Jeffrey Morais
Quantum Research Scientist

Website Email
LinkedIn Github

Educational Background

Fall 2024 **M.Sc. Physics**, *University of Victoria*, Victoria, Canada

- Thesis on axiomatization of holographic quantum error correcting codes.
- Scholarships: NSERC CREATE Quantum Computing Program, BCGS, UVic FGS ($31,500)

2019 - 2023 **B.Sc. Honours Physics**, *McGill University*, Montréal, Canada

- Thesis on de Sitter space cosmology compactifications in quantum gravity.
- Scholarships: 2 NSERC USRAs + FRQNT, SURA, SURE, BSA ($41,600)

Ongoing Experience

Present **Head of Quantum Software**, *BTQ*, Vancouver, Canada

- Leveraged topological data analysis **to strengthen post-quantum consensus protocols**, enhancing scalability and security in cryptographic frameworks.
- **Characterized autonomous network evolution in quantum key distribution (QKD) systems** by examining topological features at multiple scales, improving scalability in distributed quantum-ready infrastructures.

Collaborators: Prof. Gavin Brennen

Present **Quantum Computing Research Scientist**, *University of Victoria*, Victoria, Canada

- Examined strongly correlated quantum phases **to characterize and mitigate noise in qubit architectures**, improving coherence times and operational fidelity in quantum processors.
- Applied holographic AdS/CFT frameworks **to axiomatize quantum error correction codes**, reinforcing fault tolerance in infinite-dimensional Hilbert space models.

Supervisor: Prof. Kristan Jensen

Selected Experience

2023 - 2024 **Quantum Neural Network Research Scientist**, *Fudan University*, Shanghai, China

- Developed topological quantum neural networks **to improve generalization in deep learning**, boosting the efficiency of advanced quantum algorithms.
- Employed topological quantum field theory **to better encode quantum information**, supporting scalable and high-fidelity operations in quantum computing.

Supervisors: Prof. Antonino Marcianò, Prof. Emanuele Zappala

Summer 2022 **String Cosmology Research Scientist**, *McGill University*, Montréal, Canada

- **Increased cosmic string signal extraction efficiency by 1.7x** in noisy environments, enabling broader data sampling via wavelet/match-filter techniques.
- Created custom Python algorithms **to identify string profiles with 45% greater accuracy**, refining correlation-based analytics for astrophysical data.
- Classified string stability **to constrain signal distributions in evolving spacetime**, improving predictive models for early-universe structures.

Supervisor: Prof. Robert Brandenberger

Fall 2021 **Quantum Cosmology Research Scientist**, *McGill University*, Montréal, Canada

- Developed Python-based methods **to isolate fast radio burst signals from noise**, facilitating clearer analyses of black-white hole tunneling.
- Coordinated with 10+ physicists **to optimize bandwidth calculations using HPC and bash scripts**, accelerating signal refinement and processing.
- Established spatial correlation approaches **to pinpoint burst locations in evolving spacetime**, enhancing positional accuracy in cosmological studies.

Supervisor: Prof. Victoria Kaspi

2019 - 2020 **Quantum Simulation Research Scientist**, *Vanier College*, Montréal, Canada

- Created innovative solutions **for non-linear PDE Hamilton-Jacobi equations**, generating predictive quantum trajectories in pilot-wave frameworks.
- Implemented RNN-driven simulations **to model quantum trajectories in real-time**, adapting efficiently to arbitrary potential landscapes in Python.

Supervisor: Prof. Ivan Ivanov