VICTOR OSVALDO ONOFRE GONZALEZ

Physicist | Graduate Student at the Center of Nanoscience and Nanotechnology (CNyN) of the National Autonomous University of México (UNAM)

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Ensenada, Baja California, Mexico

SUMMARY

During my master's in physics, I worked on numerical simulations of the dynamics of open quantum systems in Python and with discord-type quantum correlations. I have done multiple projects on quantum algorithms, participated in quantum hackathons, and attended conferences on quantum information. Also, I have contributed to quantum open-source and outreach projects. I'm interested in the applications of quantum computing.

EDUCATION

Master of Science - MS, Physics

Center of Nanoscience and Nanotechnology (CNyN) of the National Autonomous University of México (UNAM)

August 2018 – Expected June 2021 Ensenada, Baja California, Mexico

- Thesis: Discord-type quantum correlations in the radical pair mechanism for magnetoreception in birds
- **Simulations of the dynamics of open quantum systems** in python using the QuTip library
- Research in quantum biology
- Worked with **discord-type quantum correlations**. Example: victor-onofre/Quantum_correlations_of_the_Werner_State
- Worked with **quantum algorithms**. victor-onofre/Quantum_Algorithms
- Highlight courses: Quantum Mechanics I and II, **Statistical mechanics, Quantum Correlations and Quantum Information**

Bachelor's degree, Physics

Autonomous University of Baja California

August 2012 – March 2018 Ensenada, Baja California, Mexico

- Thesis: Numerical simulation of the harmonic oscillator in stochastic electrodynamics
- **Simulations in Fortran 90 of systems in stochastic electrodynamics**
- Highlight project: Simulation of the spin in the Stern-Gerlach experiment using a quantum automaton. Poster in Spanish (Click here)

EXPERIENCE

unitaryHACK

Unitary Fund first quantum open source hackathon unitaryfund.github.io/unitaryhack

May 14-30, 2021 E-Learning

- Contributions to **toqito** (Theory of Quantum Information Toolkit) an open source Python library for studying various objects in quantum information.
- Link to contributions: bures_distance singlet is_quantum_channel
- Certificate (Click Here)

Quantum Coalition Hack

Hosted by Yale and Stanford quantumcoalition.io

April 10 -11, 2021 E-Learning

- Participate in the **Google challenge** (15th place out of 29 total submissions): Compile an n-qubit, $1 \leq n \leq 8$, unitary matrix to a list of operations that can run on the Google Sycamore device. Qchack_2021_Cirq_Challenge .
- Participate in the **IBM quantum creative challenge**: quantum interference using Qiskit circuits. IBM-Quantum-Challenge
- Attend bootcamp of Cirq (Google) and BOULDER OPAL (Q-CTRL)
- Certificate (Click Here)

Active member of Quantum Universal Education

Quantum Computing outreach **fullstackquantumcomputation.tech**

March 2021 - Ongoing | E-Learning

- International online group of people passionate about community-driven open-source and universal quantum education
- Presentation and moderator in journal club. Recording (Click Here)
- Contribution to open-source learning resource. The Deutsch-algorithm (Click Here)

iQuHACK (interdisciplinary Quantum HACKathon) 2021 | Team won in the hybrid division

MIT's second annual quantum hackathon. **iQuHACK/2021**

January 30 -31, 2021 | E-Learning

- We worked on solving the **Knapsack problem** with gate-based game running on IonQ hardware and annealing-based **Discrete Quadratic Model** (DQM) method running on D-Wave hardware. Link to the project: iQuHACK/2021_Hybrid-Daemons
- First introduction to quantum annealing
- Certificate (Click Here)

Data science project | Violence and local business in the city of Tijuana

IBM Data Science Specialization **Repository of the project (Click here)**

February - April, 2020 | E-Learning

- Analysis of the most common business in the more violent neighborhoods in the city of Tijuana - Data acquisition and cleaning of large data in pandas library - Use of location data from the API of Foursquare - Use of the Folium library to create maps of geospatial data

PROGRAMMING SKILLS

- Most experienced with **Python (QuTip, Qiskit, Cirq,toqito,Pandas, SciPy, keras)**
- Worked with **Julia (Yao), MATLAB, Mathematica, Fortran 90, and C/C++ (MPI)**

