Jeffrey Morais
Quantum Software Engineer

Website Email
LinkedIn Github

Skills

Languages: Python, Bash, Solidity **Libraries:** Qiskit, PennyLane, NumPy, SciPy **Tools:** Git, CI/CD, pytest, Linux

Education

2024-2026 **M.Sc. Physics**, *University of Victoria*, Victoria, Canada

- Thesis: Thermalization dynamics across quantum many-body systems, informing coherence bounds for quantum hardware design.
- Scholarships: NSERC CREATE Quantum Computing Program, BCGS, UVic FGS ($31,500)

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

- Published honours thesis modeling compactification constraints in higher-dimensional quantum systems (MSURJ).
- Scholarships: 2 NSERC USRAs + FRQNT, SURA, SURE, BSA ($41,600)

Experience

2023-Present **Quantum Software Lead**, *BTQ*, Vancouver, Canada

- Architected Léonne in Python and Solidity, modular consensus networks for **post-quantum blockchain proof**, translating topological data analysis into deployable distributed protocols with quantum key distribution.
- Built QLDPC, a quantum error correction toolkit in Python with interactive circuit construction, **real-time belief propagation decoding, and Qiskit integration**.
- Developed QRiNG, a quantum-blockchain protocol for **verifiable random number generation**, integrating quantum key distribution into deployable consensus infrastructure.

Collaborators: Prof. Gavin Brennen, Dr. Peter Rohde

2024-Present **Quantum Algorithms Researcher**, *University of Victoria*, Victoria, Canada

- Built exact diagonalization pipelines in Python across fifteen quantum many-body models, **scaling simulations on HPC clusters** and benchmarking thermalization dynamics via level spacing statistics and time evolution analysis.
- Mapped coupling parameter landscapes to quantify thermalization time scaling, identifying operating regimes that directly inform **coherence-time optimization in quantum hardware**.

Supervisor: Prof. Thomas Baker

Earlier Experience

2023-2024 **Quantum Machine Learning Researcher**, *Fudan University*, Shanghai, China

- Built TQNN, a pip-installable Python toolkit for topological quantum neural networks that **bypass barren plateau limitations**, with CI/CD pipelines, 20 automated tests, and three interactive GUIs for real-time tensor network simulation and noise-resilient classification.

Supervisors: Prof. Antonino Marcianò, Prof. Emanuele Zappala

2022 **Computational Physics Researcher**, *McGill University*, Montréal, Canada

- **Increased weak-signal extraction from noisy time-series data by 1.7x** via wavelet and matched-filter pipelines, and built Python classifiers **that identify target waveforms with 45% greater accuracy**.
- Automated end-to-end classification pipelines for data with non-stationary noise, improving predictive accuracy for large-scale physics simulations.

Supervisor: Prof. Robert Brandenberger

2019-2020 **Quantum Simulation Developer**, *Vanier College*, Montréal, Canada

- Implemented RNN-driven simulations to model **quantum trajectories in real-time**, adapting efficiently to arbitrary potential landscapes in Python.
- Solved non-linear Hamilton-Jacobi PDEs using **Crank-Nicolson numerical methods**, generating predictive quantum trajectories in pilot-wave frameworks.

Supervisor: Prof. Ivan Ivanov