

# Mario Berta

## Curriculum Vitae



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### PERSONAL INFORMATION

Place of Birth	Winterthur, Zürich, Switzerland
Nationality	Swiss
Affiliation	RWTH Aachen University, Institute for Quantum Information
Email	berta@physik.rwth-aachen.de

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### CURRENT POSITIONS

01/2026 – present	<b>Professor of Physics (W3, Director)</b> , <i>Rheinisch-Westfälische Technische Hochschule (RWTH) Aachen</i> , Institute for Quantum Information (IQI).
10/2022 – present	<b>Visiting Reader</b> , <i>Department of Computing</i> , Imperial College London.

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### PREVIOUS POSITIONS

11/2022 – 12/2025	<b>Professor of Physics (W2)</b> , <i>RWTH Aachen</i> , IQI.
01/2023 – 12/2024	<b>Visiting Research Associate Professor</b> , <i>National University of Singapore (NUS)</i> , Centre for Quantum Technologies (CQT).
11/2020 – 10/2022	<b>Senior Research Scientist</b> , <i>Amazon Web Services</i> , AWS Center for Quantum Computing.
11/2020 – 10/2022	<b>Visiting Faculty</b> , <i>California Institute of Technology (Caltech)</i> , Institute for Quantum Information and Matter (IQIM).
09/2022	<b>Reader</b> , <i>Imperial College London</i> , Department of Computing.
10/2020 – 08/2022	<b>Senior Lecturer</b> , <i>Imperial College London</i> , Department of Computing.
09/2019 – 10/2020	<b>Consultant Quantum Cryptography</b> , <i>Cambridge Quantum Computing (CQC) now Quantinuum</i> , Chessington Greater London.
08/2017 – 08/2020	<b>Lecturer</b> , <i>Imperial College London</i> , Department of Computing.
05/2016 – 07/2017	<b>Postdoctoral Researcher</b> , <i>Caltech</i> , IQIM, Advisor: Fernando Brandão.
02/2014 – 04/2016	<b>Postdoctoral Researcher</b> , <i>Caltech</i> , IQIM, Advisor: John Preskill.
06/2013 – 01/2014	<b>Postdoctoral Researcher</b> , <i>Eidgenössische Technische Hochschule (ETH) Zurich</i> , Department of Physics, Institute for Theoretical Physics, Advisor: Matthias Christandl.

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### EDUCATION

06/2010 – 05/2013	<b>Doctor of Sciences (Dr. sc. ETH)</b> , <i>ETH Zurich</i> , Department of Physics, Supervisor: Matthias Christandl.
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- 02/2009 – 05/2010 **PhD Student in Theoretical Physics**, *Ludwig-Maximilians-University (LMU) Munich, Department of Physics*, Supervisor: Matthias Christandl.
- 10/2002 – 03/2008 **Diploma in Physics (Master of Science ETH)**, *ETH Zurich*, Major in Theoretical Physics and Mathematics, Diploma Thesis Supervisor: Renato Renner.

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## FUNDED RESEARCH

- 2025 – 2028 **Eureka Applied Quantum Technologies**, *Bundesministeriums für Bildung und Forschung (BMBF) for German node*, EUR 2'135'000. Title: Quantum algorithms to simulate many-body physics (with industry partners Phasecraft United Kingdom and Planqc Germany)
- 2023 – 2026 **PhD Scholarship**, *BMW Interdisciplinary Doctoral Program in Quantum Systems Integration*, EUR 175'000. Title: Qubit-aware quantum algorithm development for industrial use cases (together with Dominique Unruh)
- 2022 – 2026 **Co-Investigator + Postdoctoral Scholarship**, *Engineering and Physical Sciences Research Council (EPSRC)*, EUR 3'470'000. Title: Distributed quantum computing and applications (lead by Kin Leung and Myungshik Kim)
- 2022 – 2025 **PhD Scholarship**, *Excellence Cluster: Matter and Light for Quantum Computing (ML4Q)*, EUR 240'000. Title: Early fault-tolerant quantum algorithms
- 2022 – 2027 **Starting Grant**, *European Research Council (ERC)*, EUR 1'500'000. Title: Entropy for quantum information science
- 2021 – 2023 **New Investigator Award**, *Engineering and Physical Sciences Research Council (EPSRC)*, EUR 321'000. Title: Optimizing information processing for quantum technologies (not started due to industrial engagement)
- 2019 – 2021 **European Partner Fund**, *Imperial College London*, EUR 4'600. Title: Optimising near-term quantum technologies for information processing
- 2018 – 2023 **President's PhD Scholarship Navneeth Ramakrishnan**, *Imperial College London*, EUR 92'711.
- 2018 – 2022 **PhD Scholarship**, *Samsung-Imperial Industrial Collaboration*, EUR 40,100. Title: Quantum simulation and algorithms for new quantum materials (lead by Myungshik Kim)
- 2018 – 2019 **Doctoral Prize Fellowship Carlo Sparaciari**, *Engineering and Physical Sciences Research Council*, EUR 61,435.
- 2017 **Institut Henri Poincaré Paris**, *Visiting Researcher Grant*, EUR 5'000.
- 2016 – 2017 **Swiss National Science Foundation**, *Advanced Postdoc Mobility Fellowship*, EUR 94,700. Title: Optimization techniques for quantum adversaries and assistance
- 2010 **Institute Mittag-Leffler Stockholm**, *Visiting Researcher Grant*, EUR 5'000.
- 2009 – 2011 **Elite Network of Bavaria & German Academic Exchange Service**, *PhD Scholarship*, EUR 37'800.

