS\)](#), Kyoto, Japan.

- 2014 Poster presentation (awarded with travel grant) at [The XVII Conference on Quantum Information Processing \(QIP\)](#), Barcelona, Spain.
- 2013 Contributed talk “Is global asymptotic cloning state estimation?” at [The 8th Conference on the Theory of Quantum Computation, Communication and Cryptography \(TQC\)](#), Guelph, Canada.
- 2013 Contributed talk “Quantum replication at the Heisenberg limit.” at [International conference on Hot Topics in Physical Informatics](#), Changsha, China.

#### Visiting

- Jan, 2015 VISITING SCHOLAR of the Quantum Computation Laboratory (QCL) of the Centre for Quantum Computation & Intelligent Systems (QCIS) at the University of Technology, Sydney.
- May, 2013 VISITING SCHOLAR of Perimeter Institute for Theoretical Physics, Waterloo, Canada.
- Jun, 2012 PARTICIPANT of the Quantum Summer School, University of Michigan.

#### Teaching

- 2016 SPRING TA of the undergraduate course “Quantum information and Computation”, The University of Hong Kong.  
Instructor: Prof. Giulio Chiribella.
- 2014 FALL & 2013 FALL TA of the undergraduate course “Quantum information”, Tsinghua University.  
Instructor: Prof. Giulio Chiribella.

#### Misc.

- 2014- Reviewer of the Journals:  
“Physical Review Letters” (APS), “Physical Review X” (APS), “Quantum Information Processing” (Springer), and “Quantum Information and Computation” (Rinton Press).