

Education

- 2012–2015 **University of Wisconsin at Madison**,
PhD. in Physics.
- 2009–2012 **Pontificia Universidad Católica del Perú**,
M. Sc. in Physics.
- 2004–2008 **Pontificia Universidad Católica del Perú**,
Ba. Sc. in Physics.

Professional Experience

- Jul. 2020 – **Assistant Professor**, HARVARD UNIVERSITY.
Ongoing Department of Physics, Faculty of Arts and Sciences
- Oct. 2015 – **Postdoctoral Research Associate**, MASSACHUSETTS INSTITUTE OF TECHNOLOGY.
Jul. 2020 Researcher in Professor Janet Conrad's group.
- Jul. 2012 – **Research Assistant**, UNIVERSITY OF WISCONSIN - MADISON.
Aug. 2015 Research assistant under the supervision of Professor Francis Halzen.
- Mar. 2010 – **Research Assistant**, PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ.
Jul. 2012 Research assistant under the supervision of Professor Alberto Gago.
- Mar. 2010 – **Teacher**, COLEGIO SANTA MARGARITA.
Dec. 2010 High school physics teacher.
- Mar. 2007 – **Teaching Assistant**, PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ.
Dec. 2011 Teaching assistant in undergraduate courses.

Awards and Fellowships

- 2022 *Science News'* 2022 SN 10: Scientists to Watch.
- 2022 TUMI USA Award in the category of "Outstanding Educator." This award is given by the USA Peruvian Community to peruvian immigrants who have made significant impact in their fields.
- 2021 International Union of Pure and Applied Physics Young Scientist Prize in Astroparticle Physics for "fundamental experimental and phenomenological contributions to neutrino physics through IceCube."
- 2021 Sloan Research Fellow (awarded 75,000 US\$).
- 2020 IceCube Collaboration Impact Award for "for key contributions in the development of a suite software tools used broadly in IceCube analyses, and his leading efforts in the advancement of diversity, equity and inclusion within the collaboration."
- 2017 American Physical Society Division of Astroparticle Physics thesis award finalist.
- 2015-2020 Wisconsin IceCube Particle Astrophysics Center (WIPAC) Honorary Fellow.
- 2011 Fermilab Theory Group Latin American Fellow.
- 2007-2008 Scholarships to spend a summer semesters at *Instituto de Matemática Pura e Aplicada* (IMPA).
- 2006 Scholarships for outstanding performance in physics to continue his undergraduate and graduate studies in physics at *Pontificia Universidad Católica del Perú*.

Collaboration Leadership, Community Involvement, and Outreach

- May 2022 – **Beyond the Standard Model Working Group Convener**, ICECUBE COLLABORATION.
on going
- Oct. 2018 – **Beyond the Standard Model Working Group Technical Leader**, ICECUBE COLLABORATION.
May 2022
- May 2017 – **IceCube Diversity Taskforce Member**, ICECUBE COLLABORATION.
ongoing

- 2021 – **IAIFI Affiliate Member**, *NSF AI Institute for Artificial Intelligence and Fundamental Interactions*.
ongoing
- 2022 – 2023 **Severo Ochoa Associate**, *Institute of Theoretical Physics in Madrid (IFT) visiting scientist supported by the Severo Ochoa Excellence Grant (SO)*.
- 2020, 2021 **Judge**, *ENVISION: Female STEM competition*.
ENVISION is a semester-long research competition that encourages female high school students interested in STEM to apply their scientific knowledge in an area of their interest. Competitors must work in groups of four or less to write a research proposal.
- 2022 **IceCube Spanish Masterclass**, ICECUBE COLLABORATION SPANISH MASTER CLASS.
Outreach activity for Spanish speakers organized with Los Amigos public school in Cambridge and the Real Colegio Complutense at Harvard.
- 2022 **Foro Internacional Creación del Ministerio de Ciencia, Tecnología e Innovación**, PERUVIAN CONGRESS.
Invited speaker to the congress commission of science discussion on the proposed ministry of science.
- 2022 **LGBTQ+ Youth Summer Camp**, BRAVE TRAILS.
Organized a workshop on physics and astrophysics for LGBTQ+ teenagers who are discovering their gender identity.
- 2022 **Underserved high school students**, COMPASS WORKSHOP.
Invited talk to motivate underserved high school students in the greater Boston area to get involved in STEM.
- 2022 **SACNAS2022**, NATIONAL DIVERSITY IN STEM CONFERENCE.
Attended the SACNAS2022 and worked in the Harvard Physics booth to recruit underrepresented minorities.
- 2016 **El Universo es Tuyo**, ICECUBE COLLABORATION SPANISH MASTER CLASS.
Outreach activity for Spanish speakers.
- 2020-2022 **Particle Physics Community Planning Exercise (a.k.a. “Snowmass”)**.
 - Editor and main contributor in: WHITE PAPER ON LIGHT STERILE NEUTRINO SEARCHES AND RELATED PHENOMENOLOGY and NEW PHYSICS WITH ASTROPHYSICAL NEUTRINO FLAVOR.
 - Contributor to the following *White Papers*: QUANTUM COMPUTING FOR DATA ANALYSIS IN HIGH-ENERGY PHYSICS, HIGH-ENERGY AND ULTRA-HIGH-ENERGY NEUTRINOS, TAU NEUTRINOS IN THE NEXT DECADE: FROM GEV TO EEV, and THE PHYSICS OF LIGHT RELICS.
 - Contributor to the following *Letters Of Interest*: OPPORTUNITIES AND SIGNATURES OF NON-MINIMAL HEAVY NEUTRAL LEPTONS, NuSTE: GLOBAL LIGHT STERILE NEUTRINO FITS, BSM NEUTRINO OSCILLATION SEARCHES WITH 1-100 TEV ATMOSPHERIC NEUTRINOS AT ICECUBE, COSMIC NEUTRINO PROBES OF FUNDAMENTAL PHYSICS, NEUTRINO NON-STANDARD INTERACTIONS, NEUTRINOS AS PROBES FOR LORENTZ AND CPT SYMMETRY, LETTER OF INTEREST ON DARK MATTER PHYSICS WITH THE ICECUBE NEUTRINO OBSERVATORY, AN ANDEAN DEEP-VALLEY DETECTOR FOR HIGH-ENERGY TAU NEUTRINOS, NEW PHYSICS WITH ASTROPHYSICAL NEUTRINO FLAVOR, OBSERVING THE HIGH-ENERGY SUN, ICECUBE AND ICECUBE-GEN: QUANTUM COMPUTING OPPORTUNITIES, and A COMPREHENSIVE EFT GLOBAL FIT IN THE NEUTRINO OSCILLATION EXPERIMENT.
 - Invited Panelist on the SnowMass conference on the short-baseline anomalies and their solutions.
- 2022 **Graduate Student Research Fellowship**, NATIONAL SCIENCE FOUNDATION.
Panelist of the NSF Graduate Student Fellowship
- Journal Referee.**
Referee for JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS, JOURNAL OF HIGH ENERGY PHYSICS, EUROPEAN PHYSICAL JOURNAL C, INTERNATIONAL JOURNAL OF MODERN PHYSICS A, MODERN PHYSICS LETTERS A, PHYSICS LETTERS B, and PHYSICAL REVIEW LETTERS
- Grant Review.**
Referee for NATIONAL SCIENCE FOUNDATION and FWF AUSTRIAN SCIENCE FUND
- Workshop and Conference Organizations.**
co-organizer of ICEDUNE Workshop, 2021
- Member of the American Physical Society.**