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## RESEARCH GROUP

- 05/2026 start date **Pablo Costa Rico**, *Postdoc*, Department of Physics, RWTH Aachen.
- 12/2025 – present **Robert Salzmann**, *Postdoc*, Department of Physics, RWTH Aachen.
- 11/2025 – present **Sven Danz**, *Postdoc*, Department of Physics, RWTH Aachen.

04/2024 – present	<b>Yongsheng Yao</b> , <i>Postdoc</i> , Department of Physics, RWTH Aachen.
04/2024 – present	<b>Michael Cao</b> , <i>Postdoc</i> , Department of Physics, RWTH Aachen.
03/2024 – present	<b>Richard Meister</b> , <i>Postdoc</i> , Department of Computing, Imperial London.
10/2025 – present	<b>Hazar Cakir</b> , <i>PhD Student</i> , Department of Physics, RWTH Aachen.
10/2024 – present	<b>Nikolaos Louloudis</b> , <i>PhD Student</i> , Department of Physics, RWTH Aachen.
04/2023 – present	<b>Gereon Kossmann</b> , <i>PhD Student</i> , Department of Physics, RWTH Aachen.
03/2023 – present	<b>Julius Zeiss</b> , <i>PhD Student</i> , Department of Physics, RWTH Aachen.
01/2023 – present	<b>Tobias Rippchen</b> , <i>PhD Student</i> , Department of Physics, RWTH Aachen.
PhD Graduates	<b>Samson Wang (2023)</b> , <b>Navneeth Ramakrishnan (2023)</b> , <b>Hyejung Jee (2022)</b> , <b>Francesco Borderi (2021)</b> .
Previous Postdocs	<b>Aditya Nema (2025)</b> , <b>Aadil Oufkir (2025)</b> , <b>Sreejith Sreekumar (2025)</b> , <b>Carlo Sparaciari (2021)</b> .

## INSTITUTIONAL RESPONSIBILITIES

2025	<b>International year of Quantum Science and Technology</b> , <i>RWTH Aachen</i> , Coordinator of local activities.
2024	<b>Führungszertifikat Hochschullehrer</b> , <i>RWTH Aachen</i> , around 10 days of interactive courses.
2023	<b>Appointment Committee</b> , <i>W2 Professorship (Germany)</i> , External expert.
2018 – 2019	<b>Undergraduate Admissions Panel</b> , <i>Department of Computing</i> , Imperial College London.
2018 – 2019	<b>Hiring Committee</b> , <i>Department of Computing</i> , Imperial College London.

## TEACHING ACTIVITIES

04/2026 – 07/2026	<b>Quantum Information</b> , <i>RWTH Aachen</i> .
10/2025 – 02/2026	<b>Theoretische Physik II: Quantentheorie</b> , <i>RWTH Aachen</i> .
04/2025 – 07/2025	<b>Quantum Algorithms</b> , <i>RWTH Aachen</i> .
04/2025 – 07/2025	<b>Advanced Topics in Quantum Information Theory</b> , <i>RWTH Aachen</i> .
10/2024 – 02/2025	<b>Theoretische Physik IV: Statistische Physik</b> , <i>RWTH Aachen</i> .
04/2024 – 07/2024	<b>Quantum Information</b> , <i>RWTH Aachen</i> .
04/2024 – 07/2024	<b>Quantum Algorithms</b> , <i>RWTH Aachen</i> .
10/2023 – 02/2024	<b>Theoretische Physik IV: Statistische Physik</b> , <i>RWTH Aachen</i> .
04/2023 – 07/2023	<b>Quantum Algorithms</b> , <i>RWTH Aachen</i> .
02/2020 – 03/2020	<b>Statistics and Probability</b> , <i>Imperial College London</i> .
10/2019 – 12/2019	<b>Quantum Computing</b> , <i>Imperial College London</i> .
02/2019 – 03/2019	<b>Statistics and Probability</b> , <i>Imperial College London</i> .
10/2018 – 12/2018	<b>Quantum Computing</b> , <i>Imperial College London</i> .

10/2018 – 12/2018 **Mathematical Methods**, *Imperial College London*.  
 02/2018 – 03/2018 **Statistics and Probability**, *Imperial College London*.

