Cell EXPLORERS National University of Ireland Galway Voice: +353 (87) 639 2197 E-mail: claudia.fracchiolla@nuigalway.ie

RESEARCHPhysics Education Research, Informal Science, Education Policy, High Energy PhysicsINTERESTSDate Jan, 2013 - Aug, 2016

PhD Curriculum & Instruction

- Subject:Physics Education Research. Thesis: "Investigating a redesigned physics course for future elementary teachers" Kansas State University, Kansas, U.S.A. Advisor: Dr. N. Sanjay Rebello. Purdue University. West Lafayette, IN, USA.
- Date Aug, 2008 Dec, 2012
- PhD Candidate in Physics/ MSc. in Physics
- Subject: Astroparticle Physics. Thesis: "Measuring the neutrino flux upper limit using the fluorescence detector of the Pierre Auger Observatory" Colorado State University, Colorado, U.S.A. Advisor: Dr. Miguel Mostafa. Penn State University.
- Date Aug, 2007 Aug, 2008

PhD Candidate in Physics

Subject: Astroparticle Physics. Thesis: "Anisotropy studies from the Pierre Auger Observatory" Advisor: Dr. Ronald Shellard, PUC-Rio de Janeiro, RJ, Brazil Co-Advisor: Dr. Antoine Lettesier-Selvon, LPNHE-IN2P3/CNRS, Paris, France.

Date Jul, 2005 - May, 2007

MSc. in Physics

- Subject: Astroparticle Physics. Thesis: "Angular Resolution of Surface Detectors of Pierre Auger Observatory" Advisor: Dr. Ronald Shellard, PUC-Rio de Janeiro, Brazil. Co-Advisor: Dr. Antoine Lettesier-Selvon, LPNHE-IN2P3/CNRS, France.
- Date Sep, 1998 Oct, 2004
- BSc. in Physics
- Subject: Astroparticle Physics. Thesis: "Neutrino Induced Cascades in Coincidence with Gamma Ray Burst". Collaboration AMANDA/IceCube. Universidad Simón Bolívar, Caracas, Venezuela. Advisor: Dr. Ignacio Taboada, Georgia Institute of Technology.

Changes of institutions during my graduate studies were in large part as a result of having to relocate geographically due to my husbands job assignments.

CURRENT POSITIONS

Date March, 2017 - Present National Coordinator and Post Doctoral Fellow of Cell EXPLORERS program National University of Ireland Galway. Advisor: Muriel Grenon.

PREVIOUS POSITIONS

Date Jul, 2016 - Mar, 2017Post Doctoral Fellow - Center for STEM LearningUniversity of Colorado - Boulder. Advisor: Noah Finkelstein.

Date Jan, 2016 - Jul, 2016Research Associate - Outreach Program Director for JILAUniversity of Colorado - Boulder. Advisor: Noah Finkelstein.

Date Jan, 2015 - May, 2015 Research Assistant at the Center for Intercultural and Multilingual Advocacy Kansas State University. Advisor: Socorro Herrera.

Date Jan, 2008 - Mar, 2008

Research Assistant under HELEN grant

Project: "Anisotropy studies for the Pierre Auger Observatory"

LPNHE-IN2P3/CNRS, Paris, France. Advisor: Dr. Antoine Lettesier-Selvon. Co-Advisor: Carla B. Bonifazi.

Date Jan, 2005 - Mar, 2005

Research Student for the ATLAS collaboration

Project: "Building the Radiation Length of SCT End-cap modules"

Manchester University. Manchester, UK. Advisor: Dr. Steve Snow.

Outreach related positions

Date Jan, 2016 - Jul, 2016

Educational Outreach and Research Director for Physics Frontier Center - Jila. An afterschool science program that serves K-12 populations that are underrepresented in science.

Date Jul, 2015 - Jul, 2016

Publicist of Physics Education Research Consortium of Graduate Students.

