

# Christopher Thomas Chubb

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## HIGHLIGHTS

- PhD and BSc. (Adv. Math) (Hons.) from University of Sydney
- Total of 9 papers, including 5 peer-reviewed journal articles, and 4 preprints, including:
  - Total citations of 88 and h-index of 4
  - Publications in [Nature Communications](#) and [Communications in Mathematical Physics](#)
  - A [JPA topical review](#) with 47 citations, selected for the [JPA Highlights of 2017](#)
  - 6 first-author papers, and 2 papers independent of doctoral supervisors
- Total of 15 talks (6 invited, 9 contributed) including:
  - QIP talks: 1
  - TQC talks: 2

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## EDUCATION

2015–present

### **Doctor of Philosophy**

- University of Sydney, NSW, Australia
- Supervisors: A/Prof. Steven T. Flammia, Dr. Marco Tomamichel
- Australian Postgraduate Award Scholarship (2015–2018)
- University of Sydney Merit Award (2015–2018)
- Australian Institute for Nanoscale Science and Technology Postgraduate Scholarship (John Makepeace Bennett Gift) (2017–2018)

2011–2014

### **Bachelor of Science (Advanced Mathematics) (Honours)**

- University of Sydney, NSW, Australia
- Majors: Physics and Mathematics
- First Class Honours with University Medal
- School of Physics Honours Scholarship (2014)
- Physics Foundation Scholarship No. 3 (2014)
- School of Physics Summer Vacation Scholarship (2014).
- Academic Merit Prize (2013, 2014)
- Dean's List of Academic Excellence (2011, 2012, 2013)
- Talented Student Program (2012, 2013)
- Mathematics Special Student Programs (2011)
- Chemistry Special Student Programs (2011)

2010/01

### **Australian Science Physics Olympiad Summer School**

- Monash University, Victoria, Australia

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## THESES

- **Efficient approximation of degenerate ground states of gapped spin chains: The unfrustrated case**  
Honours thesis, awarded first-class honours, supervised by Dr. Steven T. Flammia

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## PAPERS

Papers numbered by appearance on the arXiv

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## UNPUBLISHED PREPRINTS

- 9) **Avoiding irreversibility: engineering resonant conversions of quantum resources**  
K. Korzekwa, **C.T. Chubb**, and M. Tomamichel  
[arXiv:1810.02366](#)
- 8) **Statistical mechanical models for quantum codes with correlated noise**  
**C.T. Chubb** and S.T. Flammia  
[arXiv:1809.10704](#)
- 7) **Moderate deviation analysis of majorisation-based resource interconversion**  
**C.T. Chubb**, M. Tomamichel, and K. Korzekwa  
[arXiv:1809.07778](#)
- 5) **Beyond the thermodynamic limit: finite-size corrections to state interconversion rates**  
**C.T. Chubb**, M. Tomamichel, and K. Korzekwa  
[arXiv:1711.01193](#)

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## TOPICAL REVIEWS

- 2) **Hand-waving and Interpretive Dance: An Introductory Course on Tensor Networks**  
J.C. Bridgeman and **C.T. Chubb**  
*Journal of Physics A: Mathematical and Theoretical* **50**, 223001 (2017)  
Highlights of 2017  
[arXiv:1603.03039](#)

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## PEER-REVIEWED JOURNAL ARTICLES

- 6) **Energy cost of entanglement extraction in complex quantum systems**  
C. Bény, **C.T. Chubb**, T. Farrelly, and T.J. Osborne  
*Nature Communications* **9**, 3792 (2018)  
[arXiv:1711.06658](#)
- 4) **Moderate deviation analysis for classical communication over quantum channels**  
**C.T. Chubb**, V.Y.F. Tan, and M. Tomamichel  
*Communications in Mathematical Physics* **355**, 3 (2017)  
[arXiv:1701.03114](#)
- 3) **Approximate symmetries of Hamiltonians**  
**C.T. Chubb** and S.T. Flammia  
*Journal of Mathematical Physics* **58**, 082202 (2017)  
[arXiv:1608.02600](#)
- 1) **Computing the Degenerate Ground Space of Gapped Spin Chains in Polynomial Time**  
**C.T. Chubb** and S.T. Flammia  
*Chicago Journal of Theoretical Computer Science* **2016**, 9 (2016)  
[arXiv:1502.06967](#)