## PROFESSIONAL ACTIVITIES

Associate Editor	IEEE Transactions on Information Theory 2021 – 2027
Editorial Board	Quantum Science and Technology IOPscience 2023 – 2025
Guest Editor	IEEE Journal of Selected Topics in Signal Processing (JSTSP) on Emerging Quantum Trends: From Theoretical Foundation to Signal Processing 2026 IEEE Journal on Selected Areas in Information Theory (JSAIT) on Quantum Information Science 2020
Steering Committee	Beyond IID in Information Theory, 2024 – 2027
Organizer	Workshop on Mathematics of Quantum Information, RWTH Aachen 2025 Mini-Symposium on Polynomial and SoS Optimization in Quantum Information, SIAM Conference on Optimization (OP20) 2021
Co-Organizer	Chair Quantum Shannon Theory, London Symposium on Information Theory (LSIT) 2019
Member	IEEE Information Theory Society Association for Computing Machinery (ACM)
PhD Examiner	Imperial College London: Physics & Computer Science University of Copenhagen: Mathematics University of Nottingham: Mathematics ENS Lyon: Computer Science Politecnico di Milano: Computer Science and Engineering University of the Basque Country: Physical Chemistry
Prgm. Cmte. 26	Quantum Information Processing (QIP) IEEE International Symposium on Information Theory (ISIT)
Prgm. Cmte. 25	IEEE International Symposium on Information Theory (ISIT) IEEE Information Theory Workshop (ITW) Quantum Computing Theory in Practice (QCTIP) Asian Quantum Information Science (AQIS)
Prgm. Cmte. 24	Chair Beyond IID in Information Theory IEEE International Symposium on Information Theory (ISIT) Quantum Computation, Communication and Cryptography (TQC) Asian Quantum Information Science (AQIS)
Prgm. Cmte. 23	Quantum Information Processing (QIP) IEEE International Symposium on Information Theory (ISIT) International Conference on Quantum Cryptography (QCrypt)
Prgm. Cmte. 22	Co-chair Quantum Computing Theory in Practice (QCTIP) Quantum Information Processing (QIP) IEEE International Symposium on Information Theory (ISIT) International Conference on Quantum Cryptography (QCrypt) Quantum Computation, Communication and Cryptography (TQC)

	IEEE Information Theory Workshop (ITW)
Prgm. Cmte. 21	IEEE International Symposium on Information Theory (ISIT)
	Asian Quantum Information Science (AQIS)
	Beyond IID in Information Theory
Prgm. Cmte. 20	Quantum Information Processing (QIP)
Prgm. Cmte. 19	Quantum Computation, Communication and Cryptography (TQC)
	Asian Quantum Information Science (AQIS)
Prgm. Cmte. 18	Quantum Information Processing (QIP)
	Quantum Computation, Communication and Cryptography (TQC)
	Asian Quantum Information Science (AQIS)
Prgm. Cmte. 17	Quantum Computation, Communication and Cryptography (TQC)
	Asian Quantum Information Science (AQIS)
	Information Theoretic Security (ICITS)
Journal Referee	Nature Physics, Nature Communications, Nature Photonics, Physical Review Letters, New Journal of Physics, Physical Review A, Physical Review B, Journal of Physics A, Annals of Physics, Communications in Mathematical Physics, Annales Henri Poincaré, Letters in Mathematical Physics, Journal of Mathematical Physics, IEEE Transactions on Information Theory, Mathematical Programming, ACM Transactions on Quantum Computing, Quantum, Quantum Information and Computation, Quantum Information Processing, among others.
Conferences	Quantum Information Processing (QIP), Symposium on the Theory of Computing (STOC), IEEE Annual Symposium on Foundations of Computer Science (FOCS), International Cryptology Conference (CRYPTO), Conference on the Theory and Applications of Cryptographic Techniques (EUROCRYPT), International Conference on Randomization and Computation (RANDOM), Conference on Quantum Cryptography (QCrypt), IEEE Symposium on Information Theory (ISIT), Asian Quantum Information Science (AQIS), Quantum Computation, Communication and Cryptography (TQC), IEEE Information Theory Workshop (ITW), Information-Theoretic Security (ICITS).
Research Agencies	European Research Council (ERC), Engineering and Physical Sciences Research Council (EPSRC), The Royal Academy of Engineering, Natural Sciences and Engineering Research Council of Canada (NSERC), Netherlands Organisation for Scientific Research (NWO), Agence Nationale de la Recherche (ANR), Army Research Office USA (ARO).

## LANGUAGES

German	<b>Fluent</b>
English	<b>Fluent</b>
French	<b>Basics</b>

*Mother Tongue.*

*Speaking, reading, and writing.*

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## CONTRIBUTED TALKS

The most competitive and important conference is QIP in quantum information science (acceptance around 20% — 21 talks accepted), QCrypt in quantum cryptography (5 talks accepted), CRYPTO in cryptography (one talk accepted), and the main event in information theory is ISIT (25 talks accepted). Generally, accepted conference contributions are the most important venue in theoretical computer science.

(\*) indicates delivery by co-author.

