

# John F. Suárez-Pérez

Ph.D. in Science - Physics (Expected: June 2023)  
Bogotá, Colombia

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NASA/ADS: [ADS Abstract Service](#)

## Research Interests

### COSMOLOGY

Large-Scale Structure, Cosmic Web, Hydrodynamical Simulations.

### EXTRAGALACTIC ASTRONOMY

Bright Galaxies, Luminous Red Galaxies, Galaxy Evolution.

### DATA SCIENCE

Artificial Intelligence, Graph Algorithms, Data Mining.

## Formal Education

- 2018 M.Sc. in Physics, Universidad de los Andes - Bogotá, Colombia, “Control experimental de las correlaciones en frecuencia de pares de fotones para una fuente de fotones individuales anunciados - 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, “Desarrollo de un aplicativo computacional para el estudio de circuitos con elementos memristivos - 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 **Honour distinction for excellence in graduation work.** Laureate Thesis Award. Highest honour awarded for outstanding research work. Bachelor in Physics degree. Universidad Distrital Francisco José de Caldas - Bogotá, Colombia.

## Publications, Events and Technologies

### JOURNAL ARTICLES

- 2021 **Suárez-Pérez, John F.** - Camargo, Yeimy D. - Xiao-Dong, Li; Forero-Romero, Jaime E., “The four cosmic tidal web elements from the  $\beta$ -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

- 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, Bogotá-Colombia, **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  $\beta$ -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  $\beta$ -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 Antioquia, 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.- González, 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 Brasileira 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 Quindío, 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

- 2020-2023 Collaborator, *Dark Energy Spectroscopic Instrument - DESI* member collaborator, Galaxy and Quasars Physics, Anomaly Detection, Lyman  $\alpha$  Working Groups.
- 2019 Research Assistant, Universidad de los Andes, Transients Project: Localize Transient Astronomical Objects on image sequences.

## Teaching

- 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

- 2021-2022 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 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: ●●●●●

Bash: ●●●●●

C++: ●●●●●

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: ●●●●●

Scientists Prof. Jaime Forero-Romero (je.forero@uniandes.edu.co), Prof. Shaun Cole (shaun.cole@durham.ac.uk) and Prof. Cristiano Sabiu (csabiu@uos.ac.kr) have agreed to send reference letters for my application. Please do not hesitate to contact me should you require further information.

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