Jai N. Veilleux

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Quantum software and research engineering

Education

University of Southern California Expected May 2027
M.S. in Quantum Information Science Graduate GPA 3.60/4.00

University of Vermont May 2025
B.S. in Computer Science

Software and research projects

Qiskit · Rust and C API contributions 2025–2026

- Implemented qDRIFT Hamiltonian simulation for a proposed Qiskit C API. Wrote tests for invalid observables, gate-count scaling, and global phase, and collaborated on the follow-up pull request. Original implementation · Joint follow-up
- Proposed Rust ports for transpiler delay padding and classical type conversions. Transpiler · Classical types

Steane memory simulation · Qompute 2026 October 2026

- Wrote the team's Qiskit code for repeated error correction on seven data qubits. Implemented calibration circuits and benchmarked four decoders on held-out records using Aer and a validated logical model. Code and notebook

Spectator-qubit tomography · IBM Fez 2026

- Trace distance rose from 0.04 to 0.80–0.82 in three no-reset sweeps at the larger exchange angle. It fell in the reset control. Paper and code

Quantum optimization · QUBO and QAOA 2025–2026

- Placed third at the 2025 USC Q3 Hackathon. Helped derive the knapsack Hamiltonian and wrote Qiskit hardware code. Team project
- Mapped binary image denoising to an Ising Hamiltonian. Compared exact optimization with QAOA in Aer and on IBM hardware. Report and notebook

SamplableSet · scientific computing in Rust 2025

- Ported a C++ composition–rejection sampler to Rust for weighted sampling with replacement. Implemented dynamic weight updates and tested sampling distributions and structural invariants. Source code

Experience

Teaching Assistant (grader) · University of Vermont Aug 2024 – May 2025
Graded code and written solutions for Algorithm Design and Analysis and answered student questions about assignments.

IT Support Technician · Airship AI May 2021 – July 2022
Diagnosed Windows Server and networking issues. Automated repetitive support tasks, introduced a Git server for team scripts, and wrote troubleshooting guides for customers and contractors.

Technical skills

Languages and tools Rust, Python, C/C++, PowerShell, Git, Cargo, CMake, Linux
Quantum computing Qiskit, Aer, IBM Quantum Runtime, state tomography, circuit simulation, SQuADDs transmon modeling