- \*03/2026 **QR 2026**, Quantum Resources, RIKEN Tokyo, *Fundamental quality bound on optical quantum communication.*
- 01/2026 **QIP 2026**, Quantum Information Processing, University of Latvia in Riga, *Strong converse exponent of channel interconversion.*
- \*01/2026 **QIP 2026**, Quantum Information Processing, University of Latvia in Riga, *Umlaut information.*
- \*01/2026 **QIP 2026**, Quantum Information Processing, University of Latvia in Riga, *On the optimization of quantum divergences.*
- \*09/2025 **TQC 2025**, Quantum Computation, Communication and Cryptography, Bengaluru, India, *Polynomial time quantum Gibbs sampling for Fermi-Hubbard model at any temperature.*
- \*09/2025 **TQC 2025**, Quantum Computation, Communication and Cryptography, Bengaluru, India, *Quantum computational complexity of matrix functions.*
- \*08/2025 **AQIS 2025**, Asian Quantum Information Science, Hong Kong, *Approximating fixed size quantum correlations in polynomial time.*
- \*07/2025 **Beyond IID 2025**, Beyond IID in Information Theory, Technical University Munich, *The asymptotic exponents of quantum resource testing via blurring.*
- \*07/2025 **Beyond IID 2025**, Beyond IID in Information Theory, Technical University Munich, *Approximating fixed size quantum correlations in polynomial time.*
- \*07/2025 **Beyond IID 2025**, Beyond IID in Information Theory, Technical University Munich, *Channel simulation: Tight meta-converse for error and strong converse exponents.*
- 07/2025 **Beyond IID 2025**, Beyond IID in Information Theory, Technical University Munich, *Continuity of entropies via integral representations.*
- \*07/2025 **Beyond IID 2025**, Beyond IID in Information Theory, Technical University Munich, *On approximate quantum error correction for symmetric noise.*
- \*07/2025 **Beyond IID 2025**, Beyond IID in Information Theory, Technical University Munich, *Approximation algorithms for channel coding.*
- \*06/2025 **ISIT 2025**, IEEE Symposium on Information Theory, Ann Arbor Michigan, *Exponents for shared randomness-assisted channel simulation.*
- \*06/2025 **ISIT 2025**, IEEE Symposium on Information Theory, Ann Arbor Michigan, *Distributed quantum hypothesis testing against product states under zero-rate communication constraints.*
- \*06/2025 **ISIT 2025**, IEEE Symposium on Information Theory, Ann Arbor Michigan, *Quantum entropy prover.*

- \*04/2025 **QCTIP 2025**, Quantum Computing Theory in Practice, Berlin, *Polynomial time quantum Gibbs sampling for Fermi-Hubbard model at any temperature.*
- 03/2025 **QR 2025**, Quantum Resources, Jeju Korea, *Approximation algorithms for higher-order refinements in resource theories.*
- \*02/2025 **QIP 2025 Plenary**, Quantum Information Processing, Raleigh Convention Center, *Asymptotic quantification of entanglement with a single copy.*
- \*02/2025 **QIP 2025**, Quantum Information Processing, Raleigh Convention Center, *Channel Simulation: Tight meta converse for error and strong converse exponents.*
- 02/2025 **QIP 2025**, Quantum Information Processing, Raleigh Convention Center, *Continuity of entropies via integral representations.*
- \*07/2024 **Beyond IID 2024**, Beyond IID in Information Theory, University of Illinois Urbana-Champaign, *One-shot multiple access channel simulation.*
- 06/2024 **ISIT 2024**, IEEE Symposium on Information Theory, Athens Greece, *Optimality of meta-converse for channel simulation.*
- \*06/2024 **ISIT 2024**, IEEE Symposium on Information Theory, Athens Greece, *Locally-measured Rényi divergences.*
- \*06/2024 **ISIT 2024**, IEEE Symposium on Information Theory, Athens Greece, *One-shot multiple access channel simulation.*
- \*06/2024 **ISIT 2024**, IEEE Symposium on Information Theory, Athens Greece, *A third information-theoretic approach to finite de Finetti theorems.*
- \*06/2024 **ISIT 2024**, IEEE Symposium on Information Theory, Athens Greece, *Limit distribution for quantum relative entropy.*
- 01/2024 **QIP 2024**, Quantum Information Processing, Taipei International Convention Center, *Entanglement monogamy via multivariate trace inequalities.*
- \*01/2024 **QIP 2024**, Quantum Information Processing, Taipei International Convention Center, *Bypassing joint typicality in network quantum Shannon theory.*
- 07/2023 **Beyond IID 2023**, Beyond IID in Information Theory, Universität Tübingen, *Entanglement monogamy via multivariate trace inequalities.*
- \*07/2023 **TQC 2023**, Quantum Computation, Communication and Cryptography, Aveiro Portugal, *Qubit-efficient randomized quantum algorithms for linear algebra.*
- \*06/2023 **ISIT 2023**, IEEE Symposium on Information Theory, Taipei Taiwan, *Broadcast Channel Simulation.*
- \*04/2023 **QCTIP 2023**, Quantum Computing Theory in Practice, Riverland Cambridge, *Qubit-efficient randomized quantum algorithms for linear algebra.*
- \*02/2023 **QIP 2023**, Quantum Information Processing, Ghent University, *A streamlined quantum algorithm for topological data analysis with exponentially fewer qubits.*
- \*02/2023 **QIP 2023**, Quantum Information Processing, Ghent University, *Sparse random Hamiltonians are quantumly easy.*
- \*02/2023 **QIP 2023**, Quantum Information Processing, Ghent University, *On generalised quantum Stein's lemmata and the reversibility of quantum resources.*
- \*10/2022 **Beyond IID 2022**, Beyond IID in Information Theory, Chain rules for quantum channels, Shenzhen Southern University of Science and Technology – virtual online.



