

Alejandro Cárdenas-Avendaño

Curriculum Vitæ

Last update: May 7, 2025

Current Academic Position

Los Alamos National Laboratory Los Alamos, NM, USA
Richard P. Feynman Distinguished Fellow in Theory and Computing *2024-current*

Education

University of Illinois Urbana-Champaign Urbana, IL, USA
Ph. D. in Physics. Supervisor: Prof. N. Yunes. *2021*

Montana State University Bozeman, MT, USA
M.Sc. in Physics *2018*

Universidad Nacional de Colombia Bogotá, Colombia
M.Sc. ("magna cum laude") in Astronomy *2016*
B. S. in Physics *2014*

Fundación Universitaria Konrad Lorenz Bogotá, Colombia
B. S. ("summa cum laude") in Mathematics *2013*

Previous Academic Positions

- Associate Research Scholar, Princeton University, USA *2021-2024*
- Adjunct Research Professor. Fundación Universitaria Konrad Lorenz, Colombia. *2017-2021*
- Visiting Graduate Student. Fudan University, China. *Jun 2015, Nov 2015 - Feb 2016, May 2019*
- Visiting Graduate Fellow. Perimeter Institute for Theoretical Physics, Canada. *Feb - Apr 2015*
- EU Universe Awareness Educational Program. Leiden University, The Netherlands. *Jun 2012*

Grants

- Discover ACCESS Allocation (PHY250091) *2025-2027*

Academic Metrics

Publications: 34 papers published in peer-reviewed journals,
out of which 24 first-authored papers, written by my students or in alphabetical order,
2 papers selected as editors's choices,
10 other publications (reviews, white papers and proceedings),
1 edited book and 1 translated (to Spanish) book.

Total number of citations: >2000 **h-index:** 20 ([GOOGLE SCHOLAR](#)) **Erdős number:** 5 ([MATHSCI.NET](#))

Web links to list services: [INSPIRE](#); [ARXIV](#).

Academic Events: 33 talks at conferences, 28 talks at department seminars
8 posters at conferences, 23 Workshops and Schools.

Software: [AART](#), a python package for producing and analyzing high-resolution black hole images. [pip](#) install

↓ **Full list of publications and event participation below** ↓

Teaching and Mentoring

Taught classes:

Video conferencing online classes marked with *.

- Fundacion Universitaria Konrad Lorenz, Introduction to High Performance Computing* 2019-2021
- Fundacion Universitaria Konrad Lorenz, Introduction to Simulation* 2016-2020

Teaching assistant:

- University of Illinois at Urbana-Champaign, General Relativity I (PHYS 515) 2020,2021
- Montana State University, Physics I (PHYS205) and Physics I with calculus (PHYS220) 2016-2018

Advising: Those in **boldface** are co-authors on scientific publications.

(5) Graduate:

- *Co-supervised at Sapienza University of Rome:* Edoardo Levati (2023-2024).
- *Co-supervised at University of Naples Federico II:* Paolo Di Meo (2023-2024).
- *Co-supervised at Princeton University:* Hengrui **Zhu** (2021-2023).
- *Co-supervised at University of Mississippi:* David **Bronicki** (2021-2023).
- *Co-supervised at University of Illinois at Urbana-Champaign:* Alexander **Deich** (2021-2022).

(14) Undergraduate:

- *Supervised at Princeton University:* Chris Billings (Physics summer research, 2024), Chau **Truong** (Physics summer research, 2024), Tejahni **Desire** (Astro summer research and Junior paper, 2023-2024), Peike Wu (Physics summer research, 2023), Lennox **Keeble** (Junior Paper, 2022, and Independent Research, 2024).
- *Supervised at Fundación Universitaria Konrad Lorenz (Senior Theses):* Maria José Cabrera (2021), Felipe Vanegas (2019), Anderson Quintero (2018), Hector **Florez** (2018), Luz Santos-Guerrero (2016), Fabian Diaz (2015).
- *Co-supervised at the University of Illinois at Urbana-Champaign:* Jameson **Dong** (2021), Nicolás **Patiño** (2021).
- *Co-supervised at Montana State University:* Jaxen **Godfrey** (2019).

Computational Skills

Programming Languages: Python, C/C++ & Julia.

Technical Computing: MATHEMATICA & Maple.