LANGUAGES

Spanish (Native)
English (Full Professional Proficiency)

TECHNICAL TOOLS

- **Git - LaTeX - OriginLab - Microsoft Office**
- Operating systems: **Windows and Linux**

RESEARCH INTERESTS

- Optimization of Quantum Algorithms
- Quantum complexity
- Quantum error correction
- Quantum communication
- Quantum Biology
- Tensor Networks
- Data Science and Machine Learning

CERTIFICATIONS

IBM Certificate of Quantum Excellence

Qiskit

July 2020– No Expiration Date | E-Learning

- Certificate URL (Click here)
- Successfully completed and received a passing score on applied exercises and learning development at the 2020 Qiskit Global Summer School demonstrating applied understanding and comfort with and about Quantum Computing using Qiskit.

IBM Data Science Specialization

Coursera

April 2020– No Expiration Date | E-Learning

- Credential ID: WANKVTDUMF2G – Credential URL (Click here)
- In 9 courses, I applied Data Science methodology - Worked with Jupyter notebooks - Accessed relational databases using SQL and Python - Used Python libraries to generate data visualizations - **Performed data analysis using Pandas** - Constructed and evaluated Machine Learning (ML) models using Scikit-learn and SciPy and applied data science and ML techniques to real location data sets.

IBM AI Engineering Specialization

Coursera

July 2020 – No Expiration Date | E-Learning

- Credential ID: 562XFPRHV6G9 – Credential URL (Click here)
- In 6 courses, I applied Machine Learning (ML) techniques such as regression, classification, clustering, and recommender systems and became able to scale ML on Big Data using Apache Spark - **Learned to build, test and deploy Deep Learning models using libraries such as Keras, PyTorch, and Tensorflow** - Finished several ML and Deep Learning projects.

Perform Sentiment Analysis with Scikit-Learn

Coursera

July 2020 – No Expiration Date | E-Learning

- Credential ID: YDNDAZRXKSBS – Credential URL (Click here)
- I cleaned and pre-processed text data - **Builded and employed a logistic regression classifier using Scikit-Learn** - Performed feature extraction with The Natural Language Toolkit (NLTK) - Tuned model hyperparameters and evaluated model accuracy.

Full stack web development and AI with Python (Django)

Udemy

January 2021 – Ongoing (45%) | E-Learning

- Course URL (Click here)
- HTML, CSS, JavaScript, Python, Django, Pandas, Sklearn, Keras, Git, Linux

WORKSHOPS AND SCHOOLS

Qiskit Global Summer School

Hosted virtually

July 20-31, 2020 | E-Learning

- Qiskit is an open-source framework for working with quantum computers at the level of circuits, pulses, and algorithms. The Qiskit Global Summer School was hosted virtually within two weeks of intense lectures and labs. The curriculum consisted of 3 hour long lectures every day, accompanied by a lab, starting with the definition of Qubits and quantum states, and ending with Superconducting Qubits and Quantum Chemistry.

QuEBS 2019: Workshop on Quantum Effects in Biological Systems

Poster Presentation

October 27-31, 2019 | Puebla, Mexico

- In this annual workshop, the interplay between quantum coherence and environmental effects in both driven and undriven biomolecular systems were explored.
- **Exposition of the project:** Susceptibility of the quantum fisher information as a measure of the non-stationary multipartite entanglement in the linear response regime in the radical pair mechanism of the avian compass model.
- Poster of the project (Click here)

Quantum Info - Guanajuato 2017

A Workshop dedicated to the quantum information technologies

1-6 November 2017 | Guanajuato, Gto, Mexico

Lectures:

- High-dimensional quantum cryptography with Structured Photons - Quantum Memories and QKD - Introduction to discrete variable Quantum Key Distribution - Quantum State Estimation and applications in Metrology - Introduction to Practical QKD: Implementation and security

X Annual Meeting of the Quantum Information Division of the Mexican Society of Physics

Poster Presentation

27-29 September 2017 | San Luis Potosi, San Luis Potosi, Mexico

- **Exposition of the project:** Simulation of the spin in the Stern-Gerlach experiment using a quantum automaton.
- Poster of the project in Spanish (Click here)