- \*10/2022 **Beyond IID 2022**, Beyond IID in Information Theory, *Channel simulation: finite-blocklength and broadcast channels*, Shenzhen Southern University of Science and Technology – virtual online.
- 10/2022 **Beyond IID 2022**, Beyond IID in Information Theory, *On a gap in the proof of the generalised quantum Stein’s lemma and its consequences for the reversibility of quantum resources*, Shenzhen Southern University of Science and Technology – virtual online.
- \*07/2022 **QRE 2022**, Workshop on Quantum Resource Estimation, ISCA New York USA, *Quantum resources required to block-encode a matrix of classical data*.
- \*06/2022 **ISIT 2022**, IEEE Symposium on Information Theory, Aalto University Espoo Finland, *Chain rules for quantum channels*.
- \*06/2022 **ISIT 2022**, IEEE Symposium on Information Theory, Aalto University Espoo Finland, *One-shot point-to-point channel simulation*.
- \*03/2022 **QIP 2022**, Quantum Information Processing, California Institute of Technology, *A randomized quantum algorithm for statistical phase estimation*.
- \*10/2021 **ITW 2021**, IEEE Information Theory Workshop, *Moderate deviation analysis for quantum state transfer*, Kanazawa Japan – virtual online.
- \*09/2021 **Beyond IID 2021**, Beyond IID in Information Theory, *Moderate deviation analysis for quantum state transfer*, National Taiwan University – virtual online.
- \*07/2021 **ICALP 2021**, International Colloquium on Automata, Languages and Programming, *Quasi-polynomial time algorithms for free quantum games in bounded dimension*, University of Glasgow – virtual online.
- \*07/2021 **TQC 2021**, Quantum Computation, Communication and Cryptography, *Quasi-polynomial time algorithms for quantum games in bounded dimension*, University of Latvia – virtual online.
- \*11/2020 **Beyond IID 2020**, Beyond IID in Information Theory, *Non-additivity in classical-quantum wiretap channels*, Stanford University – virtual online.
- \*11/2020 **Beyond IID 2020**, Beyond IID in Information Theory, *Quantum Brascamp-Lieb Dualities*, Stanford University – virtual online.
- \*07/2020 **TQC 2020**, Quantum Computation, Communication and Cryptography, University of Latvia – virtual online, *Non-additivity in classical-quantum wiretap channels*.
- \*06/2020 **ISIT 2020**, IEEE Symposium on Information Theory, Los Angeles – virtual online, *Quantum Blahut-Arimoto algorithms*.
- \*06/2020 **ISIT 2020**, IEEE Symposium on Information Theory, Los Angeles – virtual online, *Additivity in classical-quantum wiretap channels*.
- 07/2019 **ISIT 2019**, IEEE Symposium on Information Theory, Paris, *Quantum coding via semidefinite programming*.
- 07/2019 **ISIT 2019**, IEEE Symposium on Information Theory, Paris, *Stein’s lemma for classical-quantum channels*.
- \*07/2019 **ISIT 2019**, IEEE Symposium on Information Theory, Paris, *Second-order characterizations via partial smoothing*.
- \*07/2019 **Beyond IID 2019**, Beyond IID in Information Theory, *Non-commutative Blahut-Arimoto algorithms*, University of Technology Sydney.



- \*07/2019 **Beyond IID 2019**, Beyond IID in Information Theory, *Semidefinite programming hierarchies for quantum error correction*, University of Technology Sydney.
- \*01/2019 **QIP 2019**, Quantum Information Processing, University of Colorado Boulder, *Thermodynamic capacity of quantum processes*.
- 07/2018 **Beyond IID 2018**, Beyond IID in Information Theory, *Partially smoothed information measures*, University of Cambridge.
- \*07/2018 **Beyond IID 2018**, Beyond IID in Information Theory, *Thermodynamic capacity of quantum processes*, University of Cambridge.
- \*07/2018 **Beyond IID 2018**, Beyond IID in Information Theory, *Quantum channel simulation and the channel's smooth max-information*, University of Cambridge.
- 07/2018 **TQC 2018**, Quantum Computation, Communication and Cryptography, University of Technology Sydney, *Thermal States as convex combinations of matrix product states*.
- \*07/2018 **TQC 2018**, Quantum Computation, Communication and Cryptography, University of Technology Sydney, *Quantum channel simulation and the channel's smooth max-information*.
- \*07/2018 **ISIT 2018**, IEEE Symposium on Information Theory, Vail, *Strong converse bound on the two-way assisted quantum capacity*.
- \*07/2018 **ISIT 2018**, IEEE Symposium on Information Theory, Vail, *Quantum channel simulation and the channel's smooth max-information*.
- \*01/2018 **QIP 2018**, Quantum Information Processing, QUTech Delft, *Disentanglement cost of quantum states*.
- \*01/2018 **QIP 2018**, Quantum Information Processing, QUTech Delft, *Efficiently computable upper bounds for quantum communication*.
- 07/2017 **Beyond IID 2017**, National University of Singapore, *A meta-converse for private communication over quantum channels*.
- \*07/2017 **Beyond IID 2017**, National University of Singapore, *Rényi divergences as weighted non-commutative vector valued  $L_p$ -spaces*.
- \*07/2017 **Beyond IID 2017**, National University of Singapore, *Deconstruction and conditional erasure of quantum correlations*.
- \*06/2017 **ISIT 2017**, IEEE Symposium on Information Theory, Aachen, *Quantum Markov chains and logarithmic trace inequalities*.
- \*06/2017 **ISIT 2017**, IEEE Symposium on Information Theory, Aachen, *A meta-converse for private communication over quantum channels*.
- \*01/2017 **QIP 2017**, Quantum Information Processing, Station Q Microsoft Research, *Multivariate trace inequalities*.
- \*01/2017 **QIP 2017**, Quantum Information Processing, Station Q Microsoft Research, *Catalytic Decoupling – Deconstruction and conditional erasure of quantum correlations*.
- \*01/2017 **QIP 2017**, Quantum Information Processing, Station Q Microsoft Research, *Converse bounds for private communication over quantum channels*.
- \*01/2017 **QIP 2017**, Quantum Information Processing, Station Q Microsoft Research, *Applications of recoverability in quantum information*.