Honors, Scholarships and Awards

Richard Feynman Distinguished Postdoctoral Fellowship, Los Alamos National Laboratory	2024-2027
Center for Nonlinear Studies Fellowship, Los Alamos National Laboratory	2024-2027
Future Faculty in the Physical Sciences Postdoctoral Fellow, Princeton University.	2023-2024
IOP Trusted Reviewer, Institute of Physics Publishing.	2023
Data Champion, Research Data Stewardship Program (RDSP), Princeton University.	2022
2022 EDI Initiative Award, Department of Physics, Princeton University.	2022
Scientific Publication Incentive, Fundación Universitaria Konrad Lorenz.	2016, 2017, 2022
Best Poster Award, Black Holes Inside and Out (BHIO) 2021.	2021
2020 Distinguished Referee, The European Physical Journal.	2020
Mavis Future Faculty Fellow (MF3), University of Illinois at Urbana-Champaign.	2020-2021
Distinguished Student Award, American Physical Society Forum on International Physics.	2019
University Fellowship, University of Illinois at Urbana-Champaign.	2019
Best Speaker Award, Conference "Recent Progress in Relativistic Astrophysics"	2019
Above and Beyond Award, Physics Department, Montana State University.	2017

Distinguished Young Investigator Science Award, Fundación Universitaria Konrad Lorenz.	2014, 2015, 2017
Graduate Meritorious Fellowship, Montana State University.	2016
Graduate Fellowship, (Beca de Asistencia Graduada) Universidad Nacional de Colombia. (Matrícula de Honor) Top 1% of my class.	2014-2015
Outstanding Student Scholarship, Fundacion Universitaria Konrad Lorenz (Matrícula de Honor) Top 1% of my class.	2009-2013

Service

Reviewing activities for **NSF** Physics Postdoctoral Fellowships and **NASA's** Astrophysics Division.

Reviewing activities for (16) Journals: Astronomy & Astrophysics (**A&A**), The Astrophysical Journal (**ApJ**), Classical and Quantum Gravity (**CQG**), Entropy, European Physical Journal C (**EPJC**), European Physical Journal Plus (**EPJP**), Galaxies, General Relativity and Gravitation (**GRG**), Journal of Cosmology and Astroparticle (**JCAP**), Journal of High Energy Astrophysics (**JHEAP**), Journal of Open Source Software (**JOSS**), Monthly Notices of the Royal Astronomical Society (**MNRAS**), Physical Review D (**PRD**), Physical Review Letters (**PRL**), Physical Review Research (**PRR**), and Universe.

Organized conferences and schools

- [First Latin American Conference on Astrophysics and Relativity](#), Bogotá 2024
- [PCTS/PGI Workshop on Nonlinear Aspects of General Relativity](#), Princeton 2023
- [Recent progress on gravity tests](#), Online 2022
- [Escuela Latinoamericana de Relatividad y Astrofísica \(ELRA\)](#), Online 2021
- [Ciclo de Cursos Especiales en Sistemas Dinámicos \(CCE\)](#), Bogotá 2013-2022
- [Communicating Astronomy with the Public 2016 \(CAP 2016\) conference](#), Medellín 2016

Outreach activities

- Latin American Webinars on Physics (**LAWPhysics**) coordinator. 2018-2024
- Co-Host and Co-Founder of the **Postdoc Path Podcast**. 2022-2024
- **Skype a Scientist** and Zoom a Princeton Physicist (ZaPP) volunteer. 2021- 2023
- Co-Founder of a mentorship program for Colombian undergraduates within **RECA**. 2020
- **Astrobitos** author. 2019-2021
- Co-founder and leader of the [Astronomy on Tap AoT](#) - BZN (Bozeman) and BOG (Bogotá) 2017-2020
- Major participant and material generator in community outreach efforts in Colombia. 2009-2021

Professional recognition

- Technical Representative, Illinois Campus Cluster. 2019-2021
- Student Rep, American Physical Society, Division of Gravitational Physics (DGRAV). 2019-2021
- Grad Rep on the Computer committee, Physics Department, Montana State University. 2017-2019
- Undergrad Student Representative, Fundacion Universitaria Konrad Lorenz. 2012

Membership to Professional Societies

- Laser Interferometer Space Antenna (LISA) Consortium (Core Member). Since 2025.
- International Astronomical Union (IAU). Since 2024.
- American Astronomical Society (AAS). Since 2023.
- American Physical Society (APS). Since 2017.
- International Society on General Relativity and Gravitation (ISGRG). Since 2016

Languages

Spanish (native), Portuguese (fluent) & English (fluent).

