CV

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Currently working as a Postdoctoral Researcher at Universidad de Concepción - Millenium Institute for Research in Optics (MIRO), Concepción, Chile, doing research in the field of quantum information theory.

Education

1. PhD in Physics, Universidad de Antofagasta, Antofagasta, Chile, 2017-2022
2. Licenciado en Física, Universidad de los Andes, Mérida, Venezuela, 2005-2014

Research and Teaching experience

1. Research:
   - 1.1. Awarded the Postdoctoral Researcher grant from the Chilean Agencia Nacional de Investigación y Desarrollo ANID, at Universidad de Concepción under the ANID grant number 3230427.
   - 1.2. Postdoctoral Researcher at Millenium Institute for Research in Optics (MIRO), Concepción, Chile. (January 2022 - April 2023)
   - 1.3. Research assistant in the field of Quantum Information Theory, MINEDUC-UA project ANT1956 (Chile), 2020.
   - 1.4. Research assistant in the field of Quantum Information Theory, MINEDUC-UA project ANT20992 (Chile), 2021.
2. Teaching:
   - 2.1. *Physics 1,* for Biology students, University of Antofagasta, 2019.
   - 2.2. *Electricity and magnetism* for engineering students, University of Antofagasta, 2017.
   - 2.3. *Physics Lab (Optics)* for engineering students, University of Antofagasta, 2018.

Publications

1. Uzcategui-Contreras, D., Guerra, A., Niklitschek, S., & Delgado, A. “Machine Learning Approach to Reconstruct Density Matrices from Quantum Marginals.” Machine Learning: Science and Technology, June 2025. DOI.org (Crossref), https://doi.org/10.1088/2632-2153/ade48d.
2. Escandón-Monardes, Jorge, Uzcátegui, D., Rivera-Tapia, M., Walborn, Stephen, Delgado, A.. (2024). Estimation of high-dimensional unitary transformations saturating the Quantum Cramér-Rao bound. Quantum. 8. 1405. https://doi.org/10.22331/q-2024-07-10-1405.
3. Daniel Uzcátegui Contreras, Dardo Goyeneche. “Reconstructing the whole from its parts”, 2022, https://arxiv.org/abs/2209.14154
4. S. Gómez, D. Uzcátegui, I. Machuca, E. S. Gómez, S. P. Walborn, G. Lima, and D. Goyeneche. “Optimal strategy to certify quantum nonlocality”. Sci Rep 11, 20489 (2021). https://doi.org/10.1038/s41598-021-99844-2.
5. D. Uzcátegui, G. Senno and D. Goyeneche. “Fast and simple quantum state estimation”, 2021 J. Phys. A: Math. Theor. 54 085302. http://dx.doi.org/10.1088/1751-8121/abdba2.
6. D. Uzcátegui, D. Goyeneche, O. Turek, and Z. Václavíková. “Circulant matrices with orthogonal rows and off-diagonal entries of absolute value 1”, Communications in Mathematics, vol.29, no.1, 2021, pp.15-34. https://doi.org/10.2478/cm-2021-0005.

Programming Experience

Postdoctoral Researcher at MIRO

- Conducting advanced numerical simulations, data analysis, and optimization for quantum information theory research, mainly using python libraries such as NumPy, SciPy, pandas, scikit-learn, keras, pytorch, Matplotlib, among others.
- Applying machine learning tools to tackle problems in the field of quantum information theory.

Programmer at TTC (https://ttc.cl/):

- Designing GUIs in the python programming language using the pyqt framework.
- Creating and managing databases with sql (mysql and postgresql)
- Analyzing data from realSense cameras using python. I have to determine the parts of trucks, determine the load and calculate its volume.

Talks

1. "*Deep Learning approach for entanglement discrimination*". Workshop on Gravity, Holography & Entanglement, Concepción, Chile 2025.
2. "*Quantum Machine Learning for Molecular Optimization*". 1st Workshop on Molecular Optimization with Quantum Computers, February 2025, Santiago de Chile
3. "*Machine Learning approach to the quantum marginal problem*". Workshop MIRO 2024, Santiago de Chile.
4. *"Optimal estimation of high-dimensional unitary transformations"*. Workshop MIRO 2023, Santiago de Chile.
5. *"About the quantum marginal problem"*. Workshop MIRO 2022, Santiago de Chile.

Courses

1. Bayesian Statistics: Techniques and Models. Apr 2024. https://coursera.org/share/a76f556f100abb40baa41b7f412428e9
2. Microsoft Power BI Data Analyst Specialization: Preparing Data for Analysis with Microsoft Excel, Feb 2024. https://coursera.org/share/aeedfb0f359a5287fd7ba152ce6440b0
3. Bayesian Statistics: From Concept to Data Analysis. Feb 2024 https://coursera.org/share/14f635de035a616e1d8de955e06949ac.
4. Inferential Statistical Analysis with Python, coursera, May 2023. https://coursera.org/share/a61285f9ddf5e542b32f3bad8bf4516f
5. Understanding and Visualizing Data with Python, coursera, February 2023. https://coursera.org/share/2c71c2185f9a0b342641b95b7829014a
6. Database Design and Basic SQL in PostgreSQL, coursera, June 2021. https://coursera.org/share/521d1720d920d4129c25e9b12998ca5d
7. Intermediate PostgreSQL, coursera, July 2021. https://coursera.org/share/b66e2133e3d1565f3b5b6f0f9ae529f0
8. JSON and Natural Language Processing in PostgreSQL, coursera, August 2021. https://coursera.org/share/bac22f42b23c94e199d1deb7cd97d402
9. Introduction to Computational Thinking and Data Science, by MITx, May 2021. https://courses.edx.org/certificates/142a23d07ab841d88110517b7b6aeb0e
10. An Intuitive Introduction to Probability, Coursera, February 2021. https://coursera.org/share/07e6e15a895947e7074403e1f0f78089
11. Structuring Machine Learning Projects, by DeepLearning.AI, January 2021. https://coursera.org/share/f906ac24a154f4f7a9bdbcb4a7125c37

12. Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization, by DeepLearning.AI, December 2020. https://coursera.org/share/a14b7ebb0c1eeb33716c1667474a1021
13. Neural Networks and Deep Learning, by DeepLearning.AI, November 2020. https://coursera.org/share/20df8f8ae49680eea701e5b6bac50105
14. Introduction to Data Science in Python, University of Michigan, on coursera, December 2016 . https://coursera.org/share/0cb8630187abbfc8dc76d0a53a8d6034
15. Algorithmic Toolbox, University of California, San Diego & Higher School of Economics, on coursera, April 2016. https://coursera.org/share/bb277c4a5cedf48e1834f0739e28f173