Javier Orduz PhD, MSc

Work Experience

2022–	Visiting Assistant Professor. Earlham College. USA
2022–2025	Instructor Online. Baylor University. USA
2020–2022	Research Scholar. Baylor University. USA
2020–2022	Instructor. Baylor University. USA
2017–2020	Instructor Online. National Autonomous University of Mexico. Mexico
2017–2020	Associate Professor. National Autonomous University of Mexico. Mexico
2015–2017	Postdoctoral Researcher. National Autonomous University of Mexico. Mexico
2015–2016	Research Assistant. National Autonomous University of Mexico. Mexico

Education

2025-	Master in Sciences: Interdisciplinary (Computational) Engineering. Purdue University. USA
2014	Doctor in Sciences. Autonomous University of Puebla. Mexico
2010	Master in Sciences. Autonomous University of Puebla. Mexico
2008	Bachelor's Degree. Pedagogical and Technological University of Colombia. Colombia

Courses & Certifications

2023	The Foundations of Cybersecurity. Kennesaw State University. USA
2020	Machine Learning Regression. University of Washington. USA
2020	The Introduction to Quantum Computing. Saint Petersburg State University. Russia
2020	Machine Learning Foundations: A Case Study Approach. University of Washington. USA
2020	Machine Learning with Python. IBM. USA
2020	Python Data Structures. University of Michigan. USA
2020	Python y OpendCV to computer vision. Udemy. Online
2019	Basic Swift. UNAM. Mexico
2019	AWS Educate. UNAM. Mexico
2019	Quantum Computing: Qtraining for Bronze. QWorld. Latvia
2017	Modern cryptography teaching. UNAM. Mexico
2017	Techniques for teaching advanced database topics. UNAM. Mexico
2016	Statistics with Mathematica and Python. UNAM. Mexico
2015	Didactic Planning for the Distance Education. UNAM. Mexico
2015	Teaching with ICT. UNAM. Mexico
2015	Assessor on distance education. UNAM. Mexico
2015	Web 2.0 Resources for the Distance Education. UNAM. Mexico

International Participation

2025	**Speaker.** Global Physics Summit. Anaheim. USA
2024	**Speaker.** Int'l Conference on Computational Science and Computation Intelligence. Las Vegas. USA
2024	**Speaker.** 50th Annual Mathematics Conference. Oxford. USA
2024	**Speaker.** LatinX in AI Research Workshop at ICML. Viena. Austria
2024	**Reviewer.** International Conference on Emergent and Quantum Technologies. Las Vegas. USA
2022	**Author.** LatinX in AI Research Workshop at ICML. Baltimore. USA
2022	**Attendee.** StoryMakers. Denver. USA
2022	**Attendee.** Faculty-Industry Relationships Workshop. Santa Clara. USA