- 09/2016 **TQC 2016**, Quantum Computation, Communication and Cryptography, Free University of Berlin, *Strong converse rates for private communication over quantum channels.*
- 09/2016 **TQC 2016**, Quantum Computation, Communication and Cryptography, Free University of Berlin, *On variational expressions for quantum relative entropies.*
- 07/2016 **ISIT 2016**, IEEE Symposium on Information Theory, Barcelona, *Exploiting variational formulas for quantum relative entropy.*
- \*01/2016 **QIP 2016**, Quantum Information Processing, University of Calgary, *Strong converse and finite resource tradeoffs for quantum channels.*
- 08/2015 **QCrypt 2015**, Conference on Quantum Cryptography, University of Tokyo, *Semidefinite programming hierarchies for quantum adversaries.*
- \*05/2015 **TQC 2015**, Quantum Computation, Communication and Cryptography, Université Libre de Bruxelles, *Semidefinite programs for randomness extractors.*
- \*05/2015 **ICITS 2015**, Information Theoretic Security, University of Lugano, *Semidefinite programs for randomness extractors.*
- 02/2015 **SQuInT 2015**, Southwest Quantum Information and Technology Workshop, University of California Berkeley, *Quantum-proof randomness extractors via hierarchies of semidefinite programs.*
- \*01/2015 **QIP 2015**, Quantum Information Processing, University of Sydney, *Quantum-proof randomness extractors via operator space theory.*
- 07/2014 **ISIT 2014**, IEEE Symposium on Information Theory, Hawaii Convention Center Honolulu, *Identifying the information gain of a quantum measurement.*
- \*07/2014 **ISIT 2014**, IEEE Symposium on Information Theory, Hawaii Convention Center Honolulu, *A duality relation connecting different quantum generalizations of the conditional Rényi entropy.*
- \*07/2014 **ISIT 2014**, IEEE Symposium on Information Theory, Hawaii Convention Center Honolulu, *Variations on classical and quantum extractors.*
- \*08/2013 **AQIS 2013**, Asian Quantum Information Science, The Institute of Mathematical Sciences Taramani Chennai, *Continuous variable entropic uncertainty relations in the presence of quantum memory.*
- \*08/2013 **QCrypt 2013**, Conference on Quantum Cryptography, University of Waterloo, *Continuous variable entropic uncertainty relations in the presence of quantum memory.*
- \*05/2013 **TQC 2013**, Quantum Computation, Communication, and Cryptography, University of Guelph, *Entanglement-assisted guessing of complementary measurement outcomes.*
- 09/2012 **QCrypt 2012**, Conference on Quantum Cryptography, Centre for Quantum Technologies Singapore, *Quantum to classical randomness extractors.*
- \*09/2012 **QCrypt 2012**, Conference on Quantum Cryptography, Centre for Quantum Technologies Singapore, *A min-entropy uncertainty relation for finite size cryptography.*
- \*09/2012 **QCrypt 2012**, Conference on Quantum Cryptography, Centre for Quantum Technologies Singapore, *Continuous variable quantum key distribution: finite-key analysis of composable security against coherent attacks.*
- 08/2012 **CRYPTO 2012**, International Cryptology Conference, University of California Santa Barbara, *Quantum to classical randomness extractors.*

- \*08/2012 **ICITS 2012**, Information Theoretic Security, Université de Montréal, *Quantum to classical randomness extractors*.
- 07/2012 **ISIT 2012**, IEEE Symposium on Information Theory, Massachusetts Institute of Technology Boston, *Entanglement cost of quantum channels*.
- 04/2010 **TQC 2010**, Quantum Computation, Communication, and Cryptography, University of Leeds, *A conceptually simple proof of the quantum reverse Shannon theorem*.