Date Jan, 2014 - Jan, 2015

President of the Physics Graduate Student Association at Kansas State University^{*,1}

Date Jan, 2012 - Dec, 2012

Voluntary work with Little Shop of Physics (LSOP). LSOP is a hand on science outreach program targeted to everyone from middle school to college students as well as teachers of all levels. (http://littleshop.physics.colostate.edu/).

Date Sep, 2010 - Dec, 2012

 $^{^{1}\}mathrm{Positions}$ marked with a sterisks indicate leadership position

Organizer of Physics Education outreach program at the Colorado Children's Hospital*. (Brings Physics demos to the kids and parents at the hospital)

Date Jul, 2011 - Jul, 2012

Coordinator of the Optics session at regionals and state Colorado Science Olympiads*.

Date Jul, 2011 - Dec, 2012

Member of the Graduate Student Council at Colorado State University.

Date Jul, 2011 - Dec, 2012

President of a Green committee at Colorado State University^{*} (organizes composting, recycling and other green related activities).

Publications

- "University physics students' motivations and experiences in informal physics programs", C. Fracchiolla, Kathleen Hinko, Simone Hyater-Adams, Noah Finkelstein, PERC Conference Proceedings 2016
- "Understanding Connections Between Physics and Racial Identities Through Recognition and Relational Resources". Simone Hyater-Adams, C. Fracchiolla, Noah Finkelstein, Kathleen Hinko. PERC Conference Proceedings 2016
- "iPad Screencasts as Evidence of Accountable Disciplinary Knowledge". Sayre, Eleanor, Fracchiolla, Claudia, Van Dusen, Ben. Phys. Rev. PER (2016), ar-Xiv:1605.08105. Manuscript under review.
- 4. "Investigating a redesigned physics course for future elementary teachers". C. Fracchiolla. PhD Thesis
- 5. "Assessing Future Elementary Teachers PCK", C. Fracchiolla, N. Sanjay Rebello PERC Conference Proceedings 2014.
- "Advanced functionality for radio analysis in the Offline software framework of the Pierre Auger Observatory", Pierre Auger Collaboration [P. Abreu et al.], Nucl. Instr.and Meth. A (2011), doi:10.1016/j.nima.2011.01.049
- "Search for First Harmonic Modulation in the Right Ascension Distribution of Cosmic Rays Detected at the Pierre Auger Observatory", Pierre Auger Collaboration [P. Abreu et al.], Astropart. Phys. (2011), doi:10.1016/j.astropartphys.2010.12.007
- "The Pierre Auger Observatory Scaler Mode for the Study of Solar Activity Modulation of Galactic Cosmic Rays", Pierre Auger Collaboration [P. Abreu et al.], Journal of Instrumentation (JINST) 6 (2011) P01003.
- "The exposure of the hybrid detector of the Pierre Auger Observatory", Pierre Auger Collaboration [P. Abreu et al.], Astroparticle Physics 34 (2011) 368.
- "Update on the correlation of the highest energy cosmic rays with nearby extragalactic matter", Pierre Auger Collaboration [P. Abreu et al.], Astroparticle Physics 34 (2010) 314 (arXiv:1009.1855v2 [astro-ph.HE]).
- "The Fluorescence Detector of the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Nuclear Instruments and Methods in Physics Research A620 (2010) 227 (arXiv:0907.4282v1 [astro-ph.IM]).
- 12. "A Study of the Effect of Molecular and Aerosol Conditions in the Atmosphere on Air Fluorescence Measurements at the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Astroparticle Physics **33** (2010), 108.
- "The Northern Site of the Pierre Auger Observatory", Pierre Auger Collaboration [J. Blümer et al.], New Journal of Physics 12 (2010), 035001.
- 14. "Measurement of the energy spectrum of cosmic rays above 10¹⁸ eV using the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.]Physics Letters B **685**(2010), 239 (arXiv:1002.1975 [astro-ph.HE]).
- "Measurement of the Depth of Maximum of Extensive Air Showers above 10¹⁸ eV", Pierre Auger Collaboration [J. Abraham et al.], Physical Review Letters 104 (2010), 091101 (arXiv:1002.0699 [astro-ph.HE]).

