

Michael de Oliveira

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Resume & Research Focus

I am a Ph.D. student at the International Iberian Nanotechnology Laboratory and an Edinburgh & Paris Quantum Virtual Lab affiliate. My research intersects **quantum and classical computational complexity** with the study of relation and decision problems. I am keenly interested in **Boolean functions** and their implications in quantum settings. I place particular emphasis on identifying scenarios that demonstrate **quantum advantage** and study both **compilation and synthesis techniques** to explore these settings further. Currently visiting LIP6, I have initiated projects to establish quantum benchmarks, particularly in the **measurement-based quantum computing model**. I am committed to further advancing research in both quantum computing and quantum complexity.

Current Position

LIP6, Sorbonne University – Visiting Researcher (October 2022 - Present)

International Iberian Nanotechnology Laboratory (INL) – Associated Researcher (September 2020 - Present)

Education & Training

University of Minho – B.Sc. & M.Sc. Engineering Physics (17/20, A on the ECTS scale)

- Excellence grant in the 2nd and 3rd year of B.Sc. and 1st year of M.Sc.

INL – PhD. candidate in Computer Science (September 2021 - September 2025)

- Supervised by Professor Elham Kashefi and Professor Ernesto Galvão

Publications, Pre-prints & Presentations

 **Quantum Bayesian Decision-Making.** Found Sci 28, 21-41 (2022)

 **Talk** – Worlds of Entanglement international workshop (WOE20)

 **Quantum advantage in temporally flat measurement-based quantum computation.** (final review process at Quantum Journal)

 **Talk** – Asian Quantum Information Science Conference 2023 (AQIS23)

Poster – Theory of Quantum Computation, Communication and Cryptography 2023 (TQC23)

* **Power of shallow depth quantum circuits with qudits.** (to be published as pre-print soon)

* **Verification-inspired quantum benchmarks.** (to be published as pre-print soon)

Technical Skills

Programming languages & Software: **Python, Numpy, Matplotlib, Wolfram Mathematica, C, Haskell, Erlang, Qiskit.**

Reviewer

Computational Complexity Conference 2022 ([CCC22](#))


Quantum Information Processing 2023 ([QIP23](#))

Supervision


 Master thesis "Quantum Bayesian Reinforcement Learning" ([20/20](#)) – Gilberto Cunha 2022


Master thesis "Bayesian Structure Learning via quantum resources" – José Martins (ongoing)


Prizes


 **Caloust Gulbenkian Foundation** – "New Talents in Quantum Technology" (awarded to 8 Portuguese students that year).

Additional Research Activities & Training

 **Visiting Researcher** – Technical University Munich (19-25/06/2023) with [Professor Robert König](#).

 **Invited Speaker** – "Temporally unstructured measurement-based quantum computation with advantage", Quantum software lab workshop, Edinburgh, Scotland

 **Invited Speaker** – "On the computational power of commuting and non- commuting operations for quantum processes", VeriQloud, France

 **Talk** – "Quantum online planning for POMDPs with Bayesian Networks"; Quantum Information and Probability: from Foundations to Engineering Conference ([QIP22](#))

IBM – Quantalab School on Quantum Computing 2018, INL

Course – "Introduction to Quantum Logic: Mathematical, Physical and Computational aspects ", Instituto de Filosofía y Ciencias de la Complejidad, Chile; lectured by [Professor Karl Svozil](#).