↓ Full list of publications and event participation below ↓

Full publication list

First-authored papers, papers written by a student under my supervision, or papers in alphabetical order due to equal contributions are marked with this symbol: ★.

Submitted papers:

1. *Perturbative and non-linear analyses of gravitational turbulence in spacetimes with stable light rings*
J. Redondo-Yuste & **A. Cardenas-Avendano**.
[2502.18643 \[gr-qc\]](#).

Papers in peer-reviewed journals:

- 34.★*Inferring Black Hole Spin from Interferometric Measurements of the First Photon Ring: A Geometric Approach*
L. S. Keeble, **A. Cardenas-Avendano** & D. C.M . Palumbo
[Physical Review D Accepted \(2025\)](#). [2502.20312 \[astro-ph.HE\]](#).
- 33.★*On turbulence for spacetimes with stable trapping*
G. Benomio, **A. Cardenas-Avendano**, F. Pretorius & A. Sullivan.
[Physical Review D Accepted \(2025\)](#). [2411.17445 \[gr-qc\]](#).
32. *On the Morphology of Relativistically Broadened Line Emission from Axisymmetric Equatorial Accretion Disks*
D. E. A. Gates, C. Truong, A. Sahu & **A. Cardenas-Avendano**.
[Physical Review D Accepted \(2025\)](#). [2411.14338 \[astro-ph.HE\]](#).
- 31.★*Cumulative effect of orbital resonances in extreme-mass-ratio inspirals*
E. Levati, **A. Cardenas-Avendano**, K. Destounis & P. Pani.
[Physical Review D 111, 104006, \(2025\)](#). [2502.20457 \[gr-qc\]](#).
- 30.★*Multi-Frequency Models of Black Hole Photon Rings from Low-Luminosity Accretion Disks*
T. Desire, **A. Cardenas-Avendano**, & A. Chael.
[The Astrophysical Journal, Volume 980, 262, \(2025\)](#). [2411.17884 \[astro-ph.HE\]](#).
29. *Measuring Black Hole Light Echoes with Very Long Baseline Interferometry*
G. Wong, L. Medeiros, **A. Cardenas-Avendano** & J. Stone.
[The Astrophysical Journal Letters, Volume 975:L40, \(2024\)](#). [arXiv:2410.10950 \[astro-ph.HE\]](#).
- 28.★*Explanation for the absence of secondary peaks in black hole light curve autocorrelations*
A. Cardenas-Avendano, C. Gammie & A. Lupsasca
[Physical Review Letters 133, 131402, \(2024\)](#). [arXiv:2406.04176 \[astro-ph.HE\]](#).
- 27.★*Assessing the impact of instrument noise and astrophysical fluctuations on measurements of the first black hole photon ring.*
A. Cardenas-Avendano, L. Keeble & A. Lupsasca
[Physical Review D 109, 124052, \(2024\)](#). [arXiv:2404.01083 \[gr-qc\]](#).
- 26.★*A Lensing-Band Approach to Spacetime Constraints.*
A. Cardenas-Avendano & A. Held
[Physical Review D 109, 064052, \(2024\)](#). [arXiv:2312.06590 \[gr-qc\]](#).
- 25.★*Challenges in Quasinormal Mode Extraction: Perspectives from Numerical solutions to the Teukolsky Equation.*
H. Zhu, J. L. Ripley, **A. Cardenas-Avendano** & F. Pretorius
[Physical Review D 109, 044010, \(2024\)](#). [arXiv:2309.13204 \[gr-qc\]](#).