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## INVITED TALKS

- 03/2026 **RIKEN Tokyo**, Quantum Resources, *Strong converse exponent of channel interconversion*.
- 01/2026 **University of Basel**, Symposium Theoretical Quantum Computing, *Quantum algorithm design for many-body simulation*.
- 11/2025 **EIN Quantum NRW**, Quantentechnologie in und für NRW, *Quantenalgorithmik*.
- 10/2025 **TUM Munich**, Workshop Enhanced Quantum Information Processing, *Quantum algorithm design for many-body simulation*.
- 09/2025 **NUS Singapore**, Colloquium Centre for Quantum Technologies, *Quantum algorithm design for many-body simulation*.
- 09/2025 **TUM Munich**, Plenary at QMATH16: Mathematical Results in Quantum Theory, *Entropy for multipartite quantum states*.
- 04/2025 **LMU Munich**, Department of Physics, *Quantum algorithm design for many-body simulation*.
- 03/2024 **Maastricht University**, Department of Advanced Computing Sciences, *Quantum algorithms for the early fault-tolerance regime*.
- 11/2023 **Ruhr-University Bochum**, Center of Computer Science, *Quantum algorithms for the early fault-tolerance regime*.
- 10/2023 **RWTH Aachen University**, Physics Colloquium, *Quantum algorithm development*.
- 09/2023 **IPAM Quantum Algorithms for Scientific Computation**, University of California Los Angeles, *Quantum state preparation without coherent arithmetic*.
- 09/2023 **Matter and Light for Quantum Computing**, Königswinter Workshop, *Quantum algorithms for the early fault-tolerance regime*.
- 05/2023 **Colloquium**, Technology Innovation Institute Abu Dhabi, *Quantum algorithms for the early fault-tolerance regime*.
- 05/2022 **Quantum Information Theory and Mathematical Physics**, Budapest University of Technology and Economics, *Chain rules for quantum channels*.
- 02/2021 **IPAM Entropy Inequalities, Quantum Information and Quantum Physics**, University of California Los Angeles, *Characterising quantum correlations of fixed dimension*.
- 12/2019 **Lyon Quantum Information Meeting**, École Normale Supérieure de Lyon, *Non-commutative Blahut-Arimoto algorithms*.
- 09/2019 **Quantum Information Theory and Mathematical Physics**, Budapest University of Technology and Economics, *De Finetti theorems for quantum channels*.

- 07/2019 **BIRS Workshop**, Banff International Research Station, *De Finetti theorems for quantum channels*.
- 06/2019 **Computer Science Seminar**, University of Warwick, *Quantum technologies for cryptography*.
- 06/2019 **Seminar**, University of Vienna, *Entropy and quantum information processing*.
- 06/2019 **Symposium on Mathematical Physics**, Heidelberg University, *Mathematics of quantum entropy*.
- 08/2018 **Modern Topics in Quantum Information**, International Institute of Physics Natal, *Matrix trace inequalities for quantum entropy*.
- 07/2018 **Basser Seminar Series**, University of Sydney, *Quantum technologies for cryptography*.
- 06/2018 **AI Summit London**, ExCeL London, *Quantum computing summit: the potential of quantum computing for enterprises*.
- 12/2017 **Conference on Analysis in Quantum Information Theory**, Institut Henri Poincaré Paris, *Matrix trace inequalities for quantum entropy*.
- 06/2017 **European Research Council**, Brussels, *Entropy for multipartite quantum systems*.
- 05/2017 **SIAM Conference on Optimization**, Vancouver, *Quantum bilinear optimization*.
- 04/2017 **Workshop Secure Communication via Quantum Channels**, Center for Interdisciplinary Research Bielefeld, *Converse bounds for private communication over quantum channels*.
- 11/2016 **Information and Complexity Day**, École Normale Supérieure de Lyon, *Deconstruction and conditional erasure of quantum correlations*.
- 10/2016 **Imperial College London**, Department of Computing, *The Quantum Revolution in Cryptography*.
- 10/2016 **QMath13: Mathematical Results in Quantum Physics**, GeorgiaTech, *Multivariate trace inequalities*.
- 03/2016 **APS March Meeting**, Baltimore, *Quantum coding with finite resources*.
- 07/2015 **Beyond IID in Information Theory Workshop**, Banff International Research Station, *Relative entropies of recovery and conditional quantum mutual information*.
- 06/2015 **Trustworthy Quantum Information Workshop**, University of Michigan, *Semidefinite programming hierarchies for quantum adversaries*.
- 06/2015 **Institute for Quantum Computing Colloquium**, University of Waterloo, *Quantum coding with finite resources*.
- 03/2015 **School in Quantum Information and Computation (WECIQ)**, University of Campina Grande, *Entropy inequalities*.
- 02/2015 **Western States Mathematical Physics Meeting**, Caltech, *Quantum adversaries via operator space theory*.
- 03/2014 **Physics Colloquium**, Louisiana State University, *The uncertainty principle in the presence of quantum memory*.
- 01/2013 **Beyond IID in Information Theory Workshop**, University of Cambridge, *Channel simulations*.

- 03/2010 **Workshop on Complex Quantum Systems**, National University of Singapore, *A conceptually simple proof of the quantum reverse Shannon theorem.*
- 07/2009 **Summer Workshop on Quantum Information**, University of Cambridge, *Single-shot quantum state merging.*

