



Ángela Capel Cuevas

(Updated: 11th August, 2025)

Professional experience

- 04/24-... **Assistant Professor**, *University of Cambridge*, Cambridge (United Kingdom)
Quantum Information Theory/Theoretical Quantum Computation
Department of Applied Mathematics and Theoretical Physics
- 10/21-03/24 **Junior Professor (W1)**, *Eberhard Karls Universität Tübingen*, Tübingen (Germany)
Mathematical Methods of Quantum Theory, Area of Mathematical Physics
- 10/20-09/21 **MCQST Distinguished Postdoc**, *Technische Universität München (TUM) and Munich Center for Quantum Science and Technology (MCQST)*, Munich (Germany)
Chair of Mathematical Physics, group of Michael Wolf and Robert König
- 01/20-09/20 **Postdoctoral researcher**, *TUM and MCQST*, Munich (Germany)
Chair of Mathematical Physics, group of Michael Wolf and Robert König
- 09/19-12/19 **Support Researcher, ERC Consolidator Grant GAPS**, *Universidad Complutense de Madrid*, Spain
Group of David Pérez-García
- 09/15-08/19 **PhD student with a Fellowship La Caixa-Severo Ochoa**, *Universidad Autónoma de Madrid and Instituto de Ciencias Matemáticas*, Madrid (Spain)
- 09/14-03/15 **Teaching Assistant**, *Universidad Carlos III de Madrid*, Leganés (Spain)

Education

- 2015-2019 **Ph.D. in Mathematics**, *ICMAT and Universidad Autónoma de Madrid*, Madrid (Spain)
Thesis: *Quantum Logarithmic Sobolev Inequalities for Quantum Many-Body Systems: An approach via Quasi-Factorization of the Relative Entropy*
Supervisors: *David Pérez-García (UCM) and Angelo Lucia (Politecnico di Milano)*
Sobresaliente cum laude, international mention. Defense date: 16th December 2019
- 2014-2015 **Master Degree in Mathematics and Applications**, *Universidad Autónoma de Madrid*, Madrid (Spain)
Master thesis: *Norm-attaining operators*
Supervisors: *Miguel Martín (UGR) and José P. Moreno (UAM)*
- 2009-2014 **Bachelor Degree in Mathematics (Licenciatura, 5 years)**, *Universidad de Granada*, Granada (Spain)

Fellowships, awards and distinctions

- 2023 **Simons Emmy Noether Fellowship at Perimeter Institute**, *Perimeter Institute*, Waterloo (Canada)
Fellowship to spend some months at Perimeter Institute for Theoretical Physics.
- 2023 **Forbes 30 Under 30**, *Forbes Spain*, Spain
Member of the list.
- 2022 **Prize "Vicent Caselles RSME-FBBVA"**, *Spanish Royal Mathematical Society and BBVA Foundation*
Best PhD theses in Mathematics in Spain or by Spanish researchers, 6 awards every year.
- 10/20-09/22 **MCQST Distinguished Postdoc**, *MCQST*, Munich (Germany), (Declined in 09/21)
Fellowship at Technische Universität München, Chair of Mathematical Physics.
- 09/15-08/19 **Fellowship La Caixa-Severo Ochoa**, *Universidad Autónoma de Madrid*, Madrid
Fellowship from "La Caixa-Severo Ochoa international Ph.D. program" to do a Ph.D. in Mathematics at ICMAT.

Complementary education

- 02/21-09/21 **Diversity in Leadership**, *Munich Center for Quantum Science and Technology*, Munich (Germany)
Program designed for future leaders in Quantum Science and Technology that aims to evoke questions and provoke a process of finding one's own values and style of leadership in the context of a diverse work environment.

- 2016-2018 **Master Degree in Computational Engineering and Mathematics, UOC and URV**
 Master thesis: *Introduction to Post-Quantum Cryptography*
 Supervisor: Oriol Farràs Ventura (URV)
- 2010-2014 **Bachelor Degree in Physics, Universidad de Granada**
 170/240 credits passed

Projects as a Principal Investigator

- 05/24-14/27 **QuantERA project "Towards a useful quantum advantage" (TouQan)**, ERA-NET Cofund in Quantum Technologies, AEI (Spain), DFG (Germany), ANR (France), NCN (Poland)
 5 PIs and approx. 1.25 million €
- 07/23-12/24 **Project "New recovery maps in quantum information theory"**, University of Tübingen, Program for the Promotion of Junior Researchers
 15.8k €
- 03/23-12/23 **Project "Infinite-dimensional quantum Markov semigroups" with University of Nottingham**, Universities of Tübingen and Nottingham, Networking funds Tübingen-Nottingham
 2 PIs and 10k €
- 02/23-12/24 **Project "Use of correlation decay and complexity theory in the study of quantum Gibbs states" with Harvard University**, University of Tübingen, Exzellenz-Mittel Funds
 46.2k €
- 01/23-12/26 **CRC TRR 352 "Mathematics of Many-Body Quantum Systems and Their Collective Phenomena"**, U. Tübingen, L.M.U. München and T.U. München, Deutsche Forschungsgemeinschaft
 24 PIs and approx. 7 million €
- 07/21-12/21 **Seed Funding Program**, Munich Center for Quantum Science and Technology, Deutsche Forschungsgemeinschaft, Germany's Excellence Strategy - EXC2111 - 390814868
 10k €

Service to the Community

- 2025 **Co-chair of the Program Committee of ITW 2025**
- 2024 **Co-chair of the Program Committee of QIP 2025**
- 2024 **Member of the Program Committee of YQIS 2024**
- 2023-24 **Member of the Steering Committee of BIID 2024**
- 2023 **Member of the Governing Body of the CRC TRR 352 "Mathematics of Many-Body Quantum Systems and Their Collective Phenomena"**, U. Tübingen, L.M.U. München and T.U. München
- 2022-24 **Editor of Quantum journal**
- 2021, 2022 **Member of the Program Committee of QIP 2022, QIP 2023**
- 02/21-09/21 **Member of the Executive Committee of the cluster of excellence "Munich Center for Quantum Science and Technology (MCQST)"**, Munich