- 24.★*Prediction for the interferometric shape of the first black hole photon ring.*
A. Cardenas-Avendano & A. Lupsasca
 Physical Review D 108, 064043, (2023). [arXiv:2305.12956 \[gr-qc\]](#).
- 23.★*Tidally induced nonlinear resonances in EMRIs with an analogue model.*
 D. Bronicki, **A. Cardenas-Avendano** & L. Stein
 Classical and Quantum Gravity 40, 215015 (2023). [arXiv:2203.08841 \[gr-qc\]](#).
- 22.★*Adaptive Analytical Ray Tracing of Black Hole Photon Rings.*
A. Cardenas-Avendano, A. Lupsasca & H. Zhu
 Physical Review D 107, 043030, (2023). [arXiv:2211.07469 \[gr-qc\]](#).
- 21.★*Chaos in quadratic gravity.*
 A. Deich, **A. Cardenas-Avendano** & N. Yunes
 Physical Review D 106, 024040, (2022). [arXiv:2203.00524 \[gr-qc\]](#).
- 20.★*Blandford-Znajek process in quadratic gravity.*
 J. Dong, N. Patiño, Y. Xie, **A. Cardenas-Avendano**, C. F. Gammie & N. Yunes
 Physical Review D 105, 044008, (2022). [arXiv:2111.08758 \[gr-qc\]](#).
- 19.★*Spherical Accretion in Alternative Theories of Gravity.*
 A. M. Bauer, **A. Cardenas-Avendano**, C. F. Gammie & N. Yunes
 The Astrophysical Journal, Volume 925, Number 2, (2022). [arXiv:2111.02178 \[gr-qc\]](#).
18. *Stealth Chaos due to Frame Dragging.*
 A. Gutierrez, **A. Cardenas-Avendano**, N. Yunes & L. A. Pachon
 Classical and Quantum Gravity 38, 145013 (2021). [arXiv:1806.06476 \[gr-qc\]](#).
17. *Astrophysical and theoretical physics implications from multimessenger neutron star observations.*
 H. O. Silva, A. M. Holgado, **A. Cardenas-Avendano** & N. Yunes
 Physical Review Letters 126, 181101, (2021). [arXiv:2004.01253 \[gr-qc\]](#).
 • PRL Editors' Suggestion and Featured in Physics.
- 16.★*Modeling uncertainties in X-ray reflection spectroscopy measurements II: Impact of the radiation from the plunging region*
A. Cardenas-Avendano, M. Zhou & C. Bambi
 Physical Review D 101, 123014, (2020). [arXiv:2005.06719 \[astro-ph.HE\]](#).
- 15.★*Gravitational-wave versus X-ray tests of strong-field gravity.*
A. Cardenas-Avendano, S. Nampalliwar & N. Yunes
 Classical and Quantum Gravity 37, 135008 (2020). [arXiv:1912.08062 \[gr-qc\]](#).
- 14.★*Experimental Relativity with Accretion Disk Observations.*
A. Cardenas-Avendano, J. Godfrey, N. Yunes & A. Lohfink
 Physical Review D 100, 024039, (2019). [arXiv:1903.04356 \[gr-qc\]](#).
- 13.★*The Sun and its educational spectrum.*
A. Cardenas-Avendano, S. Vargas-Dominguez, F. Moreno-Cardenas & B. Calvo-Mozo
 Communicating Astronomy with the Public, 25, 28-33 (2019). [arXiv:1712.07987 \[physics.ed-ph\]](#).
- 12.★*The exact dynamical Chern Simons metric for a spinning black hole possesses a fourth constant of motion: A Dynamical-Systems-Based Conjecture.*
A. Cardenas-Avendano, A. Gutierrez, L. A. Pachon & N. Yunes
 Classical and Quantum Gravity, 35, 165010 (2018). [arXiv:1804.04002 \[gr-qc\]](#).
 • IoP Editor's choice (CQG+, IOPselect).