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## SEMINARS

- 04/2024 **BMW Munich**, Kick-Off Workshop RWTH Doctoral School, *Qubit-aware quantum algorithm development for industrial use cases.*
- 09/2023 **University of Copenhagen**, Department of Mathematical Sciences, *Quantum state preparation without coherent arithmetic.*
- 03/2023 **National University Singapore**, Centre for Quantum Technologies, *Randomized quantum algorithm for statistical phase estimation.*
- 01/2023 **IBM Zurich**, Quantum Computing Group, *Quantum state preparation without coherent arithmetic.*
- 01/2023 **ETH Zurich**, Department of Physics, *Quantum state preparation without coherent arithmetic.*
- 12/2022 **NTU Singapore**, Quantum resources workshop, *Is there a way of making entanglement theory reversible?.*
- 07/2022 **University College London**, Quantum Information Theory Group, *Composite hypothesis testing and resource theories.*
- 11/2021 **AWS Center for Quantum Computing**, Tech talk, *A randomized quantum algorithm for statistical phase estimation.*
- 05/2021 **École Polytechnique Fédérale de Lausanne**, School of Basic Sciences, *Entropy & quantum information processing.*
- 02/2021 **RWTH Aachen University**, Department of Physics, *Entropy & quantum information processing.*
- 01/2020 **Ruhr-University Bochum**, Center of Computer Science, *Quantum technologies for cryptography.*
- 01/2020 **University of Amsterdam**, Korteweg-de Vries Institute for Mathematics, *Entropy & quantum information processing.*
- 10/2019 **Queen's University Belfast**, Colloquium series at the Mathematical Sciences Research Centre, *Mathematics of quantum entropy.*
- 07/2019 **Caltech**, Institute for Quantum Information and Matter Seminar, *De Finetti theorems for quantum channels.*
- 05/2019 **University of Oxford**, Algorithms & Complexity Theory Seminar, *Semidefinite programming hierarchies for quantum information.*
- 12/2018 **University College London**, Quantum Science and Technology Institute, *Semidefinite programming hierarchies for quantum error correction.*
- 08/2018 **International Institute of Physics Natal**, Convexity and Quantum Information, *Semidefinite programming hierarchies for quantum-assisted coding.*
- 05/2018 **University of Nottingham**, School of Mathematical Sciences, *On composite hypothesis testing.*
- 05/2018 **University of Cambridge**, CQIF Seminar, *On composite hypothesis testing.*
- 01/2018 **CWI Amsterdam**, QuSoft, *Matrix trace inequalities for quantum entropy.*

- 11/2017 **University of York**, Hub for Quantum Communications Technologies, *On composite hypothesis testing*.
- 07/2017 **University of Technology Sydney**, Centre for Quantum Computation and Intelligent Systems, *Conditional decoupling of quantum information*.
- 05/2017 **Technical University of Munich**, Institute of Theoretical Information Technology, *Quantum coding with finite resources*.
- 05/2017 **Technical University of Munich**, Department of Mathematics, *Conditional decoupling of quantum information*.
- 03/2017 **ETH Zurich**, Department of Physics, *Conditional decoupling of quantum information*.
- 11/2016 **Technical University of Munich**, Institute of Theoretical Information Technology, *Deconstruction and conditional erasure of quantum correlations*.
- 10/2016 **CWI Amsterdam**, QuSoft, *Quantum Bilinear Optimization*.
- 09/2016 **Leibniz University Hanover**, Institute for Theoretical Physics, *Multivariate trace inequalities*.
- 09/2016 **Stanford University**, Institute for Theoretical Physics, *Quantum entropy*.
- 07/2016 **LMU Munich**, Department of Mathematics, *Entropie für Quantensysteme* (in German).
- 05/2016 **University of Sydney**, Department of Physics, *How to define quantum entropy*.
- 05/2016 **University of Technology Sydney**, Centre for Quantum Computation and Intelligent Systems, *Multivariate trace inequalities*.
- 04/2016 **Delft University of Technology**, QuTech, *Multivariate trace inequalities*.
- 03/2016 **Louisiana State University**, Hearne Institute for Theoretical Physics, *Quantum bilinear optimization applied to noisy channel coding*.
- 02/2016 **Ghent University**, Department of Physics, *Multivariate trace inequalities*.
- 02/2016 **University of Copenhagen**, Department of Mathematical Sciences, *Multivariate trace inequalities*.
- 11/2015 **Ghent University**, Department of Physics, *Quantum bilinear optimization applied to noisy channel coding*.
- 11/2015 **École Normale Supérieure de Lyon**, Models of Computing, Complexity and Combinatorics, *Quantum coding with finite resources*.
- 10/2015 **University of Tokyo**, Department of Physics, *Quantum bilinear optimization*.
- 05/2015 **Caltech**, IQIM Postdoctoral and Graduate Student Seminar, *Quantum coding with finite resources*.
- 04/2015 **Louisiana State University**, Hearne Institute for Theoretical Physics, *Fidelity of recovery and conditional quantum mutual information*.
- 02/2015 **Stanford University**, Institute for Theoretical Physics, *Entropy inequalities*.
- 01/2015 **University of Technology Sydney**, Centre for Quantum Computation and Intelligent Systems, *Entropy inequalities*.
- 01/2015 **University of Sydney**, Department of Physics, *Entropy Inequalities*.
- 12/2014 **Louisiana State University**, Hearne Institute for Theoretical Physics, *Randomness extraction against quantum adversaries*.
- 09/2014 **ETH Zurich**, Institute for Theoretical Physics, *Randomness extraction against quantum adversaries*.

- 05/2014 **National University of Singapore**, Centre for Quantum Technologies, *Conditional quantum mutual information.*
- 03/2014 **University of Tokyo**, Department of Physics, *Identifying the information gain of a quantum measurement.*
- 10/2013 **Leibniz University Hanover**, Institute for Theoretical Physics, *Identifying the information gain of a quantum measurement.*
- 02/2011 **National University of Singapore**, Centre for Quantum Technologies, *Entropic uncertainty relations with quantum side information.*
- 12/2009 **Max Planck Institute for Quantum Optics Munich**, Quantum Computing, Control, and Communication, *A new proof of the quantum reverse Shannon theorem.*