Organization of events

- 16-20/12/24 **Workshop "Correlations of quantum many-body systems"**, University of Tübingen, Tübingen (Germany)
- 05-10/05/24 **BIRS workshop on "Towards infinite dimension and beyond in quantum information"**, Institute of Mathematics of Granada (IMAG), Granada (Spain)
- 03-08/03/24 **BIRS workshop on "Fundamental limitations to quantum computation"**, Banff International Research Station, Alberta (Canada)
- 23-24/11/23 **Workshop on "Dissipative evolutions on infinite dimensional and many-body quantum systems"**, University of Nottingham, Nottingham (UK)
- 21-25/08/23 **Workshop "Locality and Complexity in Quantum Thermal Equilibrium"**, Harvard University, US
- 01-04/08/23 **Beyond I.I.D in Information Theory 11**, University of Tübingen, Tübingen (Germany)
- 04-06/07/23 **Workshop on "Infinite dimensional quantum Markov semigroups"**, University of Tübingen, Germany
- 12-16/06/23 **25th Conference of the International Linear Algebra Society**, UPM, Madrid (Spain)
 Organizer of the Mini-symposium: 'Linear Algebra and Quantum Information Theory'

- 21-25/11/22 **Focus Event on Modified Logarithmic Sobolev Inequalities for Quantum Markov Semigroups**, Erdős Center - Rényi Institute of Mathematics, Budapest (Hungary)
- 20-24/05/19 **2nd BYMAT Conference**, Instituto de Ciencias Matemáticas (ICMAT), Madrid (Spain)
- 07-09/05/18 **1st BYMAT Conference**, Instituto de Ciencias Matemáticas (ICMAT), Madrid (Spain)
- 2017-2019 **Seminario Junior ICMAT-UAM**, Instituto de Ciencias Matemáticas and Universidad Autónoma de Madrid

Promotion of diversity

- 01/21 **QIP 2022 - Panel discussion: Women in QST**, Pasadena, US
Member of the panel
- 01/21 **QIP 2021 - Panel discussion: A conversation with women in QST**, TUM and MCQST, online
Moderator, jointly with Amanda Young

Evaluation committees

- 07/25 **PhD committee of Satvik Singh**, University of Cambridge
Internal examiner
- 01/25 **Professorship in Probability**, DPMMS, University of Cambridge
Member of the committee. Awardee: Pierre-François Rodriguez
- 12/24 **PhD committee of Bjarne Bergh**, University of Cambridge
Internal examiner
- 11/24 **PhD committee of Wilfred Salmon**, University of Cambridge
Internal examiner

Mentorship

Postdocs

- 06/24-09/24 **Christiaan van de Ven**, Universität Tübingen, Tübingen (Germany)
Co-supervision with Stefan Teufel
- 05/24-... **Tim Möbus**, Universität Tübingen, Tübingen (Germany)
- 11/23-... **Barbara Roos**, Universität Tübingen, Tübingen (Germany)
Co-supervision with Stefan Teufel
- 01/23-01/24 **Alberto Ruiz de Alarcón**, Universität Tübingen, Tübingen (Germany)
Co-supervision with Stefan Teufel

PhD students

- 06/23-... **Pablo Costa Rico**, Technische Universität München, Munich (Germany)
Mentor, supervised by Michael Wolf (TUM)
- 01/23-... **Sebastian Stengele**, Technische Universität München, Munich (Germany)
Co-supervision with Simone Warzel (TUM) and Cambyse Rouzé (Inria Saclay)
- 10/22-... **Paul Gondolf**, Universität Tübingen, Tübingen (Germany)
Co-supervision with Cambyse Rouzé (TUM)

Master students

- Summer 2025 **Paul Rosa Ruiz**, Universität Tübingen, Tübingen (Germany)
Co-supervision with Alvaro Alhambra
Title: Thermalization and stability of open quantum systems with long-range interactions
- Winter 24/25 **Javon Verspaandonk**, Technische Universität München, Munich (Germany)
Co-supervision with Michael Wolf
Title: Functional inequalities for geometric Rényi divergences
- Summer 2024 **Manuel Lubetzki**, Universität Tübingen, Tübingen (Germany)
Co-supervision with Samuel Scalet
Title: Efficient quantum Gibbs sampling for commuting Hamiltonians
- Summer 2024 **Joe Francis**, Universität Tübingen, Tübingen (Germany)
Title: Generalised Quantum Tomography
- Winter 23/24 **Simon Höfer**, Universität Tübingen, Tübingen (Germany)
Title: Banach space constructions via quantum Young functions

Winter 23/24 **Shrish Roy**, *Universität Tübingen*, Tübingen (Germany)
 Title: Quantum Teleportation and Superdense coding in Cloning Scenarios

Summer 2023 **Jan Kochanowski**, *Technische Universität München*, Munich (Germany)
 Joint project, supervised by Ignacio Cirac and Cambyse Rouzé
 Title: Static and Dynamic properties of quantum spin systems at non-zero T
MCQST Master's Award 2023

Summer 2022 **Paul Gondolf**, *Universität Tübingen*, Tübingen (Germany)
 Title: Continuity of quantum entropic quantities via almost convexity

Bachelor students

Winter 24/25 **Niclas Schilling**, *Universität Tübingen*, Tübingen (Germany)
 Title: From Toric Code to Ising: Circuit Conjugations for Efficient Gibbs Sampling

Winter 20/21 **Jasmin Sehlke**, *Technische Universität München*, Munich (Germany)
 Title: Approximation Rates for Single Hidden-Layer Neural Networks

Research interns

Summer 2025 **Andreea Silvia Goia**, *University of Bucharest*, Bucharest (Romania)
 Title: Functional inequalities for Rényi divergences