- 11.★ *Testing the Kerr black hole hypothesis using X-ray reflection spectroscopy.*
C. Bambi, **A. Cardenas-Avendano**, T. Dauser, J. A. Garcia & S. Nampalliwar
[The Astrophysical Journal](#), Volume 842:76, Number 2, (2017). [arXiv:1607.00596 \[gr-qc\]](#).
10. *Iron $K\alpha$ line of boson stars.*
Z. Cao, **A. Cardenas-Avendano**, M. Zhou, C. Bambi, C. A. R. Herdeiro & E. Radu
[Journal Of Cosmology And Astroparticle Physics](#), 10 (2016) 003. [arXiv:1609.00901 \[gr-qc\]](#) .
9. *Iron $K\alpha$ line of Kerr black holes with scalar hair.*
Y. Ni, M. Zhou, **A. Cardenas-Avendano**, C. Bambi, C. A. R. Herdeiro & E. Radu
[Journal Of Cosmology And Astroparticle Physics](#), 07 (2016) 049. [arXiv:1606.04654 \[gr-qc\]](#).
8. *Search for astrophysical rotating Ellis wormholes with X-ray reflection spectroscopy.*
M. Zhou, **A. Cardenas-Avendano**, C. Bambi, B. Kleihaus & J. Kunz
[Physical Review D](#) 94, 024036, (2016). [arXiv:1603.07448 \[gr-qc\]](#).
• PRD Kaleidoscope, July 2016.
- 7.★ *Testing the Kerr black hole hypothesis: comparison between the gravitational wave and the iron line approaches.*
A. Cardenas-Avendano, J. Jiang & C. Bambi
[Physics Letters B](#) 760 254–258, (2016) [arXiv:1603.04720 \[gr-qc\]](#) .
- 6.★ *A study for testing the Kerr metric with AGN iron line eclipses.*
A. Cardenas-Avendano, J. Jiang & C. Bambi
[Journal Of Cosmology And Astroparticle Physics](#), 04 (2016) 054. [arXiv:1603.04115 \[gr-qc\]](#).
- 5.★ *Wormholes and nonsingular space-times in Palatini $f(R)$ gravity.*
C. Bambi, **A. Cardenas-Avendano**, G. Olmo & D. Rubiera-Garcia
[Physical Review D](#) 93, 064016, (2016) [arXiv:1511.03755 \[gr-qc\]](#).
- 4.★ *Gravitational lensing in the strong field limit for Kar's metric.*
C.A. Benavides-Gallego, **A. Cardenas-Avendano** & A. Larranaga
[International Journal of Theoretical Physics](#), 55, 4, (2015) [arXiv:1410.4190 \[gr-qc\]](#).
3. *Electrostatic Self-energy of a Charged Particle in the Surroundings of a Topologically Charged Black Hole in the Brane.*
A. Larranaga, **A. Cardenas-Avendano** & D. Torres
[Romanian Journal of Physics](#) 60, 27, (2015). [arXiv:1409.0045 \[gr-qc\]](#).
2. *A Survey of Astronomical Research: A Baseline for Astronomical Development.*
V. Ribeiro, P. Russo & **A. Cardenas-Avendano**
[The Astronomical Journal](#) 146, 138, (2013). [arXiv:1304.0657 \[astro-ph.IM\]](#).
1. *Geometric Thermodynamics of Schwarzschild-AdS black hole with a Cosmological Constant as State Variable.*
A. Larranaga & **A. Cardenas-Avendano**
[Journal of the Korean Physical Society](#) 60, 7. 987-992 (2012). [arXiv:1108.2205 \[gr-qc\]](#).

White papers, review articles and conference proceedings:

10. *Multidisciplinary Science in the Multimessenger Era.*
E. Burns, et al. (84 authors incl. **A. Cardenas-Avendano**)
[arXiv:2502.03577 \[astro-ph.HE\]](#).
9. *The Black Hole Explorer: Motivation and Vision.*
M. D. Johnson, et al. (68 authors incl. **A. Cardenas-Avendano**)
[Proceedings Volume 13092, Space Telescopes and Instrumentation 2024: Optical, Infrared, and Millimeter Wave; 130922D \(2024\)](#)
[arXiv:2406.12917 \[astro-ph.IM\]](#).