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## CONFERENCE PROCEEDINGS

- **Moderate deviation analysis for classical communication over quantum channels**  
**C.T. Chubb**, V.Y.F. Tan, and M. Tomamichel  
*Proceedings of the 2017 IEEE International Symposium on Information Theory (ISIT)*, 1544–1548 (2017)

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## TALKS

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### INVITED

#### **Statistical mechanical models for quantum codes with correlated noise**

2018/10 University of New Mexico, NM, USA

2018/10 Université de Sherbrooke, QC, Canada

2018/11 Perimeter Institute, ON, Canada

#### **Moderate deviation analysis for classical communication over quantum channels**

2017/07 Freie Universität Berlin, Germany

#### **Approximate symmetries of Hamiltonians**

2017/07 California Institute of Technology, CA, USA

2016/11 Massachusetts Institute of Technology, MA, USA

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### CONTRIBUTED

\* indicates a talk given by a co-author

#### **Moderate deviation analysis of majorisation-based resource interconversion**

\*2018/12 [AIP 2018](#), Perth, WA, Australia

#### **Statistical mechanical models for quantum codes with correlated noise**

2018/12 [AIP 2018](#), Perth, WA, Australia

2018/06 [TQC 2018](#), University of Technology Sydney, NSW, Australia

#### **Beyond the thermodynamic limit: finite-size corrections to state interconversion rates**

\*2018/09 [AQIS 2018](#), Nagoya University, Japan

#### **Moderate deviation analysis of majorisation-based resource interconversion**

2018/01 [QIP 2018](#), QuTech, Delft, The Netherlands

2017/07 [Beyond IID](#), National University of Singapore, Singapore

2017/06 [ISIT 2017](#), Aachen, Germany

2017/06 [TQC 2017](#), Université Pierre-et-Marie-Curie, Paris, France

#### **Approximate symmetries of Hamiltonians**

2017/06 [TQC 2017](#), Université Pierre-et-Marie-Curie, Paris, France

2016/12 [AIP 2016](#), Brisbane, QLD, Australia

#### **Polynomial-time ground state approximation of degenerate gapped spin chains**

2014/12 [AIP 2014](#), Australian National University, Canberra, ACT, Australia

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## TEACHING

2017, 2018 **Senior Statistical Mechanics**

Computational lab tutor

2016, 2017 **Hand-waving and Interpretive Dance: An Introduction to Tensor Networks**

Informal seven lecture course presented with Jacob C. Bridgeman

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### STUDENTS SUPERVISED

2016 **Doriane Drolet**

Exchange student from Université de Sherbrooke

2016 **David M. Long**

Senior Project student

2016 **Eric Huang**  
Talented Students Programme project student

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## REFEREEING

Journals:

- Quantum Information and Computing (QIC)
- Communications in Mathematical Physics (CMP)
- Journal of Mathematical Physics (JMP)
- IEEE Transactions on Information Theory (TIT)
- Quantum Journal

Conferences:

- Annual Conference on Quantum Information Processing (QIP)
- IEEE Symposium on Information Theory (ISIT)
- International Conference on Quantum Cryptography (QCrypt)
- International Conference on Information Technology and Science (ICITS)

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## MISCELLANEOUS

- Nationality: Australian
- Languages: English (mother tongue), German (ein bisschen)
- Erdős number: 4 (C.T. Chubb → S.T. Flammia → A.W. Harrow → M. Szegedy → P. Erdős)

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## REFERENCES

**A/Prof. Steven T. Flammia**

Centre for Engineered Quantum Systems, University of Sydney, NSW, Australia

Yale Quantum Institute, Yale University, New Haven, CT, USA

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**Dr. Marco Tomamichel**

Centre for Quantum Software and Information, University of Technology Sydney, NSW, Australia

[marco.tomamichel@uts.edu.au](mailto:marco.tomamichel@uts.edu.au)