Summer 2025 **Ivan Shum**, *University of Cambridge*, Cambridge (UK)
 Title: Quantum Gibbs sampling

Summer 2025 **Benjamin Court**, *ENS Lyon*, Lyon (France)
 Title: Reversed data-processing inequalities for quantum entropies

Summer 2023 **Mae Robert**, *ENS Lyon*, Lyon (France)
 Co-supervision with Alberto Ruiz de Alarcón (U. Tübingen)
 Title: New recovery maps in quantum information

Summer 2023 **Joël Charles-Rebuffé**, *ENS Lyon*, Lyon (France)
 Co-supervision with Alberto Ruiz de Alarcón (U. Tübingen)
 Title: Approximation of Gibbs states by MPOs

IMC Team Leader

2022-23 **Coordinator of the International Mathematics Competition (IMC) team**, *University of Tübingen*, Tübingen (Germany)
 Results in 2022: Ranking 35 and individually, 1 first, 1 second and 1 third prize for the members of the team
 Results in 2023: Individually, 1 second and 1 third prize for the members of the team

Publications

- P. Páez-Velasco, N. Schilling, S. Scalet, F. Verstraete and Á. Capel,
Efficient and simple Gibbs state preparation of the 2D toric code via duality to classical Ising chains,
preprint (2025),
 arXiv: [2508.00126](https://arxiv.org/abs/2508.00126)
- T. Möbus, J. Sánchez-Segovia, Á. M. Alhambra and Á. Capel,
Stability of thermal equilibrium in long-range quantum systems,
preprint (2025),
 arXiv: [2506.16451](https://arxiv.org/abs/2506.16451)
 (Talk in BIID)
- S. Scalet, Á. Capel, A. Chowdhury, H. Fawzi, O. Fawzi, I. Kim and A. Tikku,
Classical Estimation of the Free Energy and Quantum Gibbs Sampling from the Markov Entropy Decomposition,
preprint (2025),
 arXiv: [2504.17405](https://arxiv.org/abs/2504.17405)
 (Talk in TQC, BIID)
- A. Bluhm, Á. Capel, P. Costa-Rico and A. Jenčova,
Belavkin-Staszewski Quantum Markov Chains,
preprint (2025),
 arXiv: [2501.09708](https://arxiv.org/abs/2501.09708)
 (Talk in BIID)

- Á. Capel, P. Gondolf, J. Kochanowski, and C. Rouzé,
Quasi-optimal sampling from Gibbs states via non-commutative optimal transport metrics,
preprint (2024),
arXiv: [2412.01732](https://arxiv.org/abs/2412.01732)
- K. Audenaert, B. Bergh, N. Datta, M. G. Jabbour, Á. Capel and P. Gondolf,
Continuity bounds for quantum entropies arising from a fundamental entropic inequality,
IEEE Transactions on Information Theory (2025),
DOI: [10.1109/TIT.2025.3586478](https://doi.org/10.1109/TIT.2025.3586478), arXiv: [2408.15306](https://arxiv.org/abs/2408.15306)
(Talk in QIP, BIID)
- J. Kochanowski, Á. Alhambra, Á. Capel and C. Rouzé,
Rapid thermalization of dissipative many-body dynamics of commuting Hamiltonians,
Commun. Math. Phys. 406, 176 (2025),
DOI: [10.1007/s00220-025-05353-y](https://doi.org/10.1007/s00220-025-05353-y), arXiv: [2404.16780](https://arxiv.org/abs/2404.16780)
(Talk in QIP)
- P. Gondolf, S. O. Scalet, A. Ruiz-de-Alarcón, Á. Alhambra and Á. Capel,
Conditional Independence of 1D Gibbs States with Applications to Efficient Learning,
preprint (2024),
arXiv: [2402.18500](https://arxiv.org/abs/2402.18500)
- A. Bluhm, Á. Capel and A. Pérez-Hernández,
Strong decay of correlations for Gibbs states in any dimension,
preprint (2024),
arXiv: [2401.10147](https://arxiv.org/abs/2401.10147)
(Talk in QIP)
- Á. Capel, M. Moscolari, S. Teufel and T. Wessel,
From decay of correlations to locality and stability of the Gibbs state,
Commun. Math. Phys. 406, 43 (2025),
DOI: [10.1007/s00220-024-05198-x](https://doi.org/10.1007/s00220-024-05198-x), arXiv: [2310.09182](https://arxiv.org/abs/2310.09182)
(Talk in QIP)
- A. Bluhm, Á. Capel, P. Gondolf and T. Möbus,
Unified framework for continuity of sandwiched Rényi divergences,
Ann. Henri Poincaré (2024),
DOI: [10.1007/s00023-024-01519-x](https://doi.org/10.1007/s00023-024-01519-x), arXiv: [2308.12425](https://arxiv.org/abs/2308.12425)
- A. Bluhm, Á. Capel, P. Gondolf and A. Pérez-Hernández,
General continuity bounds for quantum relative entropies,
IEEE International Symposium on Information Theory, 162-167 (2023),
DOI: [10.1109/ISIT54713.2023.10206734](https://doi.org/10.1109/ISIT54713.2023.10206734), arXiv: [2305.10140](https://arxiv.org/abs/2305.10140)
Jack Keil Wolf ISIT Student Paper Award (Paul Gondolf)
- Y. Jia and Á. Capel,
A generic quantum Wielandt's inequality,
Quantum, 8, 1331 (2023),
DOI: [10.22331/q-2024-05-02-1331](https://doi.org/10.22331/q-2024-05-02-1331), arXiv: [2301.08241](https://arxiv.org/abs/2301.08241)
- A. Bluhm, Á. Capel, P. Gondolf and A. Pérez-Hernández,
Continuity of quantum entropic quantities via almost convexity,
IEEE Trans. Inf. Theory, 69 (9), 5869-5901 (2023),
DOI: [10.1109/TIT.2023.3277892](https://doi.org/10.1109/TIT.2023.3277892), arXiv: [2208.00922](https://arxiv.org/abs/2208.00922)
(Talk in BIID)
- I. Bardet, Á. Capel, L. Gao, A. Lucia, D. Pérez-García and C. Rouzé,
Entropy decay for Davies semigroups of a one dimensional quantum lattice,
Commun. Math. Phys. 405, 42 (2024),
DOI: [10.1007/s00220-023-04869-5](https://doi.org/10.1007/s00220-023-04869-5), arXiv: [2112.00601](https://arxiv.org/abs/2112.00601)
(Talk in BIID)

