John F. Suárez-Pérez

Ph.D. in Science - Physics
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| Website | Github | NASA/ADS | Google Scholar |

Research Interests

Data Science
Artificial Intelligence, Graph Algorithms, Data Mining.

Cosmology
Large Scale Structure, Cosmic Web, Hydro-dynamical Simulations.

Extra-galactic Astronomy
Bright Galaxies, Luminous Red Galaxies, Galaxy Evolution.

Formal Education

2023 Ph.D. in Physics, Universidad de los Andes - Bogotá, Colombia, "Artificial Intelligence in Astronomy: Machine Learning and Deep Learning Approaches to DESI Data".

2017 M.Sc. in Physics, Universidad de Los Andes - Bogotá, Colombia, "Experimental Control of frequency correlations between photon pairs from an announced individual photons source".

2014 B.S. in Physics, Universidad Distrital Francisco José de Caldas - Bogotá, Colombia, "Computational software development for the study of circuits with memristive elements".

Further Education

2021 MOOC, "Julia Scientific Programming". University of Cape Town. Coursera.

2020 MOOC, "Applied Machine Learning in Python". University of Michigan. Coursera.

2019 MOOC, "Electrones en Acción: Electrónica y Arduinos para tus propios Inventos". Pontificia Universidad Católica de Chile. Coursera.

2019 MOOC, "Introducción a la programación en Python I: Aprendiendo a programar con Python". Pontificia Universidad Católica de Chile. Coursera.

Invited Research Visits

2022 VISITING RESEARCHER. Natural Science Research Institute, University of Seoul. Seoul-Republic of Korea. August-October.

2022 VISITING RESEARCHER. Institute of Computational Cosmology, Durham University. Durham-UK. June-July.

2019 VISITING RESEARCHER. Max Planck Institute for Astrophysics. Munich-Germany. June.

Honors and Awards

2014 **Honor distinction for excellence in graduation work.** Laureate Thesis Award. Highest honor awarded for outstanding research work. Bachelor in Physics degree. Universidad Distrital Francisco José de Caldas - Bogotá, Colombia.

Publications, Events and Technologies

JOURNAL ARTICLES

2023 DESI Collaboration - Adame, A.G.- Aguilar, J. - **et.al.**, "The Early Data Release of the Dark Energy Spectroscopic Instrument", *The Astrophysical Journal - ApJ*, https://arxiv.org/abs/2306.06308

2023 DESI Collaboration - Adame, A.G.- Aguilar, J. - **et.al.**, "Validation of the Scientific Program for the Dark Energy Spectroscopic Instrument", *The Astrophysical Journal - ApJ*, https://arxiv.org/abs/2306.06307

2021 **Suárez-Pérez, John F.** - Camargo, Yeimy D. - Xiao-Dong, Li; Forero-Romero, Jaime E., "The four cosmic tidal web elements from the β-skeleton", *The Astrophysical Journal - ApJ*, https://iopscience.iop.org/article/10.3847/1538-4357/ac1fed/pdf

2020 Neira, Mauricio - Gómez, Catalina - **Suárez-Pérez, John F.** - Gómez, Diego A. - Reyes, Juan Pablo - Hernández Hoyos, Marcela - Arbeláez, Pablo - Forero-Romero, Jaime E., "MANTRA: A Machine Learning reference lightcurve dataset for astronomical transient event recognition", *The Astrophysical Journal Series - APJs*, https://iopscience.iop.org/article/10.3847/1538-4365/aba267/pdf

2020 **Suárez-Pérez, John** - Valencia, Alejandra - Nuñez, Mayerlin, "Characterization of spectrally filtered heralded single photons", *Journal of the Optical Society of America B*, doi: https://doi.org/10.1364/JOSAB.387118

EVENTS

2023 **Suárez-Pérez, John** - Forero-Romero, Jaime E., "Assessing the quality of massive spectroscopic surveys with unsupervised machine learning" - *Machine Learning to 1D Astronomical Dataset*, Remote - London, United Kingdom, **Speaker**.

2022 **Suárez-Pérez, John** - Forero-Romero, Jaime E., "Assessing the quality of massive spectroscopic surveys with unsupervised machine learning" - *XXXI IAUGA 2022*, Busan, Republic of Korea, **Speaker**.

2022 **Suárez-Pérez, John** - Forero-Romero, Jaime E., DESI Team, "Assessing the quality of massive spectroscopic surveys with unsupervised machine learning" - *ESA/ESO SCIOPS Workshop 2022*, Remote - Max Planck Institute, Garching-Munich, Germany, **Speaker**.