8. *The Black Hole Explorer: Photon Ring Science, Detection and Shape Measurement*.
A. Lupsasca, **A. Cardenas-Avendano** D. C. M. Palumbo, M. D. Johnson, S. E. Gralla, D. P. Marrone, P. Galison, P. Tiede & L. Keeble.
[Proceedings Volume 13092, Space Telescopes and Instrumentation 2024: Optical, Infrared, and Millimeter Wave; 130926Q \(2024\)](#)
[arXiv:2406.09498 \[gr-qc\]](#).
- 7.★*Testing gravity with Extreme-Mass-Ratio Inspirals*.
A. Cardenas-Avendano & C. F. Sopuerta.
In Bambi, C. & **A. Cardenas-Avendano** (eds). [Recent Progress on Gravity Tests Challenges and Future Perspectives](#). Springer, Singapore.
[arXiv:2401.08085 \[gr-qc\]](#).
- 6.★*Waveform Modelling for the Laser Interferometer Space Antenna*.
N. Afshordi, et al. (105 authors incl. **A. Cardenas-Avendano** as a first-tier author).
[arXiv:2311.01300 \[gr-qc\]](#).
- 5.★*New Horizons for Fundamental Physics with LISA*.
K. G. Arun, et al. (141 authors incl. **A. Cardenas-Avendano** as a first-tier author).
[Living Reviews in Relativity, 25, 4 \(2022\)](#)
[arXiv:2205.01597 \[gr-qc\]](#).
- 4.★*A Computer-Based Approach to Study the Gaussian Moat Problem*.
H. Florez & **A. Cardenas-Avendano**.
[Applied Informatics. ICAI 2020. Communications in Computer and Information Science, vol 1277, 2020](#)
3. *Prospects for fundamental physics with LISA*.
E. Barausse, et al. (322 authors incl. **A. Cardenas-Avendano** as a second-tier author).
[General Relativity and Gravitation 52, 81 \(2020\)](#).
[arXiv:2001.09793 \[gr-qc\]](#).
- 2.★*Thermal Accretion Disk Spectra Based Tests of General Relativity*.
A. Cardenas-Avendano
[Proceedings 2019, 17, 14](#).
1. *Astrobites as a Community-led Model for Education, Science Communication, and Accessibility in Astrophysics*.
G. Khullar, et al., (24 authors incl. **A. Cardenas-Avendano**).
Submitted as an Astro2020 Decadal Survey State of the Profession White Paper.
[arXiv:1907.09496 \[astro-ph.IM\]](#).

Books:

2. *Recent Progress on Gravity Tests: Challenges and Future Perspectives*
Editors C. Bambi & **A. Cardenas-Avendano**
[Springer Series in Astrophysics and Cosmology](#). ISBN 978-981-97-2873-2
1. *Introducción a la relatividad general: Un Curso para estudiantes de Física*
Author: Cosimo Bambi. Translators: C. Benavides & **A. Cardenas-Avendano**
[Editorial Reverté](#). ISBN 978-84-291-4437-6

Full academic events list

Talks at department seminars:

28. *Physics & Astronomy Colloquium, Texas Tech University, Lubbock, Jan, 2024.*
27. *SAO/EHT group meeting, Harvard University, Cambridge, Nov, 2024.*
26. *Physics Colloquium, Wake Forest University, Winston-Salem, Oct, 2024.*
25. *Physics Colloquium, Wake Forest University, Winston-Salem, Jan, 2024.*
24. *ngEHT/EHT group meeting, Harvard University, Cambridge, Nov, 2023.*
23. *Institute for Advanced Study "Bahcall Lunch," Princeton, USA, Nov, 2023.*
22. *The University of Arizona, Tucson, Nov, 2023.*
21. *Gravity theory and gravitational wave phenomenology Group at Sapienza, Rome, July, 2023.*
20. *Los Alamos Astrophysics Distinguished Seminar Series, Los Alamos National Lab, Los Alamos, May, 2023.*
19. *VandyGRAF Initiative Seminar Series, Vanderbilt University, Nashville, Apr, 2023.*

18. *ngEHT/EHT group meeting, Harvard University, Cambridge, Feb, 2023.*
17. *Institute of Physics, Silesian University in Opava, Czechia, Nov, 2022.*
16. *International Centre for Theoretical Physics Asia-Pacific (ICTP-AP), China, May, 2022.*
15. *Cosimo Bambi's Group Meeting, Fudan University, China, April, 2022.*
14. *Orígenes, un viaje a nuestras raíces, Universidad de Antioquia, Colombia, April, 2022.*
13. *Institute for Advanced Study / Princeton University "Bahcall Lunch," Princeton, USA, March, 2022.*
12. *Seminario de "Física Matemática y Relatividad General", BUAP, Mexico, March, 2022.*
11. *Einstein Seminar, University of Tübingen, Germany, February, 2022.*
10. *Seminario de Termodinámica de Agujeros Negros, Observatorio Astronómico Nacional, Colombia, Diciembre, 2021.*
9. *Seminario de Gravitación y Teoría de Campos, Universidad Nacional Autónoma de México, UNAM, México, October, 2021.*
8. *LA-CoNGA Physics, August, 2021.*
7. *UVA Gravity Seminar, University of Virginia, USA, February, 2021.*
6. *SISSA/IFPU webinar, Scuola Internazionale Superiore di Studi Avanzati, Italy. January, 2021.*
5. *Virtual Tea Talk, California Institute of Technology, USA. December, 2020.*
4. *Gravity seminars, The University of Mississippi, Oxford, USA. March, 2020.*
3. *Theoretical Physics seminars, Universidad Complutense de Madrid, Madrid, Spain. July, 2019.*
2. *Research seminars, Universidad Antonio Nariño, Bogota, Colombia. May, 2018.*
1. *Astronomy Seminars, Universidad de Antioquia, Medellin, Colombia. May, 2016.*

Conferences, Workshops and Schools:

Contributed Talks or Posters marked with *, and invited talks with **.