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2022 **Author.** The Southwest Data Science Conference 2022. Waco. USA
2021 **Speaker.** Int'l Conference on Computational Science and Computation Intelligence. Las Vegas. USA
2020 **Speaker.** XXXIV RADPyC. Mexico City. Mexico
2020 **Organizer.** LatinX in AI Research Workshop at ICML. Viena. Austria
2020 **Attendee.** ECT Talent School on ML and Data Analysis for Nuclear Physics. Trento. Italy
2019 **Finance Chair.** LXAI at ICML. Long Beach. USA
2018 **Attendee.** LatinX in AI Research Workshop at NeurIPS. Montreal. Canada
2018 **Attendee.** Machine Learning on High Energy Physics. Oxford. UK
2018 **Speaker.** Machine Learning in Geometry and Physics. Sanya. China
2018 **Speaker.** LatinX in AI Research Workshop at NeurIPS. Montreal. Canada
2018 **Attendee.** Machine learning in geometry and Physics. Sanya. China
2018 **Speaker.** XXXII RADPyC. Mexico City. Mexico
2017 **Speaker.** Education and TIC for Sciences Teaching. Mexico City. Mexico
2017 **Speaker.** II Mathematical Thinking. Mexico State. Mexico
2017 **Reviewer.** Expociencias. Mexico State. Mexico
2017 **Speaker.** XVI Semana Académica de Matemáticas aplicadas y computación. Mexico State. Mexico
2017 **Moderator.** XVI Semana Académica de Matemáticas aplicadas y computación. Mexico State. Mexico
2017 **Referee.** Integral Contest. Mexico State. Mexico
2017 **Speaker.** Instructional development. Mexico State. Mexico
2017 **Speaker.** Research Projects. Mexico State. Mexico
2017 **Participante.** Diagnostic exam. Mexico State. Mexico
2017 **Speaker.** XXXI RADPyC. Mexico City. Mexico
2017 **Speaker.** FESAc-UNAM. Mexico City. Mexico
2016 **Speaker.** Effective Field Theories as Discovery Tools. Mainz, GER. Germany
2016 **Speaker.** Latinamerican Symposium on High Energy Physics. Antigua. Guatemala
2016 **Speaker.** MSPF. Chiapas. Mexico
2016 **Speaker.** XI SILAFAE. Antigua. Guatemala
2016 **Attendee.** REDFAE. Pachuca. Mexico
2016 **Attendee.** Mini-Workshop on Dark Matter. Mexico City. Mexico
2016 **Speaker.** Seminar. Mexico City. Mexico
2016 **Speaker.** Effective Field Theories as Discovery Tools. Mainz. Germany
2016 **Speaker.** Seminar. Siegen. Germany
2016 **Attendee.** Workshop. Mexico City. Mexico
2016 **Attendee.** 1th Workshop on Dark Matter. Puebla. Mexico
2016 **Speaker.** XXX RADPyC. Puebla. Mexico
2015 **Speaker.** XV Mexican Workshop on Particles and Fields. Mazatlan. Mexico
2015 **Speaker.** IV Congress on Technology for the education. San Luis Potosi. Mexico
2015 **Attendee.** HEP-Network Meeting. Guanajuato. Mexico
2014 **Attendee.** XXVIII RADPyC. Mexico City. Mexico
2014 **Speaker.** Conference of the High energy group. Mexico City. Mexico
2013 **Speaker.** XVI Mexican Workshop on Particles and Fields. Oaxaca. Mexico
2013 **Speaker.** XXVII RADPyC. Mexico City. Mexico
2013 **Speaker.** School on Particle Physics in the LHC era. Sao Paulo. Brazil
2012 **Speaker.** PASCOS. Merida. Mexico
2012 **Speaker.** XV Mexican Workshop on Particles and Fields. Puebla. Mexico
2012 **Speaker.** III National Science Meeting: Luis Rivera Terrazas. Puebla. Mexico
2011 **Speaker.** XXVI RADPyC. Mexico City. Mexico
2011 **Attendee.** DCPIHEP. Colima. Mexico
2011 **Speaker.** XXV RADPyC. Mexico City. Mexico
2011 **Speaker.** LIII National physics congress. Veracruz. Mexico

2011 **Speaker.** XXV National scientific meeting on divulgation. Veracruz. Mexico
2009 **Speaker.** LII National physics congress. Acapulco. Mexico
2008 **Attendee.** XXII RADPyC. Mexico City. Mexico
2005 **Speaker.** XXI National Physics Congress. Barranquilla. Colombia

International Organizing Committees

2023 **Organizer.** Int'l Conf. on Emergent and Quantum Technologies CSCE23 Las Vegas, USA
2022 **Public Relations Chair.** LatinX in AI at ICML Baltimore, USA
2022 **Organizer.** Int'l Conf. on Emergent and Quantum Technologies CSCE22 Las Vegas, USA
2022 **Organizer.** QWinter-QMexico Online, Mexico
2021 **Facilitator.** Washington Quantum Computing Meetup Online, USA
2020 **Mentor.** LatinX in AI at ICML Online, USA
2020 **Volunteer.** ICML Austria , Vienna
2020 **Coordinator.** QMexico Mexico City, Mexico
2019 **Finance Chair.** LatinX in AI at ICML Long Beach, USA
2018 **Leader.** Quantum and Scientific Computing Group FESAc-UNAM Naucalpan, Mexico
2017 **Coordinator.** STEM-Seminar FESAc-UNAM Naucalpan, Mexico
2017 **Local committee.** Scientific summer for High Energy Physics FESAc-UNAM Naucalpan, Mexico
2016 **Organizer.** III Flavor Physics Symposium FESC-UNAM Cuautitlan, Mexico
2016 **Organizer.** Workshop on Theoretical and Computational Physics FESC-UNAM Cuautitlan, Mexico

Professional Recognitions and Awards

2024 APS-Simons Travel & Professional Development Awards. USA.
2020 QMexico coordinator. QWorld.
2019 Proyecta Scholarship. Mexico-Canada.
2015 SNI 1 (Mexican office for Science). Mexico.
2015 UNAM Scholarship. Mexico.
2010 Conacyt Scholarship. Mexico.
2008 Conacyt Scholarship. Mexico.
2007 Guest researcher. Mexico.

Journal Committee

2022 Special Issue: Advances in Quantum Machine Learning and Quantum Information Guest Editor.
2022 Special Issue: Standards and Ethics in AI Guest Editor.
2020 ANIEI Editor commitee.

