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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SUMMARY

I'm currently waiting for the final revisions of my thesis for my master's degree in physics in the area of Quantum Biology. I worked with concepts of quantum information and simulations of open quantum systems in Python. I'm interested in applying quantum algorithms to solve real-world problems.

EDUCATION

Master of Science - MS, Physics

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

August 2018 – Expected April 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
- Adviser: Dr. Fernando Rojas Iñiguez PHD Fernando Rojas frojas371@gmail.com
- 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 of the project in Spanish (Click here)

EXPERIENCE

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

Qubit by Qubit | Development of content for a textbook

The Coding School

December 2020 - Ongoing E-Learning

- Development of curriculum materials, course materials, homework, practice sets and content for the textbook: **Introduction to Quantum Computing for High School Students**. qubitbyqubit.org

Co-Founder of Quantum Hispano | Coordinator of the scientific outreach team

Quantum Computing

September 2020 - Ongoing E-Learning

- Community of people interested in **quantum computing for a Spanish-speaking audience**. quantumhispano.org

- **Coordinate part of the organization of work teams** with members from Peru, Ecuador,Paraguay, Colombia and Mexico using internet communication tools.
- Create content to inform, educate, and raise awareness of quantum computing.

PROGRAMMING SKILLS

- Most experienced with **Python (Pandas, SciPy, QuTip, Qiskit, Scikit-Learn, keras, TensorFlow)**
- Worked with **MATLAB, Mathematica, Fortran 90, and C/C++ (MPI)**

RESEARCH INTERESTS

- Quantum Information
- Quantum Biology
- Finance
- Data Science
- Machine Learning
- Chemistry

TECHNICAL TOOLS

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

LANGUAGES

Spanish (Native)
English (Full Professional Proficiency)

PERSONAL PROJECTS

Violence and local business in the city of Tijuana

Python project

Final report (Click here)

- 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

Posters

For Quantum Hispano and Film-club CNyN

Portfolio (Click here)

- Use of Adobe Spark, canva, GIMP and lucidchart tools.

CERTIFICATIONS

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.

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)

IV Symposium of Nanosciences and Nanomaterials

Poster Presentation

23-27 April 2018 — Ensenada, Baja California, Mexico

- The main purpose of this symposium is to bring together experimental and theoretical researchers in the fields of nanoscience and nanotechnology and discuss on current developments in these areas.
- **Exposition of the project:** Simulation of the harmonic oscillator in stochastic electrodynamics.

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 by Ebrahim Karimi (University of Ottawa)
- Quantum Memories and QKD by Edén Figueroa (Stony Brook University)
- Introduction to discrete variable Quantum Key Distribution by Guisepe Vallone (University of Padova)
- Quantum State Estimation and applications in Metrology by Luis Snchez-Soto (Complutense University of Madrid)
- Introduction to Practical QKD: Implementation and security by Shihan Sajeed (University of Waterloo)

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)