- "Trigger and Aperture of the Surface Detector Array of the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Nuclear Instruments and Methods A613 (2010), 29.
- "Atmospheric effects on extensive air showers observed with the Surface Detector of the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Astroparticle Physics **32**, 89 (2009).
- "Limit on the diffuse flux of ultra-high energy tau neutrinos with the surface detector of the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Physical Review D79, 102001 (2009).
- "Upper limit on the cosmic-ray photon fraction at EeV energies from the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Astroparticle Physics **31**, 399 (2009).
- 20. "Evidence for suppression of the flux of cosmic rays above 4×10^{19} eV", Pierre Auger Collaboration [J. Abraham et al.], Physical Review Letters **101** (2008), 061101 (arXiv:0806.4302 [astro-ph]).
- "Upper Limit on the diffuse flux of UHE tau neutrinos from the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Physical Review Letters 100 (2008), 211101 (arXiv:0712.1909 [astro-ph]).
- "Upper Limit on the Cosmic-Ray Photon Flux Above 10¹⁹ eV Using the Surface Detector of the Pierre Auger Observatory", Pierre Auger Collaboration [J. Abraham et al.], Astroparticle Physics 29 (2008), 243 (arXiv:0712.1147 [astro-ph])
- "Correlation of the highest-energy cosmic rays with the positions of nearby active galactic nuclei", Pierre Auger Collaboration [J. Abraham et al.], Astroparticle Physics 29 (2008), 188 (arXiv:0712.2843 [astro-ph]).
- 24. "Correlation of the highest energy cosmic rays with nearby extragalactic objects", Pierre Auger Collaboration [J. Abraham et al.], Science **318**, 939 (9 November 2007), (arXiv:0711.2256v1 [astro-ph]).
- 25. "Angular resolution with the super-hexagon", C. Fracchiolla, C. Bonifazi, A. Letessier-Selvon and O. Blanch Bigas, Pierre Auger Internal Gap Notes

Publications on Physics Education Research contribution:

- Understanding Connections Between Physics and Racial Identities Through Recognition and Relational Resources: I worked closely with the author in the development of the interview protocols, collection and analysis of data, as well as editing of the paper.
- Examining student engagement with activity theory in an afterschool physics program: I worked directly in the collection and analysis of data. I also wrote large sections of the paper.

Publications on High Energy Physics contribution:

It is customary in the field of astroparticle physics that in publications the entire collaboration is included instead of independent authors. During my period with the Pierre Auger Collaboration I worked on the estimation of the angular resolution (AR) of the surface detector (SD) of the observatory. In the search for the sources of cosmic rays, it is of great importance to determine the distribution of their arrival directions. To achieve an optimal measurement of these directions, it is necessary to have a good estimate of the measurement uncertainties of the detector. While working on the angular resolution I also worked on small scale anisotropy studies. I worked on the estimation of the parameters that optimize the correlation signal with possible astrophysical sources. I also worked on the sensitivity of the fluorescence detector of the observatory to neutrino induced showers, and setting an upper limit to the neutrino flux. Although cosmic rays are an excellent tool for the study of astroparticle physics, measurements of the neutrino flux at the transition region from galactic to extra-galactic sources are expected to elucidate discrimination between different astrophysical models.