- I. Bardet, Á. Capel, L. Gao, A. Lucia, D. Pérez-García and C. Rouzé,
Rapid thermalization of spin chain commuting Hamiltonians,
Phys. Rev. Letters, 130, 060401 (2023),
DOI: [10.1103/PhysRevLett.130.060401](https://doi.org/10.1103/PhysRevLett.130.060401), arXiv: [2112.00593](https://arxiv.org/abs/2112.00593)
(Talk in TQC)
- A. Bluhm, Á. Capel and A. Pérez-Hernández,
Exponential decay of mutual information for Gibbs states of local Hamiltonians,
Quantum, 6, 650 (2022),
DOI: [10.22331/q-2022-02-10-650](https://doi.org/10.22331/q-2022-02-10-650), arXiv: [2104.04419](https://arxiv.org/abs/2104.04419)
(Talk in QIP, BIID)
- A. Bluhm, Á. Capel and A. Pérez-Hernández,
Weak quasi-factorization for the Belavkin-Staszewski relative entropy,
IEEE International Symposium on Information Theory, 118-123 (2021),
DOI: [10.1109/ISIT45174.2021.9517893](https://doi.org/10.1109/ISIT45174.2021.9517893), arXiv: [2101.10312](https://arxiv.org/abs/2101.10312)
- Á. Capel and Y. Jia,
Comment on “Generators of matrix algebras in dimension 2 and 3”,
preprint (2021),
arXiv: [2101.07159](https://arxiv.org/abs/2101.07159)
- Á. Capel, C. Rouzé and D. Stilck França,
The modified logarithmic Sobolev inequality for quantum spin systems: classical and commuting nearest neighbour interactions,
Commun. Math. Phys. (accepted) (2023),
arXiv: [2009.11817](https://arxiv.org/abs/2009.11817)
(Talk in QIP, BIID, AQIS, ICMP)
- Á. Capel and J. Ocáriz,
Approximation with Neural Networks in Variable Lebesgue Spaces,
preprint (2020),
arXiv: [2007.04166](https://arxiv.org/abs/2007.04166)
- I. Bardet, Á. Capel and C. Rouzé,
Approximate tensorization of the relative entropy for noncommuting conditional expectations,
Ann. Henri Poincaré, 23, 101-140 (2022),
DOI: [10.1007/s00023-021-01088-3](https://doi.org/10.1007/s00023-021-01088-3), arXiv: [2001.07981](https://arxiv.org/abs/2001.07981)
- I. Bardet, Á. Capel, A. Lucia, D. Pérez-García and C. Rouzé,
On the modified logarithmic Sobolev inequality for the heat-bath dynamics for 1D systems,
J. Math. Phys., 62, 061901 (2021),
DOI: [10.1063/1.5142186](https://doi.org/10.1063/1.5142186), arXiv: [1908.09004](https://arxiv.org/abs/1908.09004)
(Talk in TQC)
- A. Bluhm and Á. Capel,
A strengthened data processing inequality for the Belavkin-Staszewski relative entropy,
Rev. Math. Phys., 32(02), 2050005 (2020),
DOI: [10.1142/S0129055X20500051](https://doi.org/10.1142/S0129055X20500051), arXiv: [1904.10768](https://arxiv.org/abs/1904.10768)
(Talk in BIID)
- Á. Capel, A. Lucia and D. Pérez-García,
Quantum Conditional Relative Entropy and Quasi-Factorization of the Relative Entropy,
J. Phys. A: Math. Theor., 51, 484001 (2018),
DOI: [10.1088/1751-8121/aae4cf](https://doi.org/10.1088/1751-8121/aae4cf), arXiv: [1804.09525](https://arxiv.org/abs/1804.09525)
(Talk in BIID, TQC, AQIS)
- Á. Capel, A. Lucia and D. Pérez-García,
Superadditivity of Quantum Relative Entropy for General States,
IEEE Trans. Inf. Theory, 64 (7), 4758-4765 (2018),
DOI: [10.1109/TIT.2017.2772800](https://doi.org/10.1109/TIT.2017.2772800), arXiv: [1705.03521](https://arxiv.org/abs/1705.03521)
- Á. Capel, M. Martín and J. Merí,
Numerical radius attaining compact linear operators,
J. Math. Anal. Appl., 445, 1258-1266 (2017),
DOI: [10.1016/j.jmaa.2016.02.074](https://doi.org/10.1016/j.jmaa.2016.02.074), arXiv: [1602.07084](https://arxiv.org/abs/1602.07084)

Selected talks

Contributed talks

(* given by coauthor)