Teaching Experience

International Schools and Workshops

- Aug. 2021 **International Neutrino Summer School**, Geneva, Switzerland.
Invited lecturer on high-energy neutrino particle astrophysics.
- May. 2021 **Standard model Extension Summer School**, Bloomington, Indiana, USA.
Invited lecturer experimental searches for Lorentz symmetry violation with neutrinos.
- Aug. 2019 **ICTP-SFAIR School on High-Energy Astrophysics**, São Paulo, Brazil.
Invited lecturer on high-energy neutrino physics. Developed course syllabus and practical exercises.

Undergraduate Level Teaching

- Jan. 2022 – **Harvard University**, Cambridge, MA, USA.
May. 2022 Main lecturer of Electricity and Magnetism (PHYS15b). Instructor Evaluation: 4.18/5.00
- Sept. 2021 – **Harvard University**, Cambridge, MA, USA.
Dec. 2021 Main lecturer of Elementary Particle Physics (PHYS145). Instructor evaluation: N/A.
- Jan. 2021 – **Harvard University**, Cambridge, MA, USA.
May. 2021 Main lecturer of Electricity and Magnetism (PHYS15b). Instructor Evaluation: 4.51/5.00
- Mar. 2007 – **Pontificia Universidad Católica del Perú**, Lima, Peru.
Dec. 2011 Teaching assistant in the General Science Studies, General Humanity Studies, and Science and Engineering departments. In these departments I was a teaching assistant of the following classes:
- In General Science Studies: Calculus 2, Calculus 4, General Physics 2, and Introduction to University Physics;
 - In Science and Engineering: Probability, Probability and statistics, Computational techniques in physics, and Elementary particles;
 - In General Humanity Studies: Cosmology and Introduction to experimental sciences.

High School Level Teaching

- Mar. 2010 – **Colegio Santa Margarita**, Lima, Peru.
Dec. 2010 Was responsible of general physics for two senior high school classes of thirty students each. Designed syllabus of lectures, evaluations, and laboratory classes.

Invited Seminars and Talks

- 2022 **QUEEN'S UNIVERSITY AT KINGSTON**, Kingston, Ontario, Canada; **TEXAS A&M UNIVERSITY**,
Colloquia College Station, Texas, USA.
- 2022 **COLUMBIA UNIVERSITY**, New York City, New York, USA; **KAVLI INSTITUTE FOR THEORETICAL**
Seminars **PHYSICS**, Santa Barbara, California, USA; **CENTRO ATÓMICO DE BARILOCHE**, Bariloche, Río Negro,
Argentina; **UNIVERSITY OF MASSACHUSETTS AT AMHERST**, Amherst, Massachusetts, USA; **FER-**
MILAB NATIONAL ACCELERATOR LABORATORY, Batavia, Illinois, USA.; **HARVARD-SMITHSONIAN**
CENTER FOR ASTROPHYSICS, Cambridge, Massachusetts, USA.
- 2021 **HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS**, Cambridge, Massachusetts, USA.
Colloquia
- 2021 **OHIO STATE UNIVERSITY**, Columbus, Ohio, USA; **VIRGINIA TECH**, Blacksburg, Virginia, USA;
Seminars **KING'S COLLEGE LONDON**, London, UK; **KAVLI IPMU**, Kashiwa, Japan; **BOGAZICI UNIVERSITY**,
Istanbul, Turkey.
- 2020 **CASE WESTERN RESERVE UNIVERSITY**, Cleveland, Ohio, USA; **PABNA UNIVERSITY OF SCIENCE**
Colloquia **AND TECHNOLOGY**, Pabna, Bangladesh.
- 2020 **MICHIGAN STATE UNIVERSITY**, East Lansing, Michigan, USA.
Seminars
- 2019 **SUNGKYUNKWAN UNIVERSITY**, Seoul, Korea; **UNIVERSIDADE ESTADUAL PAULISTA AND ICTP-**
Colloquia **SAIFR**, Sao Paulo, Brazil.
- 2019 **UNIVERSITÉ LIBRE DE BRUXELLES**, Brussels, Belgium; **LOS ALAMOS NATIONAL LABORATORY**, Los
Seminars **Alamos**, NM, USA; **FERMILAB LPC PHYSICS FORUM**, Batavia, IL, USA; **DURHAM UNIVERSITY**,
Durham, UK; **HARVARD**, Cambridge, MA, USA; **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**,
Cambridge, MA, USA; **RUTGERS UNIVERSITY**, New Brunswick, NJ, USA; **PONTIFICIA UNIVERSIDAD**
CATÓLICA DEL PERÚ, Lima, Peru.

