Jordan Makansi

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Experience

Independent Consultant – Quantum Algorithms Resarcher/Engineer 06/15/2024 – present, 40 hr/wk

- Conducted in-depth literature reviews of state-of-the-art quantum algorithm developments (peer-reviewed papers and preprints), producing rigorous technical write-ups for The Quantum Insider and Quantum Computing Report; one report achieved #1 monthly readership.
- Architected and implemented end-to-end quantum algorithm workflows-circuit construction, compilation, and benchmarking-validated on current-generation QPUs, delivering benchmark-driven recommendations that guided backend and approach selection.
- Authored a modular, notebook-based curriculum on quantum programming workflows in Python/Qiskit, emphasizing reproducibility and clear computational narratives.
- Developed exam-style assessment items as structured evaluation instruments (code-to-output and output-to-code), with coverage mapped to a published skills blueprint.
- Maintained versioned materials as APIs evolved; documented deltas and updated examples to preserve correctness and consistency.

PWICE Institute of USC, Los Angeles – Quantum Computing Researcher 08/20/2020 – 06/14/2024, 60 hr/wk

Quantum Simulation Researcher

- Implemented Hamiltonian and noise/decoherence models (e.g., T_1/T_2, crosstalk, readout) and circuit-level analyses in Python/C++/Qiskit; packaged as a reproducible toolchain with tests, docs, and CI.
- Built simulation-measurement fitting pipelines that ingest lab data, calibrate model parameters, and generate diagnostics to support debugging and design decisions for superconducting-style qubit systems.
- Scaled large simulation campaigns on MPI/HPC; profiled and optimized kernels (vectorization, memory layout) to meet delivery timelines and produce software artifacts for PWICE stakeholders.

Quantum Algorithms Researcher

- Successfully executed multi-year research project from grant-writing, to developing state-of-the-art classical and quantum solutions to practical, constrained optimization problems, resulting in papers in classical and quantum computing.
- Developed novel classical algorithm for solving a robust optimization problem by mapping to set cover.
- Validated performance using Solomon benchmark instances for up to 100 nodes, implemented using Pyomo, Numpy
- Achieved ≥50% speedup over Gurobi with tuned parameters on all tested instance types with >25 nodes, while maintaining an empirical approximation ratio < 2.0 and provable exponential asymptotic scaling advantage (see Papers).
- Designed a noise-robust QAOA for constrained optimization problems which exploits correlation between samples, and provably converges to a feasible solution without post-processing.
- Showed the proposed algorithm obtains an 80% lower optimality gap, in similar time as state-of-the-art methods.
- Obtained computational results for graph problems of 50 nodes using QisKit, and C++ on a high-performance computing cluster to produce software deliverables for PWICE stakeholders (see Papers).

Veritone Inc. – Senior Research Engineer – Multi-Agent Systems 12/17/2017 – 08/19/2020, 60 hr/wk

- Built end-to-end physics simulation workflows for ODE/DAE/PDE-governed systems (dynamics, control, estimation); methods patented and productized (Veritone CDI on Microsoft AppSource).
- Authored a Python interface (SymPy/NumPy) to pose optimal-control problems via Hamiltonian/Pontryagin formulations, with real-data constraints, automatic discretization (shooting/collocation), and symbolic/automatic differentiation; implemented high-performance C++ solvers (implicit/explicit RK, BDF) exposed to Python for seamless NumPy/SciPy use.
- Operationalized reproducible scientific computing: containerized simulation stacks, scaled on Azure HPC with MPI/containers, and integrated real-time simulation loops with NumPy/SimPy/SciPy for automated validation, visualization, and reporting.

eSentire Inc. – Simulation Optimization Engineer 12/06/2016 – 12/16/2017, 60 hr/wk

- Framed beaconing detection as a constrained numerical optimization problem (objectives + false-positive constraints), enabling identification of three beaconing behaviors for the first two customers. Built a sparsity-driven feature selection pipeline (L1/L0, wrapper/embedded) with cross-validated hyperparameters; delivered compact, high-signal feature sets.
- Built a sparsity-driven feature-selection pipeline (L1/L0, wrapper/embedded) with cross-validated hyperparameters; delivered compact, high-signal feature sets for production.
- Accelerated the end-to-end pipeline from 6 hours to 6 minutes (~60×; −98.3%) by offloading hot paths to CUDA/C++ (cuBLAS/cuSPARSE), vectorizing NumPy/SciPy, and reducing overhead with pybind11, coalesced loads, shared-memory tiling, and CUDA streams.
- Operated Spark/YARN jobs over ~50 GB/day of proxy/DNS logs and surfaced optimized results in a customer-facing UI, contributing to the company's 2nd and 3rd paying customers.