- 09/25 * **XX Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2025)**, Bengaluru (India)
Title: Classical Estimation of the Free Energy and Quantum Gibbs Sampling from the Markov Entropy Decomposition
- 07/25 * **Beyond I.I.D. in Information Theory 2025**, *Institute of Advanced Studies*, Garching (Germany)
Title: Belavkin-Staszewski Quantum Markov Chains
- 07/25 * **Beyond I.I.D. in Information Theory 2025**, *Institute of Advanced Studies*, Garching (Germany)
Title: Continuity bounds for quantum entropies arising from a fundamental entropic inequality
Merged with "Continuity of entropies via integral representations"
- 07/25 **Beyond I.I.D. in Information Theory 2025**, *Institute of Advanced Studies*, Garching (Germany)
Title: Classical Estimation of the Free Energy and Quantum Gibbs Sampling from the Markov Entropy Decomposition
- 02/25 * **Quantum Information Processing (QIP) 2025**, Rayleigh (United States)
Title: Continuity bounds for quantum entropies arising from a fundamental entropic inequality
Merged with "Continuity of entropies via integral representations"
- 09/24 * **XIX Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2024)**, Okinawa (Japan)
Title: Conditional Independence of 1D Gibbs States with Applications to Efficient Learning
- 07/24 **Beyond I.I.D. in Information Theory 2024**, *University of Illinois*, Urbana-Champaign (United States)
Title: Conditional Independence of 1D Gibbs States with Applications to Efficient Learning
- 01/24 **Quantum Information Processing (QIP) 2024**, Taipei (Taiwan)
Title: Towards a unification of different measures of correlations and locality in Gibbs states
- 01/24 * **Quantum Information Processing (QIP) 2024**, Taipei (Taiwan)
Title: Spectral gap implies rapid mixing for commuting Hamiltonians
- 06/23 * **2023 IEEE International Symposium on Information Theory**, Taipei (Taiwan), online
Title: General continuity bounds for quantum relative entropies
- 09/22 * **Beyond I.I.D. in Information Theory 2022**, Shenzhen (China), online
Title: Continuity of quantum entropic quantities via almost convexity
- 07/22 * **XVII Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2022)**, *University of Illinois Urbana-Champaign*, Urbana-Champaign (United States)
Title: Rapid thermalization of 1D commuting Hamiltonians
- 05/22 **ICE-7 Quantum Information in Spain**, Granada (Spain)
Title: Exponential decay of mutual information for Gibbs states of local Hamiltonians
- 03/22 **Quantum Information Processing (QIP) 2022**, *Caltech*, Pasadena (United States)
Title: Exponential decay of mutual information for Gibbs states of local Hamiltonians
- 09/21 * **Beyond I.I.D. in Information Theory 2021**, Taipei (Taiwan), online
Title: Exponential decay of mutual information for Gibbs states of local Hamiltonians
- 09/21 **Beyond I.I.D. in Information Theory 2021**, Taipei (Taiwan), online
Title: Entropy decay for Davies semigroups of a one dimensional quantum lattice
- 08/21 **International Workshop on Operator Theory and its Applications (IWOTA)**, *Chapman University*, California (United States), online
Title: Functional inequalities in non-commutative L_p spaces for quantum many-body systems
- 08/21 **International Congress on Mathematical Physics (ICMP)**, Geneva (Switzerland)
Title: The modified logarithmic Sobolev inequality for quantum spin systems
- 07/21 **Young Researchers Symposium (YRS)**, Geneva (Switzerland)
Title: Approximate tensorization of the relative entropy for noncommuting conditional expectations
- 07/21 **2021 IEEE International Symposium on Information Theory**, Melbourne (Australia), online
Title: Weak Quasi-Factorization for the Belavkin-Staszewski Relative Entropy
- 01/21 * **Quantum Information Processing (QIP) 2021**, Munich (Germany), (online)
Title: The modified logarithmic Sobolev inequality for quantum spin systems: classical and commuting nearest neighbour interactions

- 12/20 **20th Asian Quantum Information Science Conference (AQIS 2020)**, *University of Technology Sydney*, Sydney (Australia), online
Title: The modified logarithmic Sobolev inequality for quantum spin systems: classical and commuting nearest neighbour interactions
- 11/20 **Beyond I.I.D. in Information Theory 2020**, *Stanford University*, Stanford (United States), online, lightning talk
Title: A strengthened data processing inequality for the Belavkin-Staszewski relative entropy
- 11/20 *** Beyond I.I.D. in information theory 2020**, *Stanford University*, Stanford (United States), online, given by coauthor
Title: The modified logarithmic Sobolev inequality for quantum spin systems: classical and commuting nearest neighbour interactions
- 06/20 **XV Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2020)**, *University of Latvia*, Riga (Latvia), online
Title: On the modified logarithmic Sobolev inequality for the heat-bath dynamics for 1D systems
- 11/18 **Q-Turn: Changing paradigms in quantum science**, *Universidade Federal de Santa Catarina*, Florianópolis (Brazil)
Title: Quantum conditional relative entropy and quasi-factorization of the relative entropy
- 09/18 **18th Asian Quantum Information Science Conference (AQIS 2018)**, *University of Nagoya*, Nagoya (Japan)
Title: Quasi-factorization of the relative entropy
- 07/18 **XIII Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2018)**, *Centre for Quantum Software and Information of the University of Technology Sydney*, Sydney (Australia)
Title: Quantum conditional relative entropy and quasi-factorization of the relative entropy
- Invited talks**
- 07/25 **Workshop in Mathematics of Quantum Information**, *Aachen*, (Germany)
Title: Quantum Markov chains and conditional independence of Gibbs states
- 06/25 **Colloquium “Joan van der Waals”**, *University of Leiden*, (Netherlands)
Title: Thermalisation of open quantum many-body systems
- 05/25 **Workshop “Entangled Matter out-of-equilibrium”**, *Erwin Schrödinger Institute*, Vienna (Austria)
Title: Rapid thermalization of quantum dissipative many-body systems
- 05/25 **Colloquium “Extreme Universe”**, *Japan*, online
Title: The Many Faces of Quantum Entropy: From Divergence Measures to Conditional Independence
- 02/25 **Entanglement in Strongly Correlated Systems**, *Benasque*, (Spain)
Title: Thermalization of open quantum many-body systems
- 01/25 **RSME’s 7th Congress of Young Researchers**, *Bilbao*, (Spain)
Title: Thermalization of open quantum many-body systems
- 08/24 **Bridging Quantum Information and Mathematical Physics**, *University of Cambridge*, (United Kingdom)
Title: Conditional independence of 1D Gibbs states with applications to efficient learning
- 08/24 **International Workshop on Operator Theory and its Applications (IWOTA)**, *University of Kent*, Canterbury (United Kingdom)
Title: Quantum Markov semigroups and modified logarithmic Sobolev inequalities
- 07/24 **2nd AMS-UMI International Joint Meeting**, *Palermo* (Italy)
Title: Rapid thermalisation of quantum dissipative many-body systems
- 07/24 **CIRM school on Random quantum channels: entanglement and entropies**, *Marseille* (France)
Title: A generic quantum Wielandt’s inequality for matrix and Lie algebras
- 07/24 **International Congress on Mathematical Physics (ICMP)**, *Strasbourg* (France)
Title: Rapid thermalisation of quantum dissipative many-body systems
- 03/24 **Workshop “Open Quantum Systems”**, *Institut de Mathématiques, Université Paul Sabatier*, Toulouse
Title: Rapid thermalisation of quantum dissipative many-body systems
- 03/23 **Workshop “Mathematical Challenges in Quantum Physics”**, *Princeton University*, Princeton (US)
Title: Rapid thermalization of spin chain commuting Hamiltonians
- 03/23 **Workshop “Quantum Many Body Systems and Quantum Information”**, *ICMAT*, Madrid (Spain)
Title: Rapid thermalization of spin chain commuting Hamiltonians