2019 INVISIBLE NETWORK, Europe.

Webinars

2018 NIELS BOHR INSTITUTE, Copenhagen, Denmark.

Seminars

2017 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA, USA; WAYNE STATE UNIVERSITY, Detroit, MI, USA; FERMILAB THEORY GROUP, Batavia, IL, USA; DESY-ZEUTHEN, Berlin, Germany.

2016 UNIVERSITY OF WASHINGTON, Seattle, WA, USA; BROOKHAVEN NATIONAL LABORATORY, Upton, NY, USA; INSTITUTO DE FÍSICA CORPUSCULAR, Valencia, Spain; YALE WRIGHT LABORATORY, New Haven, CT, USA; CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, CA, USA; COLUMBIA UNIVERSITY, New York City, NY, USA; UNIVERSITY OF MICHIGAN AT ANN ARBOR, Ann Arbor, MI, USA; SLAC NATIONAL ACCELERATOR LABORATORY, Menlo Park, CA, USA; NORTHWESTERN UNIVERSITY, Evanston, IL, USA; OHIO STATE UNIVERSITY, Columbus, OH, USA.

2016 LATIN AMERICAN WEBINARS ON PHYSICS, America.

Webinars

2015 HARVARD, Cambridge, MA, USA; MASSACHUSETTS INSTITUTE OF TECHNOLOGY, Cambridge, MA, USA; PENNSYLVANIA STATE UNIVERSITY, College Park, PA, USA.

Conferences and Workshops

Invited Plenary Talks

Dec. 2022 **IFT Christmas Workshop**, Instituto de Física Teórica, Spain.

Nov. 2022 **Dark Interactions: New Perspectives**, Brookhaven National Laboratory, USA.

Sep. 2022 **Baryon and Lepton Number Violation**, Kingston, Canada.

Aug. 2022 **TeVPa**, Kingston, Canada.

May. 2022 **Neutrino**, Seoul, Korea.

May. 2022 **Ninth Meeting on CPT and Lorentz Symmetry**, Bloomington, IN, USA.

Sep. 2021 **nuFACT**, Cagliari, Italy.

Sep. 2021 **NuTau2021**, Brookhaven National Laboratory, USA.

Aug. 2018 **TeVPa2018**, Berlin, Germany.

Plenary Talks

May 2019 **Eight Meeting on CPT and Lorentz Symmetry**, Bloomington, IN, USA.

Aug. 2018 **nuFACT**, Blacksburg, VA, USA.

Jun. 2017 **Rencontre du Vietnam**, Quy Nhon, Vietnam.

Jun. 2016 **Seventh Meeting on CPT and Lorentz Symmetry**, Bloomington, IN, USA.

Invited Parallels

Nov. 2022 **Neutrinos In the Multi-Messenger Era**, Louvain-la-Neuve, Belgium.

Oct. 2022 **Atracción de colaboraciones científicas al Perú**, Arequipa, Peru.

Jun. 2022 **Neutrino Theory Network Workshop**, Batavia, Illinois, USA.

Apr. 2022 **Interplay of Fundamental Physics and Machine Learning**, Aspen, Colorado, USA.

Apr. 2022 **The Mitchell Conference on Collider, Dark Matter, and Neutrino Physics**, College Station, Texas, USA.

Apr. 2022 **American Physical Society April Meeting**, New York, New York, USA.

Mar. 2022 **New methods and ideas at the frontiers of particle physics**, Aspen Center for Physics, Aspen, Colorado, USA.

Mar. 2022 **Interdisciplinary Developments in Neutrino Physics**, KITP, Santa Barbara, California, USA.

Jul. 2021 **Sterile Neutrino Search at Underground Detectors**, Institute for Basic Science, Korea.

Apr. 2021 **American Physical Society April Meeting**, Online format, USA.

Mar. 2021 **Workshop on Interplay of Neutrino and Dark matter Experiments and Exotic Searches**, Nagoya, Japan.

Oct. 2019 **Neutrino Platform Week**, CERN, Geneva, Switzerland.
 Sep. 2019 **NEPLES**, KIAS, Seoul, Korea.
 Jun. 2019 **Rencontres de Blois**, Blois, France.
 Jun. 2019 **Workshop on Non-standard Interactions in Neutrino Experiments**, St. Louis, MO, USA.
 Jun. 2018 **PANE**, ICTP, Trieste, Italy.
 Mar. 2017 **PINS**, SLAC, Menlo Park, CA, USA.
 Jan. 2017 **American Physical Society April Meeting**, District of Columbia, USA.
 Sep. 2016 **TeVPa**, CERN, Geneva, Switzerland.
 Apr. 2016 **American Physical Society April Meeting**, Salt Lake City, Utah, USA.

Parallel Talks

May. 2020 **Phenomenology 2020 Symposium**, Pittsburgh, PA, USA.
 Oct. 2019 **PPNT**, Uppsala, Sweden.
 Aug. 2017 **TeVPa**, Columbus, Ohio, USA.
 Jul. 2017 **VietNus**, Quy Nhon, Vietnam.
 May 2017 **IPA**, Madison, WI, USA.
 Jan. 2017 **American Physical Society April Meeting**, District of Columbia, USA.
 Dec. 2016 **Astroparticle Physics at Ecuador**, Quito, Ecuador.
 Sep. 2016 **TeVPa**, Geneva, Switzerland.
 Aug. 2016 **International Conference of High-Energy Physics**, Chicago, IL, USA.
 Sep. 2015 **Very Large Volume Neutrino Telescope**, Rome, Italy.
 Jun. 2015 **Weak Interactions and Neutrinos**, Heidelberg, Germany.
 Mar. 2012 **PASI: Exploring the Terascale and Beyond**, Buenos Aires, Argentina.

Poster Presentations

Jun. 2020 **Neutrino**, Chicago, IL, USA.
 Jul. 2019 **36th International Cosmic-Ray Conference**, Madison, WI, USA.
 Jul. 2018 **Neutrino**, Heidelberg, Germany.
 Jul. 2016 **Neutrino**, London, UK.
 Jun. 2015 **Invisibles**, Madrid, Spain.
 Dec. 2010 **VII Simposio Latinoamericano de Física de Altas Energías**, Valparaiso, Chile.

