

Alejandro Montanez

alejandro.montanezbarrera@gmail.com | +49 2461/61-6767

EDUCATION

PHD. MECHANICAL ENGINEERING

UNIVERSITY OF GUANAJUATO

May 2018- Apr 2022 | Salamanca, GTO

GPA: 10.0/10.0 | Summa Cum Laude

MSC. MECHANICAL ENGINEERING

UNIVERSITY OF GUANAJUATO

Jan 2019- Dec 2020 | Salamanca, GTO

GPA: 9.0/10.0

B.E. ELECTROMECHANICAL ENGINEERING

UNIVERSIDAD PEDAGÓGICA Y

TECNOLÓGICA DE COLOMBIA

Jan 2019- Dec 2020 | Duitama, BOY

GPA: 4.0/5.0 | First Class Honors

LINKS

LinkedIn:// [alejandromontanez](#)

GitHub:// [alejomonbar](#)

Google Scholar:// [J.A. Montanez-Barrera](#)

SKILLS

QUANTUM PROGRAMMING

Qiskit • Cirq • PennyLane • Amazon Braket • Qutip • QAOA • VQE • Ocean

MACHINE LEARNING

TensorFlow • PyTorch • KLearn

PROGRAMMING

Python • Jupyter • Git, Github • Numpy • Matplotlib • Scipy • Pandas

ADDITIONAL INFO

AWARDS AND RECOGNITION

- Winner QHack 2023 - Quantum Computing Today, Amazon Braket challenges
- Qiskit Advocate
- Winner QHack 2022 - Financial, QAOA, and Entrepreneur challenges
- Winner iQCHack 2022 - Social for good
- IBM Quantum Excellence 2020
- Best GPA PhD, University of Guanajuato.
- Scholarship - Best GPA at the Universidad Pedagógica y Tecnológica de Colombia.

INTERESTS

Quantum Computing • Non-equilibrium Quantum Thermodynamics • Deep learning • Machine Learning • Quantum Error Mitigation • Optimization

EXPERIENCE

POSTDOCTORAL RESEARCHER | JÜLICH SUPERCOMPUTER CENTER

June 2022-Ongoing | Optimization in quantum computing | Benchmarking and characterization of quantum computing hardware | Simulation of large quantum systems

MICROGRANT | UNITARY FUND

January 2023-Ongoing | Develop the optimization problems structure of openQAOA a python-based library from Entropica Labs |

QUANTUM COMPUTING MENTORSHIP | IBM

Jan-May 2022 | Adding functionalities to the BasicAer backend | Mentor: Kevin Sung.
Sept-Dec 2021 | Adding applications to the Qiskit Optimization library and benchmarking codes of these applications | Mentor: Takashi Imamichi.

LATEST RESEARCH PAPERS

- (2024) Transfer learning of optimal QAOA parameters in combinatorial optimization. **In preparation**
- (2023) Improving Performance in Combinatorial Optimization Problems with Inequality Constraints: An Evaluation of the Unbalanced Penalization Method on D-Wave Advantage. **IEEE International Conference on Quantum Computing and Engineering (QCE)** <https://doi.org/10.1109/QCE57702.2023.00067>
- (2022) Unbalanced penalization: A new approach to encode inequality constraints of combinatorial problems for quantum optimization algorithms 23–25. <http://arxiv.org/abs/2211.13914>
- (2022) Decoherence predictions in a superconductive quantum device using the steepest-entropy-ascent quantum thermodynamics framework. **Physical Review A** <https://doi.org/10.1103/PhysRevA.106.032426>
- (2022) Method for generating randomly perturbed density operators subject to different sets of constraints. **Quantum Information Processing** <https://doi.org/10.1007/s11128-022-03651-1>

LATEST PROJECTS

QUANTUM-POWERED PLANNER FOR EV CHARGING NETWORKS

2022 | <https://github.com/alejomonbar/Quantum-Supply-Chain-Manager> | Optimizing the electric vehicle charging networks using neutral atoms quantum computers
Language: **Python** Libraries: **Pulser•Numpy**

QUANTUM SUPPLY CHAIN MANAGER

2022 | <https://github.com/alejomonbar/Quantum-Supply-Chain-Manager> | The quantum supply chain manager is a quantum solution for logistics problems.
Language: **Python** Libraries: **Qiskit•Numpy**

QUANTUM COUNSELOR FOR PORTFOLIO INVESTMENT

2022 | <https://github.com/alejomonbar/Quantum-Counselor-for-Portfolio-Investment> | Stock Forecasting using QNN and Portfolio optimization with a novel heuristic equation using QAOA and VQE
Language: **Python** Libraries: **Qiskit•Numpy • Cirq • PennyLane**

COURSES & CERTIFICATIONS

- Quantum Programming 101 - **DWave**
- IBM Certified Associate Developer - **Quantum Computation using Qiskit v0.2X**