- 03/23 **Workshop "Celebrating the Choi-Jamiołkowski Isomorphism"**, Jagiellonian University (Poland), online
Title: A generic quantum Wielandt's inequality
- 11/22 **Quantitative Linear Algebra meets Quantum Information Theory II**, Chicago (United States)
Title: Continuity of quantum entropic quantities via almost convexity
- 10/22 **Workshop "Mathematics of Quantum Information and Many-body Systems"**, *University of Cambridge*, Cambridge (United Kingdom)
Title: Continuity of quantum entropic quantities via almost convexity
- 10/22 **8th Iberian Mathematical Meeting**, *University of Sevilla*, Sevilla (Spain)
Title: Continuity of quantum entropic quantities via almost convexity
- 09/22 **Workshop "Optimal Transport on Quantum Structures"**, Budapest (Hungary)
Title: Modified logarithmic Sobolev inequalities for quantum many-body systems
- 07/22 **Munich Conference on QST 2022**, Bavarian Alps (Germany)
Title: When does a quantum dissipative evolution mix rapidly?
- 06/22 **Mathematics Colloquium of the University of Tübingen**, Tübingen (Germany)
Title: When does a quantum many-body system mix rapidly?
- 06/22 **Quantum Information Theory and Mathematical Physics 2022**, Budapest (Hungary)
Title: Entropy decay for Davies semigroups of a one dimensional quantum lattice
- 03/22 **DPG Spring Meeting of the Matter and Cosmos Section**, Heidelberg (Germany), online
Title: Rapid thermalization of spin chain commuting Hamiltonians
- 10/21 **2021 Quantum Trajectories Fall School**, *Institut de Mathématiques, Université Paul Sabatier*, Toulouse
Title: Logarithmic Sobolev Inequalities for Quantum Many-Body Systems
- 02/21 **Entropy Inequalities, Quantum Information and Quantum Physics**, *Institute for Pure & Applied Mathematics, University of California Los Angeles*, Los Angeles (United States), online
Title: The modified logarithmic Sobolev inequality for quantum spin systems via approximate tensorization
- 01/20 **V Congreso de Jóvenes Investigadores de la RSME**, Castelló (Spain)
Title: On the data processing inequality for the relative entropy between two quantum states
- 10/19 **Workshop in Quantum Innovators in Computer Science and Mathematics**, *Institute for Quantum Computing of the University of Waterloo*, Waterloo (Canada)
Title: On the modified logarithmic Sobolev inequality for the heat-bath dynamics for 1D systems
- 05/19 **Workshop 2 of the Thematic Research Program: "Operator Algebras, Groups and Applications to Quantum Information"**, *Instituto de Ciencias Matemáticas*, Madrid (Spain)
Title: Stability for the data processing inequality of the Belavkin-Staszewski relative entropy
- 07/18 **Beyond I.I.D. in information theory 2018**, *Isaac Newton Institute for Mathematical Sciences of the University of Cambridge*, Cambridge (United Kingdom)
Title: Quantum conditional relative entropy and quasi-factorization of the relative entropy
- 06/18 **Workshop on Quantum Functional Inequalities**, *Institut de Mathématiques of the Université Paul Sabatier*, Toulouse (France)
Title: Quasi-factorization of the relative entropy
- 03/14 **X Meeting of the Functional Analysis Network**, Sevilla (Spain)
Title: Monge-Kantorovich problem
- 04/13 **IX Meeting of the Functional Analysis Network**, Zafra (Spain)
Title: Applications of the Cantor set

Courses

- 05/25 **Intensive Period "Quantum Mathematics @ Polimi"**, Milan (Italy)
Title: Thermalization of Open Quantum Systems
- 09/24 **TheoQS Autumn School**, Paderborn (Germany)
Title: Thermalization of Open Quantum Systems

Seminars

- 04/25 **Quantum Computing Seminar**, Harvard, Cambridge (US)
Title: Towards a unification of different measures of correlations and locality in Gibbs states
- 03/25 **LIP6 Quantum Seminar**, Paris (France)
Title: Rapid thermalisation of quantum dissipative many-body systems