Advising And Mentoring

Postdoctoral Fellows

Dr. Alfonso Garcia Soto, *Marie Sklodowska-Curie Fellow*, 05/2021-present.

Dr. Ivan Martinez Soler, 10/2021-ongoing.

Dr. William Thompson, 04/2022-ongoing.

Former Postdoctoral Fellows

Dr. Rui An, *Now machine learning engineer at Hiretual*, 12/2020-3/2021.

Former Visiting Postdoctoral Fellows

Dr. Ali Kheirandish, *Now professor at the University of Nevada Las Vegas*, 07/2020-/06/2022.

Graduate Students at Harvard

Ms. Barbara Skrzypek, *fifth-year student, Physics*, Primary Advisor.

Ms. Diyaselis Delgado, *third-year student, Physics*, Primary Advisor.

Ms. Julia Book, *third-year student, Physics*, Primary advisor.

Mr. Miaoichin (Andy) Jin, *second-year student, Physics*, Primary Advisor.

Mr. Pavel Zhelnin, *second-year student, Physics*, Primary Advisor.

Mr. Felix Yu, *first-year student, Physics*, Primary Advisor.

Ms. Kiara Carloni, *first-year student, Physics, Primary Advisor.*

Visiting Graduate Students at Harvard

Mr. Eliot Genton, *master student, Ecole Normale Superior, Visiting Fellow.*

Mr. Jeffrey Lazar, *fifth-year student, University of Wisconsin at Madison, Co-advisor with Professor Francis Halzen.*

Former Graduate Students

Dr. Nicolo Foppiani, *Harvard University, Co-advisor with Professor Roxanne Guenette, Graduated 2022.*

Dr. Ibrahim Safa, *University of Wisconsin at Madison, Co-advisor with Professor Francis Halzen, Graduated 2022 and moved to a postdoctoral fellowship at Columbia University.*

Undergraduate Research Advises

Mr. Connor Sponsler, *Summer 2022 – on going, HCRP awardee.*

Ms. Savanna Coffel, *Summer 2022 – on going, HCRP awardee.*

Mr. Christian Chiu, *Summer 2022 – on going, HCRP awardee.*

Mr. Tommaso Serafin, *Spring 2022, HCRP awardee.*

Former Undergraduate Research Advises

Mr. Juan Castillo, *Summer and fall of 2021, HCRP awardee and Prise Fellow.*

Mr. Jeffrey Kwan, *Summer of 2021 – Spring 2022, HCRP awardee and Prise Fellow.*

Mr. Santiago Giner, *Summer of 2021 – Spring 2022, HCRP awardee and Prise Fellow.*

Mr. Josh Villareal, *Spring 2021, Accepted in PhD programs at MIT, MSU, UCSB, among others..*

Mr. Oswaldo Vazquez, *Fall 2020 and Spring 2021, HCRP awardee.*

Mr. Miguel Fernandez, *Summer and Fall of 2022, HCRP awardee.*

Visiting Undergraduate Research Advises

Mr. Pablo Castaño, *Fall 2020 and Spring 2021, University of California - Berkeley.*

Mr. Pratik Kafle, *Summer 2021, Reed College.*

Mr. David Kim, *Summer 2022 – on going, Cornell University.*

Undergraduate Academic Advises

Mr. Gabriel Maxemin.

Mr. Jaiden Edelman.

Mr. Diego Panzardi Serra.

High School Student Academic Advises

Mr. Matias Andia, *Summer and Fall of 2022.*

Professional Activities at Harvard

2022 – ongoing **Member of the Physics Department Colloquia Committee.**

2022 **Member of the Natural Sciences Hoopes Prize Committee.**

2021-2023 **Member of the Graduate Admissions Committee, Department of Physics.**

Member of Ph.D. Committees at Harvard

Mr. Nicolo Foppiani, *Member of the Ph.D. qualifying committee worked under my supervision and of Professor Roxanne Guenette.*

Ms. Barbara Skrzypek, *Member of the Ph.D. qualifying committee working under my supervision.*

Ms. Shion Kubota, *Member of the Ph.D. qualifying committee working with Professor Roxanne Guenette.*

Mr. Shu-Fan Chen, *Member of the Ph.D. qualifying committee working with Professor Cora Dvorkin.*

Mr. Brendon Bullard, *Member of the Ph.D. qualifying committee working with Professor Masahiro Mori.*

Mr. Anthony Badea, *Member of the Ph.D. qualifying committee working with Professor John Huth.*

Ms. Betty Hu, *Member of the Ph.D. qualifying committee working with Professor Douglas Finkbeiner.*

Ms. Justina Yang, *Member of the Ph.D. qualifying committee working with Professor Douglas Finkbeiner.*

Mr. Arindam Bhattacharya, *Member of the Ph.D. qualifying committee working with Professor Matthew D. Schwartz.*

Mr. Neeraj Tata, *Member of the Ph.D. qualifying committee working with Professor Daniel Jafferis.*

Grants

Fall 2022 Dean's Competitive Fund for Promising Scholarship, *Improving Event Reconstruction In Current and Next-Generation Neutrino Observatories*, Period of performance: 01/2023 onwards, 75,000 USD.

William F. Milton Fund, *Towards Observing The Galactic Center In Neutrinos: A Tau Neutrino Observatory in the Peruvian Andes*, Period of performance: 2022 to 2022, 50,000 USD.

Fall 2021 Dean's Competitive Fund for Promising Scholarship, *Discovering Unexpected Patterns with Classical and Quantum Computers*, Period of performance: 01/2022 onwards, 37,500 USD.

Sloan Research Fellowship, Period of performance: 07/2021 to 07/2022, 75,000 USD.

Spring 2021 Dean's Competitive Fund for Promising Scholarship, *Opening New Window into the Universe in the Andes*, Period of performance: 07/2021 onwards, 50,000 USD.