Conferences and Invited Talks

Conference 2016 Physics Education Research Conference Poster "Understanding the impact of institutional structures and cultural practices on university informal physics programs" Date Jul. 27th, 2015 **Conference** 2015 American Association of Physics Teachers Summer Meeting Poster "Does the Pedagogical Learning Bi-cycle promotes transfer?" Date Jul. 29th, 2015 Conference 2015 American Association of Physics Teachers Summer Meeting Title Aspects of PCK in a Physics Class for Future Elementary Teachers Date Jul. 30th, 2015 Conference 2015 American Association of Physics Teachers Summer Meeting **Poster** "Incorporation of Social-Context into the Classroom to Support Transfer" Date Jan. 4th, 2015 Conference 2015 American Association of Physics Teachers Winter Meeting Title Does the Pedagogical Learning Bicycle promotes transfer? Date Jan. 6th, 2015 Conference 2015 American Association of Physics Teachers Winter Meeting Poster "Social-Context in a Physics Class for Future Elementary Teachers" Date Jul. 29th, 2014 Conference 2014 American Association of Physics Teachers Summer Meeting Title Assessing Future Elementary Teachers PCK Date Jul. 28th, 2014 Conference 2014 American Association of Physics Teachers Summer Meeting Poster "Infusing Pedagogical Content Knowledge into Elementary Teacher Preparation" **Date** July 28th, 2012 **Conference** 2012 American Association of Physics Teachers Summer Meeting Title "Little Shop of Physics workshops" Date Apr. 28th, 2012 Conference American Association of Physics Teacher. CO-WY Section. Title "Little Shop of Physics open house" Date Mar. 31st, 2012 Conference 2012 American Physical Society, April Meeting, Atlanta, GA, USA.

Title "Upper limit on the diffuse flux of ultra high energy neutrinos using the fluorescence detector of Pierre Auger observatory"

Date Mar. 28th - 29th, 2012

Conference Physics at CSU: Neutrinos to Nano Science **Poster** "Neutrino searches with multivariate analysis"

Date Mar. 28th - 29th, 2012

Conference Physics at CSU: Neutrinos to Nano Science

Poster "Cosmic ray anisotropy studies using the infill array of the Pierre Auger observatory"

Date Feb. 14th, 2010

Conference 2010 American Physical Society, April Meeting, Washington, DC, USA. **Title** "Upper limit on the diffuse flux of ultra high energy neutrinos"

Date May 2nd, 2009

Conference 2009 American Physical Society, April Meeting, Denver, CO, USA. **Title** "Upper limit on the diffuse flux of ultra high energy tau neutrinos"

Date Oct. 7th, 2009

Conference Guest Lecturer at Regis University, Denver, Colorado, USA. **Title** "Globalization and diversity in the scientific community"

Date May 4th, 2009

Conference 2009 American Physical Society, April Meeting, Denver, CO, USA. **Title** "Life as a graduate student in a globalized collaboration" (Invited Speaker)

Date Feb. 14th, 2009

Conference Joint Annual Conference of the National Society of Black Physicists and the National Society of Hispanic Physicists

Title "The Pierre Auger Observatory"

Date Feb. 25th, 2008

Conference Pierre Auger Collaboration meeting. Malargüe, Argentina **Title** "Angular Resolution. SD view."

Date Feb. 2nd, 2008

Conference Pierre Auger Collaboration meeting, CNRS/LPHE. Paris, France. **Title** "Angular Resolution for the Surface Detector from the Pierre Auger Observatory"

Date Apr. 26th, 2007Conference Pierre Auger Collaboration meeting. Malargüe, Argentina.Title "Measuring the Surface Detector performances with the Super-Hexagon"

Date Jun. 22nd, 2003

Conference IV Jornadas de Estudiantes de Física. Caracas, Venezuela. **Title** "Neutrino induced showers in coincidence with Gamma Ray Bursts"

ORGANIZATION OF CONFERENCE SESSIONS

Date Jul. 18th, 2016
Conference American Association of Physics Teachers Summer Meeting 2016
Session "Graduate Student Topical Discussion"
Date Jan. 12th, 2016
Conference American Association of Physics Teachers Winter Meeting 2016
Session "K-16 Physics Education Collaboratives"
Date Jan. 11th, 2016
Conference American Association of Physics Teachers Winter Meeting 2016
Session "International Women in Physics"
Date Jan. 11th, 2016
Conference American Association of Physics Teachers Winter Meeting 2016
Session "International Women in Physics"
Date Jan. 11th, 2016
Conference American Association of Physics Teachers Winter Meeting 2016
Session "International Komen in Physics"

