

Research scientist with a strong background in quantum computation, quantum machine learning, and quantum simulations. Experienced in developing quantum algorithms, implementing error mitigation techniques, conceiving and leading research projects, and collaborating across theory–experiment interfaces. Proven track record in scientific publishing, supervising and mentoring PhD students, and contributing to open-source quantum software development.

## Education

- 2022 **University of Barcelona.**  
PhD in Quantum Computation and Quantum Information.  
Advisor: Prof. Dr José I. Latorre
- 2017 **Institute of Photonic Sciences (ICFO) and Polytechnic University of Catalonia.**  
MSc in Photonics specializing in Quantum Physics.
- 2016 **University of Barcelona.**  
BSc in Physics.

## Experience

### *Research*

- 2022 - Present **Freie Universität Berlin, Postdoctoral Researcher**, Berlin, Germany.  
Quantum machine learning.  
Jens Eisert's group.
- 2020 - 2022 **Technology Innovation Institute, Associate Researcher**, Abu Dhabi, UAE.  
Research and software development for quantum algorithms.
- 2019 **Los Alamos National Laboratory, Fellowship**, Los Alamos, USA.  
Quantum algorithms for linear systems of equations.  
Patrick J. Coles' group.
- 2018 - 2020 **Barcelona Supercomputing Center, Research Engineer**, Barcelona, Spain.  
Near-term quantum algorithms.

### *Visitor*

- 2022 **Centre for Quantum Technologies (CQT)**, National University of Singapore, Singapore.

## Journal Publications

- [1] Marie Kempkes, Aroosa Ijaz, Elies Gil-Fuster **Carlos Bravo-Prieto**, Jakob Spiegelberg, Evert van Nieuwenburg, and Vedran Dunjko, Double descent in quantum kernel methods, *PRX Quantum* 7, 010312
- [2] Elies Gil-Fuster, Jens Eisert, and **Carlos Bravo-Prieto**, Understanding quantum machine learning also requires rethinking generalization, *Nature Communications* 15, 2277.
- [3] **Carlos Bravo-Prieto**, Ryan LaRose, Marco Cerezo, Yigit Subaşı, Lukasz Cincio and Patrick J. Coles, Variational quantum linear solver, *Quantum* 7, 1188.
- [4] **Carlos Bravo-Prieto**, Julien Baglio, Marco Cé, Anthony Francis, Dorota M. Grabowska, and Stefano Carrazza, Style-based quantum generative adversarial networks for Monte Carlo events, *Quantum* 6, 777.
- [5] Mirko Consiglio, Wayne J. Chetcuti, **Carlos Bravo-Prieto**, Sergi Ramos-Calderer, Anna Minguzzi, José I. Latorre, Luigi Amico, and Tony J. G. Apollaro, Variational quantum eigensolver for  $SU(N)$  fermions, *Journal of Physics A: Mathematical and Theoretical* 55, 265301.

- [6] Sergi Ramos-Calderer, **Carlos Bravo-Prieto**, Ruge Lin, Emanuele Bellini, Marc Manzano, Nawja Aaraj, and José I. Latorre, Solving systems of boolean multivariate equations with quantum annealing, *Physical Review Research* 4, 013096.
- [7] Stavros Efthymiou, Sergi Ramos-Calderer, **Carlos Bravo-Prieto**, Adrián Pérez-Salinas, Diego García-Martín, Artur Garcia-Saez, José I. Latorre and Stefano Carrazza, Qibo: a framework for quantum simulation with hardware acceleration, *Quantum Science and Technology* 7, 015018.
- [8] **Carlos Bravo-Prieto**, Quantum autoencoders with enhanced data encoding, *Machine Learning: Science and Technology* 2, 035028.
- [9] Sergi Ramos-Calderer, Adrián Pérez-Salinas, Diego García-Martín, **Carlos Bravo-Prieto**, Jorge Cortada, Jordi Planagumà, and José I. Latorre, Quantum unary approach to option pricing, *Physical Review A* 103, 032414. (*Editors' suggestion*)
- [10] **Carlos Bravo-Prieto**, Josep Lumbreras-Zarapico, Luca Tagliacozzo, and José I. Latorre, Scaling of variational quantum circuit depth for condensed matter systems, *Quantum* 4, 272.
- [11] **Carlos Bravo-Prieto**, Diego García-Martín, and José I. Latorre, Quantum singular value decomposer, *Physical Review A* 101, 062310.
- [12] Adrián Pérez-Salinas, Diego García-Martín, **Carlos Bravo-Prieto**, and José I. Latorre, Measuring the tangle of three-qubit states, *Entropy*, 22, 436.