Publication Record

My top-ten most cited publications where I had essential and significant contributions are:

Searches for Sterile Neutrinos with the IceCube Detector, PHYS. REV. LETTERS 117 071801, IceCube Collaboration, Preprint arXiv:1605.01990.
290 citations as of Sep. 04 of 2022.

Where Are We With Light Sterile Neutrinos?, PHYS. REPT. 884 (2020), A. Diaz, C.A. Argüelles, G. H. Collin, J. M. Conrad, and M. H. Shaevitz, Preprint arXiv:1906.00045.
161 citations as of Sep. 04 of 2022.

New Physics in Astrophysical Neutrino Flavor, PHYS. REV. LETTERS 115 161303, C.A. Argüelles, T. Katori, and J. Salvado, Preprint arXiv:1506.02043.
114 citations as of Sep. 04 of 2022.

First Constraints on the Complete Neutrino Mixing Matrix with a Sterile Neutrino, PHYS. REV. LETTERS 117 221801 (2016), G.H. Collin, C.A. Argüelles, J.M. Conrad, and M.H. Shaevitz, Preprint arXiv:1607.00011.
85 citations as of Sep. 04 of 2022.

Sterile Neutrino Fits to Short Baseline Data, NUCL. PHYS. B 908 (2016), G.H. Collin, C.A. Argüelles, J.M. Conrad, and M.H. Shaevitz, Preprint arXiv:1602.00671.
78 citations as of Sep. 04 of 2022.

A Simple Quantum Integro-Differential Solver (SQulDS), COMPUT.PHYSIS.COMMUN. 196 (2015) 569-591, C.A. Argüelles, J. Salvado, and C. N. Weaver, Preprint arXiv:1412.3832.
60 citations as of Sep. 04 of 2022.

Neutrino Interferometry for High-Precision Tests of Lorentz Symmetry with IceCube, NATURE PHYSICS (2018), IceCube Collaboration, Preprint arXiv:1709.03434.
71 citations as of Sep. 04 of 2022.

The High-Energy Behavior of Photon, Neutrino and Proton Cross Sections, PHYS. REV. D92 (2015) NO.7, 074040, C.A. Argüelles, F. Halzen, L. Wille, M. Kroll, and M. H. Reno, Preprint arXiv:1504.06639.
63 citations as of Sep. 04 of 2022.

Testing New Physics Explanations of the MiniBooNE Anomaly at Neutrino Scattering Experiments, PHYS.REV.LETT. 123 (2019) 26, 261801, C.A. Argüelles, M. Hostert, and Yu-Dai Tsai, Preprint arXiv:1812.08768.

60 citations as of Sep. 04 of 2022.

Solar Atmospheric Neutrinos and the Sensitivity Floor for Solar Dark Matter Annihilation Searches, JCAP 07 (2017) 024, C.A. Argüelles, G. de Wasseige, A. Fedynitch, and B. J. P. Jones, Preprint arXiv:1703.07798.

58 citations as of Sep. 04 of 2022.

Peer-reviewed Publications

My ORCID is <https://orcid.org/0000-0003-4186-4182>. For a full publication list go to: <http://inspirehep.net/search?p=exactauthor%3AC.A.Arguelles.1&sf=earliestdat>

Selected Publications in Particle Physics

Probing Pseudo-Dirac Neutrinos with Astrophysical Source at IceCube, PREPRINT ARXIV:2212.00737, K. Carloni, I. Martínez-Soler, Carlos A. Argüelles, K. S. Babu, and P. S. Bhupal Dev, Submitted to *Physical Review Letters*.

Contribution: Conceptualized idea, guided graduate student, developed statistical method, and wrote sections of the letter.

New Clues About Light Sterile Neutrinos: Preference for Models with Damping Effects in Global Fits, PREPRINT ARXIV:2211.02610, J. M. Hardin, I. Martínez-Soler, A. Diaz, M. Jin, N. K. Kamp, C. A. Argüelles, J. M. Conrad, and M. H. Shaevitz, Submitted to *Physical Review D*.

Contribution: Guided graduate student and postdoctoral researchers, and wrote sections of the article.

Measuring Oscillation with A Million Atmospheric Neutrinos, PREPRINT ARXIV:2211.02666, C. A. Argüelles, P. Fernández, I. Martínez-Soler, and M. Jin, Submitted to *Physical Review X*.

Contribution: Guided graduate student and postdoctoral researchers, and wrote sections of the article.

Dark Matter decay to neutrinos, PREPRINT ARXIV:2211.02666, C. A. Argüelles, D. Delgado, A. Friedlander, A. Kheirandish, I. Safa, A. C. Vincent, and H. White, Submitted to *Physical Review Letters*.

Contribution: Guided graduate student and postdoctoral researchers, and wrote sections of the article.

Probing Quantum Gravity with Elastic Interactions of Ultra-High-Energy Neutrinos, PREPRINT ARXIV:2209.06282, Alfonso Garcia Soto, Diksha Garg, Mary Hall Reno, and C. A. Argüelles, Submitted to *Physical Review D*.

Contribution: Guided postdoctoral researcher and wrote sections of the article.

Dipole-Coupled Neutrissimo Explanations of the MiniBooNE Excess Including Constraints from MINERvA Data, PREPRINT ARXIV:2206.07100, Nicholas W. Kamp, Matheus Hostert, Austin Schneider, Stefano Vergani, Carlos A. Argüelles, Janet M. Conrad, Michael H. Shaevitz, and Melissa A. Uchida, Submitted to *Physical Review D*.

Contribution: Guided graduate student and wrote article.

Efficiently Exploring Multi-Dimensional Parameter Spaces Beyond the Standard Model, PREPRINT ARXIV:2205.12273, Carlos A. Argüelles, Nicolo Foppiani, and Matheus Hostert, Submitted to *Physical Review X*.

Contribution: Designed multi-dimensional scanning algorithm, guided graduate student, and wrote article.

Tau depolarization at very high energies for neutrino telescopes, PHYS.REV.D 106 (2022) 4, 043008, Carlos A. Argüelles, Diksha Garg, Sameer Patel, Mary Hall Reno, and Ibrahim Safa, Preprint arXiv:2205.05629.

