Christopher Thomas Chubb

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Highlights

- PhD and BSc. (Adv. Math) (Hons.) from University of Sydney
- Total of 10 papers, including 6 peer-reviewed journal articles, and 4 preprints, including:
  - Total citations of 104 and h-index of 4
  - Publications in Nature Communications and Communications in Mathematical Physics
  - A JPA topical review with 60 citations, selected for the JPA Highlights of 2017, and in the top 10 most viewed JPA articles
  - 6 first-author papers, and 2 papers independent of doctoral supervisors
- Total of 19 talks (8 invited, 11 contributed) including:
  - QIP talks: 1
  - TQC talks: 3

Education

2015–present **Doctor of Philosophy**

- University of Sydney, NSW, Australia
- Supervisors: A/Prof. Steven T. Flammia, Dr. Marco Tomamichel
- Auxiliary Supervisor: Prof. Andrew C. Doherty
- 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

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

Papers

Papers numbered by appearance on the arXiv

Unpublished preprints

10) **Tailoring surface codes for highly biased noise**
D.K. Tuckett, **C.T. Chubb**, S. Bravyi, S.D. Bartlett, and S.T. Flammia
arXiv:1812.08186

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

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

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

5) **Beyond the thermodynamic limit: finite-size corrections to state interconversion rates**
C.T. Chubb, M. Tomamichel, and K. Korzekwa
Quantum **2**, 108 (2018)
arXiv:1711.01193

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

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)

Talks

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
2018/11 Yale University, CT, USA
2018/11 California Institute of Technology, CA, USA
2019/01 Microsoft Research (QuArC), WA, USA

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

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 2017, 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

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

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

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)

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)

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
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Prof. Stephen D. Bartlett
Centre for Engineered Quantum Systems, University of Sydney, NSW, Australia
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