- 61.* *11th Gulf Coast Gravity Meeting*
Oxford, USA, 2025
- 60.* *American Physical Society (APS) Global Summit 2025*
Anaheim, USA, 2025
59. *Build Basic Generative Adversarial Networks (GANs)*
Online non-credit course authorized by DeepLearning.AI and offered through Coursera (Grade: 100%), 2025.
- 58.* *245th Meeting of the American Astronomical Society (AAS) meeting*
National Harbor, USA, 2025
57. *Introduction to Deep Learning & Neural Networks with Keras*
Online non-credit course authorized by IBM and offered through Coursera (Grade: 100%), 2025.
- 56.* *40th Annual New Mexico Symposium*
Socorro, USA, 2024
- 55.* *3rd TDAMM Workshop*
Baton Rouge, USA, 2024
- 54.** *Black-Hole Microstructure VI*
IPhT, CEA Saclay, France, 2024
[Recorded Talk](#): "Deciphering the Measured Absence: Autocorrelations of Photon Rings around Black Holes."
53. *LISA Sprint 2024*
Pasadena, USA, 2024
- 52.** *Conference for Undergraduate Underrepresented Minorities in Physics (CU² MIP)*
College Park, USA, 2024
- 51.* *American Physical Society (APS) April Meeting 2024*
Sacramento, USA, 2024
50. *Vanderbilt Photon Ring Workshop*
Nashville, USA, 2024
- 49.* *243rd Meeting of the American Astronomical Society (AAS) meeting*
New Orleans, USA, 2024
- 48.** *EHT+ @IAS workshop, Institute for Advanced Study*
Princeton, USA, 2023
47. *Event Horizon Explorer (EHE) Fall Workshop 2023, NASA Goddard Space Flight Center*
Greenbelt, USA, 2023
- 46.** *Lisa@Copenhagen, Fundamental Physics with LISA, Niels Bohr Institute Copenhagen, Denmark, 2023*

- 45.* *American Physical Society (APS) April Meeting 2023*
Minneapolis, USA, 2023
- 44.* *Testing Gravity 2023*
Simon Fraser University, Vancouver, Canada, 2023.
- 43.* *23st International Conference on General Relativity and Gravitation*
Online & Beijing, China, 2022.
- 42.* *Society for Industrial and Applied Mathematics - Mexico Section Annual Meeting 2022*
Online, 2022
41. *Julia Scientific Programming*
Online non-credit course authorized by the University of Cape Town, offered through Coursera (Grade: 99.50%), 2022.
40. *Research Data Stewardship Program (RDSP) 2021-2022*
Princeton University, USA, 2022 • Data Champion.
39. *5th Annual Black Hole Initiative (BHI) Conference "Beyond the Horizon"*
Harvard University, Cambridge, USA, 2022
- 38.* *American Physical Society (APS) April Meeting 2022*
New York City, USA, 2022
37. *Weather and Climate on Neutron Stars: Connecting Surface Flow Theory and Observations*
Princeton Center for Theoretical Science (PCTS) and Princeton Gravity Initiative (PGI), Princeton University, 2022.
- 36.* *Black Holes Inside and Out (BHIO) 2021*
Online, 2021. [Recorded Talk](#) and contributed ePoster: "Searching for a needle in a haystack: Chaos in EMRIs"
• Best poster award.
- 35.* *APS April Meeting "Quarks to Cosmos"*
American Physical Society, United States of America, 2021.
- 34.* *Experimental Tests and Signatures of Modified and Quantum Gravity*
Wilhelm und Else Heraeus-Stiftung, Online, 2021.
- 33.* *Maratón Colombia Espacial*
Universidad Nacional de Colombia, Online, 2020.
[Recorded Talk](#): "Gravitational-wave versus X-ray tests of strong-field gravity"
- 32.* *30th annual Midwest Relativity Meeting*
University of Notre Dame, Online, 2020.
- 31.* *Cosmología en Colombia (CoCo) 2020*
Universidad Antonio Nariño, Online, 2020.
30. *Advances and Challenges in Computational Relativity*
- 29.* *The 13th International LISA Symposium*
LISA Consortium, Online, 2020.
[Recorded Talk](#): "Stealth Chaos due to Frame Dragging"
28. *Writing in the Sciences*
Online non-credit course authorized by Stanford University, offered through Coursera (Grade: 97.22%), 2020.
27. *BHPToolkit Spring 2020 workshop*
Online event hosted by the Astronomical Institute of the Czech Academy of Sciences, 2020.
- 26.** *Cosmic Marathon (In Spanish)*
Universidad Nacional de Colombia, Bogota, Colombia, 2020.
- 25.* *APS Virtual April Meeting*
American Physical Society, United States of America, 2020.
- 24.* *22st International Conference on General Relativity and Gravitation and the 13th edition of the Edoardo Amaldi Conference on Gravitational Waves*
University of Valencia, Valencia, Spain, 2019.
- 23.* *Recent Progress in Relativistic Astrophysics*
Fudan University, Shanghai, China, 2019.
• Best student presentation award.
- 22.* *Testing Gravity 2019*
Simon Fraser University, Vancouver, Canada, 2019.
- 21.* *International HPC Summer School 2018*
IT4Innovations National Supercomputing Center, sponsored by PRACE, XSEDE, RIKEN, SciNet, Ostrava, Czech Republic, 2018.