Student advising and committees

2020 Mentor. Baylor University. USA
2018 Master thesis research advisor. UNAM. Mexico
2020 Bachelor thesis research advisor. UNAM. Mexico
2020 Examination committee. UNAM. Mexico
2017 Examination committee. UNAM. Mexico
2017 Examination committee. UNAM. Mexico

Projects

2024	Quantum in Kets Representation on Emerging Computing Era . Earlham College. USA
2020	Quantum Machine Learning and applications. Baylor University. USA
2020	QMexico initiative. QMexico. Mexico
2019	Teaching-programming reinforcement at high school and undergraduate level. UNAM. Mexico
2018	Probing New Physics and models using Machine Learning. UNAM. Mexico
2016	Flavor physics and dark matter in beyond standard model. UNAM. Mexico
2016	Flavor change in loop-level inside 2HDM in the phi to VV process. UNAM. Mexico
2015	Physics' Virtual Laboratory. UNAM. Mexico

Computing and Programming

Python/Swift	Linux	Markdown	Mathematica Wolfram	Git
C/C++	IOSX	LaTeX	Gnuplot	Bash
Fortran	Windows	HTML	Office	make

Languages

Spanish	Native
English	B2
French	A1

Indiana, USA. May 21, 2025

List of Peer-Reviewed Publications

[1] Javier Orduz. Mathematical foundations for Modern Cryptography in the Quantum Era. 2025. Accepted to be published soon.

[2] Tisha, Sadia Nasrin, and Rahman, Mushfika Sharmin, and Orduz, J. Quantum Machine Learning for Heart Disease Detection: A Case Study, 2025. Accepted to be published soon.

[3] Hillary Kavagi and Javier Orduz. Unleash quantum computing on cognitive and eye dilation. *TBD*, 2025.

[4] Pablo Rivas, Javier Orduz, Tonni Das Jui, Casimer DeCusatis, and Bikram Khanal. Quantum-Enhanced Representation Learning: A Quanvolutional Autoencoder Approach against DDoS Threats. *Machine Learning and Knowledge Extraction*, 6(2):944–964, 2024.

[5] Rahaman, Md Shahidur, and Islam, Agm, and Orduz, Javier. Quantune: An Automatic Music Generation Using Quantum Computing. In *LatinX in AI (LXAI) Research at ICML 2024*, 2024.

[6] Pablo Rivas, Christopher Thompson, Brenda Tafur, Bikram Khanal, Olawale Ayoade, Tonni Das Jui, Korn Sooksatra, Javier Orduz, and Gissella Bejarano. Chapter 15 - ai ethics for earth sciences. In Ziheng Sun, Nicoleta Cristea, and Pablo Rivas, editors, *Artificial Intelligence in Earth Science*, pages 379–396. Elsevier, 2023.

[7] Olawale Ayoade, Pablo Rivas, Javier Orduz, and Nurul Rafi. Chapter 13 - satellite image classification using quantum machine learning. In Ziheng Sun, Nicoleta Cristea, and Pablo Rivas, editors, *Artificial Intelligence in Earth Science*, pages 337–355. Elsevier, 2023.

[8] Khanal, B., Orduz, J., Rivas, P. and Baker, E. Supercomputing leverages quantum machine learning and Grover's algorithm. *J Supercomput*, 2022.

[9] Orduz, J. Rastogi, S. and and Baker, E. An introduction to quantum natural language processing and a study case, 2022. International Conference on Machine Learning Conference: LatinX in AI (LXAI) Research Workshop 2022, Baltimore, Maryland USA.

[10] Olawale Ayoade, Pablo Rivas, and Javier Orduz. Artificial intelligence computing at the quantum level. *Data*, 7(3), 2022.

[11] Ziheng Sun, Laura Sandoval, Robert Crystal-Ornelas, S. Mostafa Mousavi, Jinbo Wang, Cindy Lin, Nicoleta Cristea, Daniel Tong, Wendy Hawley Carande, Xiaogang Ma, Yuhan Rao, James A. Bednar, Amanda Tan, Jianwu Wang, Sanjay Purushotham, Thomas E. Gill, Julien Chastang, Daniel Howard, Benjamin Holt, Chandana Gangodagamage, Peisheng Zhao, Pablo Rivas, Zachary Chester, Javier Orduz, and Aji John. A review of earth artificial intelligence. *Computers & Geosciences*, 159:105034, 2022.

[12] Tonni Jui, Olawale Ayoade, Pablo Rivas, and Javier Orduz. Performance analysis of quantum machine learning classifiers. In *NeurIPS 2021 Workshop LatinX in AI*, 2021.

[13] Pablo Rivas, Liang Zhao, and Javier Orduz. Hybrid quantum variational autoencoders for representation learning. In *2021 International Conference on Computational Science and Computational Intelligence (CSCI)*, pages 52–57, 2021.