Contribution: Guided graduate student, and wrote article.

Hadrophilic Light Dark Matter from the Atmosphere, PHYS.LETT.B 833 (2022) 137363, Carlos A. Argüelles, Víctor Muñoz, Ian M. Shoemaker, and Volodymyr Takhistov, Preprint arXiv:2203.12630.

Contribution: Wrote article, assisted in computations of fluxes in the atmosphere, and experimental analysis.

Impact of Wave Packet Separation in Low-Energy Sterile Neutrino Searches, PREPRINT ARXIV:2201.05108, Carlos A. Argüelles, Toni Bertólez-Martínez, and Jordi Salvado, Submitted to *Physical Review Letters*.

Contribution: Wrote letter, wrote code for Daya Bay analysis, and assisted in other experimental analyses.

MicroBooNE and the ν_e Interpretation of the MiniBooNE Low-Energy Excess, PHYS.REV.LETT. 128 (2022) 24, 241802, Carlos A. Argüelles, Ivan Esteban, Matheus Hostert, Kevin J. Kelly, Joachim Kopp, Ivan Martinez-Soler, and Yuber F. Perez-Gonzalez, Preprint arXiv:2111.10359.

Contribution: Wrote code to evaluate the MiniBooNE likelihood, analysis tools, and wrote text.

Cascade Appearance Signatures of Sterile Neutrinos at 1-100 TeV, PHYS. REV. D 105, 052001, Benjamin R. Smithers, Ben Jones, Carlos A. Argüelles, and Janet Conrad, PREPRINT ARXIV:2111.08722.

Contribution: Guided graduate student.

Search for Quantum Gravity Using Astrophysical Neutrino Flavour with IceCube, PREPRINT ARXIV:2111.04654, IceCube Collaboration, Submitted to *Nature Physics*.

Contribution: Conceived idea, wrote analysis software, guided graduate students, and wrote text.

Sterile neutrinos with neutrino telescopes, UNIVERSE 7 (2021) 11, 426, Carlos A. Argüelles and Jordi Salvado, PREPRINT ARXIV:2111.03357.

Contribution: Equal contribution from all authors.

Lorentz symmetry and high-energy neutrino astronomy, UNIVERSE 2021, 7(12), 490, Carlos A. Argüelles and Teppei Katori, PREPRINT ARXIV:2109.13973.

Contribution: Equal contribution from all authors.

Heavy neutral leptons below the kaon mass at hodoscopic detectors, PHYS. REV. D 105, 095006, Carlos A. Argüelles, Nicolò Foppiani, Matheus Hostert, PREPRINT ARXIV:2109.03831.

Contribution: Guided graduate students and wrote paper.

Closing the Neutrino BSM Gap: Physics Potential of Atmospheric Through-going Muons at DUNE, PHYS. REV. D 104, 092015, Austin Schneider, Barbara Skrzypek, Carlos A. Argüelles, Janet M. Conrad, PREPRINT ARXIV:2106.01508.

Contribution: Guided graduate students and wrote paper.

Explaining the MiniBooNE Excess Through a Mixed Model of Oscillation and Decay, PHYS. REV. D 104, 095005, Stefano Vergani, Nicholas W. Kamp, Alejandro Diaz, Carlos A. Argüelles, Janet M. Conrad, Mike H. Shaevitz, Melissa A. Uchida, PREPRINT ARXIV:2105.06470.

Contribution: Designed model, guided graduate students, and wrote paper.

Millicharged Particles from the Heavens: Single- and Multiple-Scattering Signatures, JOURNAL OF HIGH ENERGY PHYSICS ARTICLE NUMBER:99 (2021), Carlos A. Argüelles, Kevin J. Kelly, Victor M. Muñoz, PREPRINT ARXIV:2104.13924.

Contribution: Wrote millicharged particle Monte Carlo, implemented Super-Kamiokande analysis, guided graduate students, and wrote paper.

An eV-scale sterile neutrino search using eight years of atmospheric muon neutrino data from the IceCube Neutrino Observatory, PHYS. REV. LETTERS 125, 141801 (2020), IceCube Collaboration, Preprint arXiv:2005.12942.

Contribution: One of the leading authors. Guided graduate students, wrote analysis framework, wrote paper, and developed Bayesian analysis.

Searching for eV-scale sterile neutrinos with eight years of atmospheric neutrinos at the IceCube neutrino telescope, PHYS. REV. D 102, 052009 (2020), IceCube Collaboration, PREPRINT ARXIV:2005.12943.

Contribution: One of the leading authors. Guided graduate students, wrote analysis framework, wrote paper, and developed Bayesian analysis.

Dark Matter Annihilation to Neutrinos, REV. MOD. PHYS. 93, 35007 (2021), C.A. Argüelles, A. Diaz, A. Kheirandish, A. Olivares-Del-Campo, I. Safa, and A. C. Vincent, Preprint arXiv:1912.09486.

Contribution: Reviewed constraints and experiments. Guided graduate students.

Searches for Atmospheric Long-Lived Particles, JOURNAL OF HIGH ENERGY PHYSICS VOLUME 2020, ARTICLE NUMBER: 190 (2020), C.A. Argüelles, P. Coloma, P. Hernández, and V. Muñoz, Preprint arXiv:1910.12839.

Contribution: Wrote code to compute cosmic-ray air shower meson distributions and provided input on IceCube limitations and capabilities.

Combining Sterile Neutrino Fits to Short Baseline Data with IceCube Data, PHYS. REV. D 101, 055020 (2020), M.H. Moulai, C.A. Argüelles, G. Collin, J.M. Conrad, A. Diaz, and M. Shaevitz, Preprint arXiv:1910.13456.

Contribution: Guided graduate students and wrote the paper.

Where Are We With Light Sterile Neutrinos?, PHYS.REPT. 884 (2020), A. Diaz, C.A. Argüelles, G. Collin, J.M. Conrad, and M. Shaevitz, Preprint arXiv:1906.00045.

Contribution: Made general edits and paper writing. Mainly contributed in the sections related to: new statistical treatments, sterile neutrinos in non-accelerator sources, astrophysical neutrinos, and cosmology.