- 02/25 **Quantinuum Seminar**, Cambridge (UK)
Title: Rapid thermalisation of quantum dissipative many-body systems
- 12/24 **Mathematical Physics Seminar**, TUM, Munich (Germany)
Title: Thermalization of open quantum many-body systems
- 10/24 **One World IAMP Mathematical Physics Seminar**, online
Title: Rapid thermalization of dissipative many-body dynamics of commuting Hamiltonians
- 05/24 **Lattice Seminar**, online
Title: From decay of correlations to locality and stability of the Gibbs state
- 05/24 **UCL Quantum Information Theory Seminar**, *University College London*, London (UK)
Title: Rapid thermalisation of quantum dissipative many-body systems
- 02/24 **Quantum Information Seminar**, *Universidad Complutense de Madrid*, Madrid (Spain)
Title: Towards a unification of different measures of correlations and locality in Gibbs states
- 11/23 **Quantum Computing and Related Topics Seminar**, *Hamburg University of Technology*, Germany
Title: Spectral gap implies rapid mixing for commuting Hamiltonians
- 11/23 **Mathematical Challenges in Quantum Mechanics, PhD Lecture**, online
Title: Quantum entropy and trace inequalities
- 10/23 **Perimeter Institute Quantum Information Seminar**, *Perimeter Institute*, Waterloo (Canada)
Title: Spectral gap implies rapid mixing for commuting Hamiltonians
- 05/23 **Paderborn Seminar**, Paderborn (Germany), online
Title: A generic quantum Wielandt's inequality for matrix and Lie algebras
- 05/23 **IUMPA Seminar**, *Universidad Politécnica de Valencia*, Valencia (Spain)
Title: When does a quantum many-body system mix rapidly?
- 04/23 **Quantum Optics and Information Talks**, *Brazilian Physical Society (SBF)*, Brasil, online
Title: A generic quantum Wielandt's inequality for matrix and Lie algebras
- 11/22 **QPequi Seminar**, *Federal University of Goiás*, Goiânia (Brasil), online
Title: Rapid thermalization of spin chain commuting Hamiltonians
- 01/22 **Perimeter Institute Quantum Information Seminar**, *Perimeter Institute*, Waterloo (Canada), online
Title: Entropy decay for Davies semigroups of a one dimensional quantum lattice
- 11/21 **UNED Applied Mathematics Seminar**, *Universidad Nacional de Educación a Distancia*, Madrid (Spain)
Title: Logarithmic Sobolev Inequalities for Quantum Many-Body Systems
- 03/21 **Stochastic Analysis Group Seminar**, *Institute of Science and Technology Austria*, Klosterneuburg, online
Title: Approximate tensorization for the relative entropy and exponential decay for the mutual information
- 06/20 **UCL Quantum Information Theory Seminar**, *University College London*, London (UK), online
Title: Logarithmic Sobolev Inequalities for Quantum Many-Body Systems
- 12/19 **Junior Seminar ICMAT-UAM**, *Instituto de Ciencias Matemáticas*, Madrid (Spain)
Title: Computación cuántica. En busca de la "supremacía cuántica"
- 12/19 **Departamento de Electromagnetismo y Física de la Materia Seminar**, *Universidad de Granada*
Title: Logarithmic Sobolev Inequalities for Quantum Many-Body Systems
- 10/19 **Perimeter Institute Quantum Discussions**, *Perimeter Institute*, Waterloo (Canada)
Title: Logarithmic Sobolev Inequalities for Quantum Many-Body Systems
- 04/19 **IQI Seminar**, *California Institute of Technology (Caltech)*, Pasadena (United States)
Title: Entropy decays for 1D quantum Gibbs samplers
- 03/19 **QuEDiver Seminar**, *Freie Universität Berlin*, Berlin (Germany)
Title: Entropy decays for 1D quantum Gibbs samplers
- 01/19 **Quantum Information Theory Seminar**, *Technische Universität München*, Munich (Germany)
Title: Entropy decays for 1D quantum Gibbs samplers
- 01/19 **Quantum Information Seminar**, *Universidad Complutense de Madrid*, Madrid (Spain)
Title: Entropy decays for 1D quantum Gibbs samplers
- 08/18 **Institute of Information Science Seminar**, *Academia Sinica*, Taipei (Taiwan)
Title: Quasi-factorization of the quantum relative entropy
- 05/18 **QLunch Seminar**, *University of Copenhagen*, Copenhagen (Denmark)
Title: Quasi-factorization of the quantum relative entropy

- 04/18 **CQIF Seminar**, *University of Cambridge*, Cambridge (United Kingdom)
Title: Quasi-factorization of the quantum relative entropy
- 04/18 **Quantum Information Seminar**, *Universidad Complutense de Madrid*, Madrid (Spain)
Title: Quantum conditional relative entropy
- 11/17 **Young researcher seminar during the thematic Trimester "Analysis in Quantum Information Theory"**, *Institut Henri Poincaré*, Paris (France)
Title: Superadditivity of Quantum Relative Entropy for General States
- 04/17 **Quantum Information Seminar**, *Universidad Complutense de Madrid*, Madrid (Spain)
Title: Quasi-factorization of the quantum relative entropy
- 03/16 **Quantum Information Seminar**, *Universidad Complutense de Madrid*, Madrid (Spain)
Title: Entropy inequalities for unbounded spin systems
- 02/16 **Junior Seminar ICMAT-UAM**, *Universidad Autónoma de Madrid*, Madrid (Spain)
Title: Bishop-Phelps problem

Long research visits

- 11/24-12/24 **3 weeks**, *Technical University of Munich*, Munich (Germany)
Hosts: Robert König and Michael Wolf
- 09/23-11/23 **9 weeks**, *Perimeter Institute for Theoretical Physics*, Waterloo (Canada)
Simons Emmy Noether Fellowship
- 06/18-09/18 **12 weeks**, *Institute of Information Science, Academia Sinica*, Taipei (Taiwan)
Host: Kai-Min Chung
- 09/17-12/17 **14 weeks**, *Institut Henri Poincaré*, Paris (France)
Thematic trimestre "Analysis in Quantum Information Theory"
- 07/13, 09/13 **9 weeks**, *Instituto de Ciencias Matemáticas*, Madrid (Spain)
Host: Luis Álvarez-Cónsul

Teaching experience

University of Cambridge

- Michaelmas 25 **Quantum Information Theory**, *Part III Tripos*
- Michaelmas 25 **Vectors and matrices**, *Part IA Tripos*
- Lent 2025 **Quantum Information Theory**, *Part III Tripos*