[14] Bikram Khanal, Pablo Rivas, Javier Orduz, and Alibek Zhakubayev. Quantum machine learning: A case study of grover's algorithm. In *2021 International Conference on Computational Science and Computational Intelligence (CSCI)*, pages 79–84, 2021.

[15] Bikram Khanal, Pablo Rivas, and Javier Orduz. Human activity classification using basic machine learning models. In *2021 International Conference on Computational Science and Computational Intelligence (CSCI)*, pages 121–126, 2021.

[16] Korn Sooksatra, Pablo Rivas, and Javier Orduz. Evaluating accuracy and adversarial robustness of quanvolutional neural networks. In *2021 International Conference on Computational Science and Computational Intelligence (CSCI)*, pages 152–157, 2021.

[17] Orduz, J. and Rivas, P. and Baker, E. Quantum Machine Learning Foundations and Applications: A Succinct Literature Review. In *International Conference on Scientific Computing*. Springer, Transactions on Computational Science and Computational Intelligence, July 2021. To be published soon: `https://www.springer.com/series/11769`.

[18] Orduz, J. and Rivas, P. and Baker, E. Quantum Circuits for Quantum Convolutions: A Quantum Convolutional Autoencoder. In *International Conference on Scientific Computing*. Springer, Transactions on Computational Science and Computational Intelligence, August 2021. To be published soon: `https://www.springer.com/series/11769`.

[19] Orduz, J. and Iyer, V. Quantum Machine Learning concepts for Physicists. 2021. To be published soon: `https://terc.mx/index.php/terc`.

[20] Orduz, J. and Iyer, V. Quantum Machine Learning concepts and applications, 2020. LatinXAI at NeuRIPS. PDF: `https://tinyurl.com/yzzga8eu`.

[21] Orduz-Ducuara, J. A. Higgs decay mediated by top-quark with flavor-changing neutral scalar interactions. *J. Phys. Conf. Ser.*, 912(1):012032, 2017. See the website: `https://goo.gl/KFpxKU`.

[22] Gaitan, R. and Montes de Oca, J. H. and Orduz-Ducuara, J. A. Probing flavor parameters in the scalar sector and new bounds for the fermion sector. *PTEP*, 2017(7):073B02, 2017. See the website: `https://goo.gl/YjCVdE`.

[23] Orduz-Ducuara, J. A. Exclusions on Z' mass and its non-universal couplings in LFV decays. 8 2016. See the website: `https://goo.gl/8Ll9FL`.

[24] Gaitan, R. and Orduz-Ducuara, J. A. Brief description of the flavor-changing neutral scalar interactions at two-loop level. *J. Phys. Conf. Ser.*, 761(1):012011, 2016. See the website: `http://bit.ly/2fB8te0`.

[25] Orduz-Ducuara, Javier A. Tecnicas en informatica educativa (TIE): LaTeX y Python (herramientas para la enseñanza de las ciencias). *Revista Mexicana de Bachillerato a Distancia*, 8(15):124–137, 2016. See the website: `http://goo.gl/Dkz6S8`.

[26] Diaz-Cruz, J. Lorenzo and Diaz, Enrique and Orduz-Ducuara, Javier A. The texturized 2HDM (2HDM-TX) and Higgs signature at colliders. *J. Phys. Conf. Ser.*, 651(1):012016, 2015. See the website: `http://goo.gl/ziuACv`.

[27] Diaz-Cruz, J. L. and Honorato, C. G. and Orduz-Ducuara, J. A. and Perez, M. A. One-loop decays $A^0 \to ZZ, Z\gamma, \gamma\gamma$ within the 2HDM and its search at the LHC. *Phys. Rev. D*, 90(9):095019, 2014. See the website: `http://goo.gl/hKGvOF`.

[28] Hernandez Lopez, J. M. and Orduz-Ducuara, J. A. A calculation for $Br(Z' \to tth)$ in a B-L model. *J. Phys. Conf. Ser.*, 468:012012, 2013. See the website: `http://goo.gl/3xGWw0`.

[29] Arroyo-Ureña, Marco A. and Diaz-Cruz, J. Lorenzo and Diaz, Enrique and Orduz-Ducuara, Javier A. Flavor violating Higgs signals in the Texturized Two-Higgs Doublet Model (THDM-Tx). *Chin. Phys. C*, 40(12):123103, 2016. See the website: `https://goo.gl/aR6NV4`.

[30] Diaz-Cruz, J. Lorenzo and Hernandez-Lopez, Javier M. and Orduz-Ducuara, Javier A. An extra Z' gauge boson as a source of Higgs particles. *J. Phys. G*, 40:125002, 2013. See the website: `http://goo.gl/LcUyPf`.