Testing New Physics Explanations of MiniBooNE Anomaly at Neutrino Scattering Experiments, PHYS. REV. LETT. 123, 261801, C.A. Argüelles, M. Hostert, and Y.-D. Tsai, Preprint arXiv:1812.08768.

Contribution: Developed phenomenology, guided graduate students, and performed part of the analysis.

Exploring a Nonminimal Sterile Neutrino Model Involving Decay at IceCube, PHYS. REV. D 97, 055017, Z. Moss, M. H. Moulai, C. A. Argüelles, and J. Conrad, Preprint arXiv:1711.05921.

Contribution: Developed phenomenology, guided graduate student and undergrad on analysis.

Neutrino Interferometry for High-Precision Tests of Lorentz Symmetry with IceCube, NATURE PHYSICS (2018), IceCube Collaboration, Preprint arXiv:1709.03434.

Contribution: Developed phenomenology, did analysis, and guiding graduate student on the analysis.

First Constraints on the Complete Neutrino Mixing Matrix with a Sterile Neutrino, PHYS. REV. LETTERS 117 221801 (2016), G.H. Collin, C.A. Argüelles, J.M. Conrad, and M.H. Shaevitz, Preprint arXiv:1607.00011.

Contribution: Integrated IceCube into the global fit. Determined the allowed range of extended PMNS matrix element parameters.

Searches for Sterile Neutrinos with the IceCube Detector, PHYS. REV. LETTERS 117 071801, IceCube Collaboration, Preprint arXiv:1605.01990.

Contribution: Paper associated with my thesis analysis; see thesis for detailed contributions.

Dark Gauge Bosons: LHC Signatures of Non-Abelian Kinetic Mixing, PHYS. LET. B 2017.04.037, C.A. Argüelles, X.-G. He, G. Ovanessian, T. Peng, and M. Ramsey-Musolf, Preprint arXiv:1604.00044.

Contribution: Implemented the model in MadGraph.

Sterile Neutrino Fits to Short Baseline Data, NUCL. PHYS. B908 (2016) 354-365, G.H. Collin, C.A. Argüelles, J.M. Conrad, and M.H. Shaevitz, Preprint arXiv:1607.00011.

Contribution: Guided graduate student.

The High-Energy Behavior of Photon, Neutrino and Proton Cross Sections, PHYS. REV. D92 (2015) NO.7, 074040, C.A. Argüelles, F. Halzen, L. Wille, M. Kroll, and M. H. Reno, Preprint arXiv:1504.06639.

Contribution: Performed the calculations described in the text in parallel with L. Wille and M. Kroll.

Searching for cavities of various densities in the Earth's crust with a low-energy electron-antineutrino beta-beam, MOD. PHYS. LETT. A30 (2015) NO. 29, 1550148, C.A. Argüelles, M. Bustamante, and A.M. Gago, Preprint arXiv:1201.6080.

Contribution: Implemented oscillations in the presence of cavities, performed the analysis, wrote paper text and made figures.

[Selected Publications in Astrophysics and Astroparticle Physics](#)

Multi-messenger High-Energy Signatures of Decaying Dark Matter and the Effect of Background Light, PREPRINT ARXIV:2205.03416, Barbara Skrzypek, Marco Chianese, and Carlos A. Argüelles, Submitted to *Journal of Cosmology and Astroparticle Physics*.

Contribution: Guided graduate students and postdocs, designed Monte Carlo reweighting technique, and wrote text.

PeV Tau Neutrinos to Unveil Ultra-High-Energy Sources, PREPRINT ARXIV:2203.13827, Carlos A. Argüelles, Francis Halzen, Ali Kheirandish, and Ibrahim Safa, Submitted to *Nature Astronomy*.

Contribution: Guided graduate students and postdocs, analysis discussion, and wrote text.

Tau Appearance from High-Energy Neutrino Interactions, PHYS. REV. LETT. 128, 171101, Alfonso Garcia Soto, Pavel Zhelnin, Ibrahim Safa, and Carlos A. Argüelles, PREPRINT ARXIV:2112.06937.

Contribution: Guided graduate students and postdocs, analysis discussion, and wrote text.

The Future of High-Energy Astrophysical Neutrino Flavor Measurements, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 04 (2021) 054, Ningqiang Song, Shirley Weishi Li, Carlos A. Argüelles, Mauricio Bustamante, and Aaron C. Vincent, Preprint arXiv:2012.12893.

Contribution: Started the work, analysis discussion, and wrote text.

The IceCube high-energy starting event sample: Description and flux characterization with 7.5 years of data, PHYSICAL REVIEW D 104, 022002 (2021), IceCube Collaboration, Preprint arXiv:2011.03545.

Contribution: One of the leading authors. Guided graduate students, wrote analysis framework, design astrophysical model test, wrote paper, and developed Bayesian analysis.

Measurement of Astrophysical Tau Neutrinos in IceCube's High-Energy Starting Events, PREPRINT ARXIV:2011.03561, IceCube Collaboration, Submitted to *Physical Review Letters*.

Contribution: One of the leading authors. Guided graduate students, wrote analysis framework, and developed statistical analysis.

χ_{arou} : a tool for neutrino flux generation from WIMPs, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 10.1088/1475-7516/2020/10/043, Q. Liu, J. Lazar, C.A. Argüelles, A. Kheirandish, Preprint arXiv:2007.15010.

Contribution: Wrote dark matter capture calculation, improved treatment of nuSQUIDS solar neutrino propagation, guided graduate students, and edited paper.

Probe of Sterile Neutrinos Using Astrophysical Neutrino Flavor, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 10.1088/1475-7516/2020/02/015, C.A. Argüelles, K. Farrag, T. Katori, R. Khandelwal, S. Mandalia, J. Salvado, Preprint arXiv:1909.05341.

Contribution: Conceived idea, guided graduate students, and edited the paper.

Observing EeV neutrinos through the Earth: GZK and the anomalous ANITA events, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 2001 (2020) NO.01, 012, I. Safa, A. Pizzuto, C. Argüelles, F. Halzen, R. Hussain, A. Kheirandish, J. Vandenbroucke, Preprint arXiv:1909.10487.