Atigeo Inc. – Optimization and Machine Learning Engineer 09/21/2015 – 12/05/2016, 60 hr/wk

- Designed end-to-end binary classifier with ~60 features for predicting readmissions to hospitals for patients with orthopedic issues, from feature extraction, to feature selection, to data cleanup, and hyper-parameter optimization.

- Constructed optimization tool for feature construction for logistic regression to predict patient surgical outcomes.
- Automated the processing for matching HL7 messages (80 GB per day) to reconstruct a patient's encounter in a hospital using HIVE and python.

CloudPassage Inc. – Data Scientist 06/15/2014 – 09/20/2015, 50 hr/wk

- Engineered anomaly detection pipelines for 30 GB/day of netstat traffic and DNS logs using scikit-learn's DBSCAN algorithm, enabling scalable and reliable detection of irregular network activity.
- Designed a custom distance metric using scipy and numpy, to quantify and prioritize anomaly severity, improving the accuracy and interpretability of threat classification.
- Built interactive Django dashboards for anomaly visualization, supporting real-time monitoring and faster incident response by security teams.

Education

University of Southern California - Los Angeles CA: Engineer's Degree (All-but-thesis PhD) 05/15/2024
University of Washington - Seattle WA: M.S. Applied Mathematics 05/21/2020
University of California - Berkeley CA: M.S. Systems Engineering 05/15/2015
Bucknell University: B.S. Engineering with Honors 12/14/2014

Skills: Python, Qiskit (IBM Certified), C++, Gurobi, CPLEX, High Performance Computing, Networkx, SciPy/Numpy, Pyomo.
Expertise: Quantum Optimization Algorithms, Quantum Computing, Combinatorial Optimization, Mixed-Integer Linear Programming, Computational Complexity, Linear Algebra, Matrix Decompositions.

Papers/Patents

An Overview of Noise-Adaptive Quantum Algorithms, The Quantum Insider, 06/14/2025
An Update on Quantum Near-Term Optimization, Quantum Computing Report, 06/11/2025
Reconciling D-Wave's Supremacy Claims and the EPFL/Flatiron Rebuttals, Quantum Computing Report, 05/31/2025
Makansi, J., & David E. B. Neira, *A Greedy Quantum Route-Generation Algorithm.* Constraint Programming, Artificial Intelligence, and Operations Research 2024. (Submitted)
Makansi, J., & Savla, K. *A Set Cover Mapping Heuristic for Demand-Robust Fleet Size Problem with Time Windows and Compatibility Constraints.* Constraint Programming, Artificial Intelligence, and Operations Research 2023. (Submitted)
Kohn, W., Makansi, J., & Shen, Y. (2020). *U.S. Patent No. 11407327*. Washington, DC: U.S. Patent and Trademark Office. *Controlling ongoing usage of a battery cell having one or more internal supercapacitors and an internal battery.*
Kohn, W., Makansi, J., & Shen, Y. (2020). *U.S. Patent No. 10666076*. Washington, DC: U.S. Patent and Trademark Office. *Using Battery State Excitation to Control Battery Operations.*
Kohn, W., Makansi, J., & Shen, Y. (2020). *U.S. Patent No. 10816949*. Washington, DC: U.S. Patent and Trademark Office. *Managing Coordinated Improvement Of Control Operations For Multiple Electrical Devices to Reduce Power Dissipation.*
Kohn, W., Makansi, J., & Shen, Y. (2019). *U.S. Patent No. 10452045*. Washington, DC: U.S. Patent and Trademark Office. *Controlling Ongoing Battery System Usage While Repeatedly Reducing Power Dissipation.*