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## Pre-Print Publications

- [1] Pablo Rodriguez-Grasa, Matthias C. Caro, Elies Gil-Fuster, Franz J. Schreiber, Jens Eisert, and **Carlos Bravo-Prieto**, A PAC-Bayesian approach to generalization for quantum models, *arXiv:2603.22964*.
- [2] Sergi Masot-Llima, Elies Gil-Fuster, **Carlos Bravo-Prieto**, Jens Eisert, and Tommaso Guaita, Prospects for quantum advantage in machine learning from the representability of functions, *arXiv:2512.15661*.
- [3] Erik Recio-Armengol, Franz J. Schreiber, Jens Eisert, and **Carlos Bravo-Prieto**, Learning complexity gradually in quantum machine learning models, *arXiv:2411.11954*.
- [4] Andrea Delgado, et al., Quantum computing for data analysis in high energy physics, *arXiv:2203.08805*.

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## Programming

- Classical Python, Fortran, Matlab, Mathematica.
- Quantum Qibo (TII), Qiskit (IBM), Cirq (Google), PennyLane (Xanadu), cuQuantum (NVIDIA).
- ML TensorFlow, PyTorch, Keras.

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## Software Development

- Qibo**, <https://github.com/qiboteam/qibo>, Developer.  
Framework for quantum simulation with hardware acceleration.
- Qiskit**, <https://github.com/qiskit-community>, Contributor.  
Implemented arithmetic operations as quantum circuits.

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## Awards and Honors

- 2022 **PhD Excellent Cum Laude**, *University of Barcelona*.
- 2019 **Quantum computing Summer School Fellowship**, *Los Alamos National Laboratory*.  
1/20 awarded internationally.
- 2019 **Unitary Fund Grant**.  
\$2k for open-source quantum software development.

- 2018 **IBM Teach me Qiskit Award, Top contributions.**  
Implemented quantum circuits for arithmetic operations, from addition to modular exponentiation.

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## Selected Presentations

- 2024 **[Invited talk] Machine Learning and Quantum Physics workshop in Obergurgl.**  
Understanding quantum machine learning also requires rethinking generalization.
- 2023 **[Invited talk] IPAM's Mathematical Aspects of Quantum Learning Workshop.**  
Understanding quantum machine learning also requires rethinking generalization.
- 2022 **[Invited talk] IPAM's Quantum Numerical Linear Algebra Workshop.**  
Variational quantum algorithms for linear algebra applications.
- 2021 **Snowmass Workshop on Quantum Computing for High-Energy Physics.**  
Style-based quantum generative adversarial networks for Monte Carlo events.
- 2019 **[Invited talk] IBM Quantum Computing Workshop.**  
Quantum singular value decomposer.

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## Academic and Professional Service

- 2025 **AIMS Quantum Learning and Testing (AQLT).**  
*Organising Committee Member.* Supported the planning, promotion, and execution of a focused conference on quantum learning and testing methods. Collaborated with an international team to define the programme, select contributors, and ensure a high-quality scientific schedule. AQLT brings together researchers from academia and industry to advance theoretical and experimental aspects of quantum learning and testing.
- 2024 **Quantum Computing Theory in Practice (QCTiP).**  
*Programme Committee Member.* Contributed to the selection and review of submissions on quantum algorithms, simulation, and applications. QCTiP brings together researchers and industry leaders to discuss the path toward practical quantum computing.
- 2021 **Snowmass Workshop on Quantum Computing for High-Energy Physics.**  
Panel discussion with industry and academic members.

**Journal reviewer:** Nature Communications, PRX Quantum, npj Quantum Information, Quantum, Physical Review A, Physical Review Research, Machine Learning: Science and Technology.

**Conference reviewer:** Quantum Information Processing (QIP), Theory of Quantum Computation (TQC), Quantum Technologies in Machine Learning (QTML), Quantum Computing Theory in Practice (QCTiP).