2021 **Suárez-Pérez, John** - Neira, Mauricio - Gómez, Catalina - Hernández Hoyos, Marcela - Arbeláez, Pablo - Forero-Romero, Jaime E., "TAO: Transient Astronomical Object Image Dataset" - *Statistical Challenges in Modern Astronomy VII*, Remote - The Pennsylvania, United States, **Speaker**.

2020 **Suárez-Pérez, John** - Forero-Romero, Jaime, "Introducción al análisis de datos del Dark Energy Spectroscopic Instrument (DESI)" - *XXIII Semana de la Enseñanza de la Física - SEF2020*, Remote - Universidad Distrital Francisco José de Caldas, Bogotá-Colombia, Speaker.

2020 **Suárez-Pérez, John** - Forero-Romero, Jaime - Camargo, Yeimy Xiao, Dong-Li, "From the β-skeleton to cosmic web elements" - *Latin American Workshop on Observational Cosmology*, Remote - ICTP-SAIFR, São Paulo-Brazil, **Speaker**.

2020 **Suárez-Pérez, John** - Valencia, Alejandra - Nuñez, Mayerlin, "Characterization of spectrally filtered heralded single photons", *Q-Turn Workshop 2020*, Remote - IQOQI Vienna.

2020 **Suárez-Pérez, John**, *I Encuentro Nacional de Enseñanza de la Ciencia para la Inclusión - ENECI*, Virtual - Universidad Distrital Francisco José de Caldas - Universidad Tecnológica de Pereira, Colombia, Assistant.

2020 **Suárez-Pérez, John** - Forero-Romero, Jaime - Camargo, Yeimy Xiao, Dong-Li, "From the β-skeleton to cosmic web elements" - *2nd CoCo meeting (Cosmología en Colombia)* , Remote - Universidad Antonio Nariño, Bogotá-Colombia , Speaker.

2019 **Suárez-Pérez, John** - Forero-Romero, Jaime, "Machine Learning to reconstruct the dark matter density fields from galaxy survey" - *XVI Latin American Regional IAU Meeting*, Hotel de Antofagasta - Universidad de Antofagasta, Antofagasta-Chile , **Speaker**.

2019 **Suárez-Pérez, John** - Forero-Romero, Jaime, "Reconstructing the Universe with Machine Learning" - *VI Congreso Colombiano de Astronomía y Astrofísica*, Parque Explora - Universidad de Antioquía, Medellín-Colombia , Speaker.

2019 **Suárez-Pérez, John** - Forero-Romero, Jaime, "Reconstructing the Universe with Machine Learning" - *X Escuela de Física Matemática: Machine learning for quantum matter and technology*, Universidad de los Andes, Bogotá-Colombia , Speaker.

2019 **Suárez-Pérez, John** - Forero-Romero, Jaime, "Understanding the large scale dark matter distribution with machine learning algorithms"- *1st CoCo meeting (Cosmología en Colombia)*, Universidad Antonio Nariño, Bogotá-Colombia, Speaker.

2019 Pellaton, Matthieu - Villabona-Monsalve, Juan Pablo - **Suárez-Pérez, John** - Valencia, Alejandra - Nuñez-Portela, Mayerlin, "Measuring entangled two photon absorption cross sections and controlling the frequency correlations of paired photons for spectroscopic applications." *26th Central European Workshop on Quantum Optics*, Paderborn University, Paderborn-Germany.

2018 **Suárez-Pérez, John** - Alvis, Elkin R.- Gonzaléz, Juan, González, María - Cuadrado, Marcela - Aguilera, Alejandra, Bermudez, Santiago - *1st Joint Symposium in Optics: Topics on nonlinear phenomena*, Universidad Nacional - Universidad de los Andes, Bogotá-Colombia, **Organizer**.

2018 **Suárez-Pérez, John** - Valencia, Alejandra - Nuñez, Mayerlin, "Experimental control of the frequency correlations for pure heralded single photons", *IX Quantum Optics*, Cartagena-Colombia, Speaker.

2017 **Suárez, John** - Nuñez, Mayerlin - Valencia, Alejandra, "Measurement of the heralded efficiency and the purity of a heralded single photons source", *XXVII Congreso Nacional de Física* , Sociedad Colombiana de Física, Cartagena-Colombia, Speaker.

2017 **Suárez, John** - Nuñez, Mayerlin - Valencia, Alejandra, "Experimental Control of Frequency Correlations of Entangled Photon Pairs", *VI Quantum Information School and Workshop*, Sociedade Brasilera de Fisica, Paraty-Brasil, Speaker.