Contribution: Developed structure of neutrino propagation algorithm and guided graduate students.

Solar Atmospheric Neutrinos and the Sensitivity Floor for Solar Dark Matter Annihilation Searches, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 07(2017)024, C.A. Argüelles, G. de Wasseige, A. Fedynitch, and B.J.P. Jones, Preprint arXiv:1703.07798.

Contribution: Wrote code that propagated neutrino fluxes through the Sun and wrote the discussion of oscillation physics and neutrino transport on the paper.

Imaging Galactic Dark Matter with High-Energy Cosmic Neutrinos, PHYSICAL REVIEW LETTERS 119 201801 (2017), C.A. Argüelles, A. Kheirandish, and A. C. Vincent, Preprint arXiv:1703.00451.

Contribution: Initiated the idea, developed the phenomenology in collaboration with a theorist, and developed likelihood framework for the analysis.

Production of keV Sterile Neutrinos in Supernovae: New Constraints and Gamma Ray Observables, PHYSICAL REVIEW D 99, 04301, C.A. Argüelles, V. Brdar, and J. Kopp, Preprint arXiv:1605.00654.

Contribution: Performed calculations detailed in the paper in parallel with V. Brdar.

New Physics in Astrophysical Neutrino Flavor, PHYSICAL REVIEW LETTERS 115 161303, C.A. Argüelles, T. Katori, and J. Salvado, Preprint arXiv:1506.02043.

Contribution: Equal contributions from the three authors on this work.

Sterile Neutrinos and Indirect Dark Matter Searches in IceCube, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 07:016,201, C.A. Argüelles and J. Kopp, Preprint arXiv:1202.3431.

Contribution: Performed the calculations and analysis described in the paper.

The Brightening of Saturn's F Ring, ICARUS, 2012,219, 181-193, R. S. French, M. R. Showalter, R. Sfair, C.A. Argüelles, M. Pajuelo, P. Becerra, M. M. Hedman, P. D. Nicholson, Preprint arXiv:1408.2536.
Contribution: Processed Cassini's raw data.

IceCube Expectations for Two High-Energy Neutrino Production Models at Active Galactic Nuclei, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 1012:005,2010, C.A. Argüelles, M. Bustamante, and A.M. Gago, Preprint arXiv:1008.1396.
Contribution: Performed the statistical analysis, made model comparison plots, and collaborated on article writing.

[Selected Publications in Statistics, Computing, and Experimental Methods](#)

nuSQuIDS: A toolbox for neutrino propagation, COMPUT. PHYS. COMMUN. 277 (2022) 108346, C.A. Argüelles, J. Salvado, and C.N. Weaver, PREPRINT ARXIV:2112.13804.
Contribution: Developed algorithm and wrote package code.

TauRunner: A Public Python Program to Propagate Neutral and Charged Leptons, COMPUT.PHYS.COMMUN. 278 (2022) 108422, I. Safa, J. Lazar, A. Pizzuto, O. Vasquez, C.A. Argüelles, and J. A. Vandenbroucke, Preprint arXiv:2110.14662.
Contribution: Worked in original code design, guided graduate and undergraduate students, and wrote paper.

LeptonInjector and LeptonWeighter: A neutrino event generator and weighter for neutrino observatories, COMPUT. PHYS. COMMUN. 266 (2021) 108018, IceCube Collaboration, Preprint arXiv:2012.10449.
Contribution: Worked in code design, wrote first implemetation of LeptonWeighter, guided graduate students to improve and integrate the project in IceCube software, and maintains the code.

A Simple Quantum Integro-Differential Solver (SQuIDS), COMPUT.PHYS.COMMUN. 255 (2020) 107405, C.A. Argüelles, J. Salvado, and Christopher N. Weaver.
Contribution: Updated version of the SQuIDS software. Worked on code and documentation.

Pulse Shape Particle Identification by a Single Large Hemispherical Photo-Multiplier Tube, JINST 15 (2020) 05, T05002, S. Samani, S. Mandalia, C. Argüelles, S. Axani, Y. Li, M.H. Moulai, B. Ty, Z. Xie, J. Conrad, T. Katori, P. Sandstrom, Preprint arXiv:1912.03901.
Contribution: Run the experiment and guided graduate students.

Efficient propagation of systematic uncertainties from calibration to analysis with the Snow-Storm method in IceCube, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 1910 (2019) NO.10, 048, IceCube Collaboration, Preprint arXiv:1909.01530.
Contribution: Development of method and guided graduate students.

Neutrino oscillations in a quantum processor, PHYS. REV. RESEARCH. 1 (2019) 033176, C.A. Argüelles and B.J.P. Jones, Preprint arXiv:1904.10559.
Contribution: Equal contribution of all authors.

A binned likelihood for stochastic models, JOURNAL OF HIGH ENERGY PHYSICS 06 (2019) 030., C.A. Argüelles, A. Schneider, and T. Yuan, Preprint arXiv:1901.04645.
Contribution: Participated in the likelihood construction, guided graduate student, and wrote sections of the paper.

Unified atmospheric neutrino passing fractions for large-scale neutrino telescopes, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 1807 (2018) NO. 07, 047, C.A. Argüelles, S. Palomares-Ruiz, A. Schneider, L. Wille, and T. Yuan, Preprint arXiv:1805.11003.
Contribution: Developed the phenomenology and performed parts of the calculation.

High-energy neutrino attenuation in the Earth and its associated uncertainties, JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS 11(2017)012, A. C. Vincent, C.A. Argüelles, and A. Kheirandish, Preprint arXiv:1706.09895.
Contribution: Estimated neutrino cross section uncertainties and collaborated in development of the nuFATE code.

A Simple Quantum Integro-Differential Solver (SQuIDS), COMPUTER PHYSICS COMMUNICATIONS 196 (2015) 569-591, C.A. Argüelles, J. Salvado, and Christopher N. Weaver, Preprint arXiv:1412.3832.
Contribution: Developed algorithm and wrote package code.