- 20.* *APS April Meeting*
American Physical Society, Columbus, United States of America, 2018.
19. *eXtreme Matter meets eXtreme Gravity*
Montana State University, Bozeman, United States of America, 2017.
- 18.* *21st International Conference on General Relativity and Gravitation*
Columbia University, New York, United States of America, 2016.
17. *New Spaces in Mathematics and Physics*
Institut Henry Poincare, Paris, France, 2015.
16. *Recent Advances in Mathematical General Relativity*
Institut Henry Poincare, Paris, France, 2015.
15. *Introductory school: Introduction to mathematical general relativity*
Institut Henry Poincare, Paris, France, 2015.
14. *Extreme Gravity Workshop in Bozeman*
Montana State University, Bozeman, United States of America, 2015.
13. *Workshop on Astrophysics and Relativity: Astro-GR 2015*
ICTP South American Institute for Fundamental Research, Sao Paulo, Brazil, 2015.
- 12.* *School on Gravitational Waves: from data to theory and back*
ICTP South American Institute for Fundamental Research, Sao Paulo, Brazil, 2015.
11. *Superluminality in Effective Field Theories for Cosmology*
Perimeter Institute for Theoretical Physics, Waterloo, Canada, 2015.
- 10.* *X Latin American Symposium of High Energy Physics (SILAFEA)*
Universidad de Antioquia, Medellin, Colombia, 2014.
- 9.* *EHT 2014*
Perimeter Institute for Theoretical Physics, Waterloo, Canada, 2014.
- 8.* *XIX Ciclo de Cursos Especiais, Advanced School in Astrophysics*
Observatorio Nacional de Brasil no Rio de Janeiro, Rio de Janeiro, Brazil, 2014.
7. *Physics School on General Relativity @ 99*
Deutsche Physikalische Gesellschaft, Physikzentrum, Bad Honnef, Germany, 2014.
6. *International Conference Boltzmann, Vlasov and related equations: Last results and open problems*
Universidad de Cartagena, Cartagena, Colombia, 2014.
5. *SciCoder 2013*
New York University, United States of America, 2013.
4. *XVII Ciclo de Cursos Especiais, Advanced School in Astrophysics*
Observatorio Nacional de Brasil no Rio de Janeiro, Rio de Janeiro, Brazil, 2012.
3. *International Summer School. Solar Astrophysics: Modern Trends and Techniques*
Universidad Nacional de Colombia, Bogota Colombia, 2012.
2. *XVI Ciclo de Cursos Especiais, Advanced School in Astrophysics.*
Observatorio Nacional de Brasil no Rio de Janeiro, Rio de Janeiro, Brazil, 2011.
1. *First School on Numerical Relativity.*
Universidad Nacional de Colombia, Bogota, Colombia, 2011.