Universität Tübingen

- Winter 23/24 **Seminar on Quantum Information meets Quantum Matter**, *M. Sc. Mathematical Physics*
- Summer 2023 **Quantum Information Theory**, *M. Sc. Advanced Quantum Physics*
- Winter 22/23 **Seminar on Quantum Information Theory**, *M. Sc. Mathematical Physics*
- Summer 2022 **Quantum Shannon Theory and Beyond**, *M. Sc. Mathematical Physics*
- Wi21-Sum22 **Mathematical Physics Colloquium**, *M. Sc. Mathematical Physics*

Technische Universität München

- Summer 2020 **Berufspraktikum (Professional Internship Seminar)**

Universidad Autónoma de Madrid

- Spring 2019 **Linear Algebra**, *1st year Physics B.S.*, Problems sessions
- Spring 2018 **Linear Algebra**, *1st year Physics B.S.*, Problems sessions
- Spring 2018 **Statistics**, *1st year Environmental Sciences B.S.*, Problems sessions
- Fall 2016 **Mathematics**, *1st year Chemical Engineering B.S.*, Problems sessions

Innovative teaching projects

- 2018-2020 **Training of Young University Professors in Mathematics**, *U. Complutense Madrid*, National project
Principal Researcher: Inés M^a Gómez Chacón; paper: **Multimedia learning scenarios in professional development of the novice university mathematics lecturers** (2019), [Link](#)

Referee for journals and conferences

Journals: Annals of Mathematics, Journal of Functional Analysis, Nature Communications, Physical Review X, Physical Review X, Communications in Mathematical Physics, Letters in Mathematical Physics, Nature Physics, Entropy, Journal of Statistical Physics, Annales Henri Poincaré, Journal of Mathematical Physics, iScience, Quantum, IEEE Transactions on Information Theory, Journal of Optimization Theory and Applications.

Conferences: Beyond I.I.D., QIP, TQC, STOC, FOCS, YQIS, QCTiP.

Languages

2020	2 months course (B1.1), German	<i>TUM Sprachenzentrum, Munich (Germany)</i>
2009	Certificate in Advanced English (C1), English	<i>University of Cambridge</i>
2008	First Certificate of English (B2), English	<i>University of Cambridge</i>
2008	30 hours course (B2), German, German	<i>GLS Sprachenzentrum, Berlin (Germany)</i>
2008	Advanced degree in English (C1), English	<i>Oficial Languages School, Spain</i>
2008	Basic degree in German (A2), German	<i>Oficial Languages School, Spain</i>
2006	Elementary degree in English (B1), English	<i>Oficial Languages School, Spain</i>

Outreach

- 03/25 **Seminario del Colegio de España en Francia**, Paris (France)
"Computadores Cuánticos y Decoherencia: Un Amor Complicado"
- 02/19 **11th February, International Day of Women and Girls in Science**, IES Huarte de San Juan, Linares (Spain)
3 talks for students of 3º ESO (15 years old) and 1º Bachillerato (17 years old) on the topic: "El Ordenador Cuántico: La revolución tecnológica del siglo XXI"
- 11/18 **Science Week ICMAT 2018**, ICMAT, Madrid (Spain)
Designed and was responsible of a gymkhana for high school students
- 11/18 **Science Week UAM 2018**, Universidad Autónoma de Madrid, Madrid (Spain)
Imparted the workshop "Mathematical games"
- 03/18 **4º ESO + Empresa**, Instituto de Ciencias Matemáticas (Spain)
Imparted the workshop "Astronomía de posición"
- 11/16 **Science Week ICMAT 2016**, ICMAT, Madrid (Spain)
Designed and was responsible of a gymkhana for high school students
- 11/16 **Science Week UAM 2016**, Universidad Autónoma de Madrid, Madrid (Spain)
Imparted the workshop "Mathematical games"
- 09/16 **Séptima Noche Europea de los Investigadores**, Madrid (Spain)
Imparted the workshop "Mathematical games"
- 05/16 **Ciencia en Acción XIII**
Member of the committee for the modality "Scientific Outreach Projects. Press, Radio and Television"
- 03/16 **4º ESO + Empresa**, Instituto de Ciencias Matemáticas (Spain)
Imparted the workshop "Relojes, dígitos de control y múltiplos"
- 10/12 **Ciencia en Acción XIII**, Alcobendas (Spain)
Honorable mention in the category "Laboratory of Mathematics" with the project "Matemáticas en el Camino"
- 10/11 **Ciencia en Acción XII**, Lérida (Spain)
Prize to participate in the AGORA in the category "Laboratory of Mathematics" with the project "Artemáticas. Matemáticas, arquitectura y música: Más relacionadas de lo que parece"
- 10/10 **Science on Stage 2011**, Copenhagen (Denmark)
Participation with the project "Maths on Stage"
- 10/10 **Ciencia en Acción XI**, Santiago de Compostela (Spain)
First prize ex-aequo in the category "Laboratory of Mathematics" with the project "Mates en Acción"
- 09/09 **Ciencia en Acción X**, Granada (Spain)
First prize in the category "Laboratory of Mathematics" with the project "Geometría en una retícula"

Outreach papers

- Á. Capel, P. Contreras, J. Ocáriz and R. Naveiro, *¿Cómo se ha convertido Matemáticas en la carrera universitaria más popular?*, *El País* (2020), [Link](#)
- Á. Capel, *Y yo quiero ser... Matemática Física*, chapter of book "Y yo quiero ser..." (2018), [Link](#)
- Á. Arias, J. P. Ávila, Á. Capel, P. Morales, *Mates en Acción*, *Matematicalia*, vol. 7, núm. 3 (2011), [Link](#)
- F. T. Sánchez-Cobo, Á. Capel, *Estalmat: Una experiencia con cerillas*, *Revista EPSILON de la SAEM Thales*, 2010, Vol. 27(2), no 75, pp. 57-64, [Link](#)

References

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