2016 **Suárez, John** - Eraso, Leidy - Valencia, Alejandra, "Construcción de un perfilador láser portable mediante la adaptación de una webcam al microordenador Raspberry Pi", *XIX Semana de la Enseñanza de la Física*, Universidad Distrital Francisco José de Caldas, Bogotá-Colombia, Speaker.

2016 Buesaquillo, Victor - **Suárez, John** - Nuñez, Mayerlín, "Study of the spectral properties of entangled photons", *Light and Matter School* , Universidad de los Andes, Bogotá-Colombia, Speaker.

2014 **Suárez, John**, "Desarrollo y funcionamiento del Software Científico MEMCIRCUIT para el análisis de circuitos memristivos", *XVII Semana de la Enseñanza de la Física* , Universidad Distrital Francisco José de Caldas, Bogotá-Colombia, Speaker.

2013 **Suárez, John**, "Números pseudoaleatorios: Algoritmos de producción, evaluación de eficiencia, y aplicabilidad en el estudio de fenómenos físicos.", *XVI Semana de la Enseñanza de la Física* , Universidad Distrital Francisco José de Caldas, Bogotá-Colombia, Speaker.

2013 **Suárez, John**, "Estudio del problema de la aguja de Buffon para el cálculo de PI a través de un aplicativo computacional empleando la infraestructura de análisis de datos ROOT", *XVI Semana de la Enseñanza de la Física* , Universidad Distrital Francisco José de Caldas, Bogotá-Colombia, Speaker.

2013 Vargas, Andrés - **Suárez, John**, "Elementos conceptuales para abordar el uso de fotones polarizados para la distribución de claves criptográficas", *XVI Semana de la Enseñanza de la Física* , Universidad Distrital Francisco José de Caldas, Bogotá-Colombia, Speaker.

2013 **Suárez, John**, "Diseño e implementación de algoritmos en el paradigma de la programación orientada a objetos para la resolución de ODE's empleando la infraestructura de análisis de datos ROOT.", *XVI Semana de la Enseñanza de la Física* , Universidad Distrital Francisco José de Caldas, Bogotá-Colombia, Speaker.

2013 **Suárez, John**, "Desarrollo de un aplicativo informático para el análisis y la visualización del comportamiento de un circuito con elementos memristivos", *XXV Congreso Nacional de Física*, Universidad del Quíndio, Armenia-Colombia, Speaker.

Technologies

2014 **Suárez, John** - Castillo, Miguel - Salamanca, Julián, "Memcircuit", Software for the study of memristive circuits, *Scientific Software*, 1-2014-64122.

Researching

2020-2024 Collaborator, *Dark Energy Spectroscopic Instrument - DESI* member collaborator, Data, Galaxy and Quasars Physics, Anomaly Detection Working Groups.

2019 Research Assistant, Universidad de Los Andes, Transients Project: Localize Transient Astronomical Objects on image sequences.

Teaching

2023 Adjunct Professor. Fundación Universidad de América. Data Analytics, Big Data Analytics.

2018-2023 Graduate Assistant Ph.D. Universidad de Los Andes. Computer Vision, Computational Methods, Introduction to Data Science, Physics I.

2016-2017 Graduate Assistant M.Sc. Universidad de Los Andes. Experimental Physics I, Experimental Physics II, Basic Physics I Laboratory, Physics I, Physics II, Modern Optics.

2015-2015 Adjunct Professor. Universidad de Los Andes. Experimental Physics I, Experimental Physics II.

Outreach

2021-2024 Member, *Red de Estudiantes Colombianos de Astronomía - RECA* mentorship program committee. A program focused on guiding students in Colombia who are interested in becoming professional astronomers.

2020-2021
2023-2024 Editor and Tutor, *DESI High: School of the Dark Universe* initiative, a project of DESI members focusing on introducing DESI to high schoolers through introductory notebooks written in python.

Skills and Abilities

Software Development Skills

Python: ●●●●●
C++: ●●●●◐
Bash: ●●●●○
Julia: ●●●○○

Software Tools

Visualization: ●●●●●
matplotlib, gnuplot

Machine Learning: ●●●●●
sklearn, pytorch
others

Data Analysis: ●●●●●
numpy, pandas
scipy, astropy

Others: ●●●●●
git, make, conda

Languages

Spanish: ●●●●●
English: ●●●●○
Esperanto: ●●●○○

Scientist Prof. Jaime Forero-Romero (je.forero@uniandes.edu.co) has agreed to send reference letters for my application. Please do not hesitate to contact me should you require further information.