TEACHING POSITIONS

Date Aug, 2014 - Dec, 2014 Primary Instructor Concept of Physics Kansas State University, Physics Department. Manhattan, KS, USA Date Jan, 2014 - May, 2014 **Primary Instructor** Studio Engineering Physics I Kansas State University, Physics Department. Manhattan, KS, USA Date Sep, 2013 - Dec, 2013 Teaching Assistant (TA) Concepts of Physics. Conceptual Physics class for pre-service elementary teachers Kansas State University, Physics Department. Manhattan, KS, USA Date Jun, 2013 - Aug, 2013 Online Teaching Assistant (TA) Tutoring Mechanics Online by RELATE. Massachusetts Institute of Technology Date Jan, 2013 - May, 2013 Teaching Assistant (TA) Teaching laboratory of basic Mechanics Kansas State University, Physics Department. Manhattan, KS, USA

Date Aug, 2012 - Dec, 2012 Teaching Assistant (TA) Teaching laboratory of basic Mechanics Colorado State University, Physics Department. Fort Collins, CO, USA

Date May, 2012 - Aug, 2012
Teaching Assistant (TA)
Teaching laboratory of basic Mechanics
Colorado State University, Physics Department. Fort Collins, CO, USA

Date Aug, 2011 - Dec, 2011
Teaching Assistant (TA)
Teaching laboratory of basic Optics and Electricity
Colorado State University, Physics Department. Fort Collins, CO, USA

Date May, 2011 - Aug, 2011
Teaching Assistant (TA)
Teaching laboratory of basic Mechanics
Colorado State University, Physics Department. Fort Collins, CO, USA

Date Aug, 2007 - Dec, 2007
Teaching Assistant (TA)
Tutoring students on subjects of Thermodynamics and Optics
Pontificia Universidade Católica - Rio de Janeiro, Physics Department. RJ, Brazil

Date Aug, 2006 - Dec, 2006
Teaching Assistant (TA)
Teaching laboratory of elementary Thermodynamics
Pontificia Universidade Católica - Rio de Janeiro, Physics Department. RJ, Brazil

Date Sep, 2004 - Dec, 2004
Teaching Assistant (TA)
Teaching Laboratory of Physics I. Mechanics
Universidad Simón Bolívar, Physics Department. Caracas, Venezuela

Date Jan, 2004 - Mar, 2004
Teaching Assistant (TA)
Tutoring students on subjects of basic Mechanics
Universidad Simón Bolívar, Physics Department. Caracas, Venezuela

Date Apr, 2003 - Dec, 2003 Teaching Assistant (TA)

Organizing and setting up Physics demonstrations for all the classes in the department Universidad Simón Bolívar, Physics Department. Caracas, Venezuela

Other skills

Languages Mothertongue Spanish Other languages English and Portuguese Proficient in reading, writing, and speaking² Italian Basic in reading, writing, and speaking²

Technical and Computer skills

Statistic packages: SPSS, R Text mining and big data packages: SPSSTextAnalytic, Rapidminer. Programming language: Python (intermediate), C++(basic), Bash (intermediate).

Schools and Workshops

Date Jul. 6th - 17th, 2009School International Neutrino Summer School. Fermilab, Batavia, IL, USA.

Date Jul., 2007

School IV School of Gravitation and Cosmology. ICRA/CBPF. Rio de Janeiro, RJ, Brazil.

Date Mar., 2006

School LISHEP. International School on High Energy Physics. Rio de Janeiro, RJ, Brazil.

Other Training

Summer 2014

Coursera class(MOOC): Coaching teachers: Making changes that stick

Summer 2014

MOOC from Purdue University: Using Next Generation Science Standards for students' deeper understanding

Fall 2012

Education 8175: Why has
nt anything changed?. University of Colorado, Boulder, CO, USA. Instructors: Valerie Otero and David Meltzer

Summer 2012

Mechanics Online by RELATE. Massachusetts Institute of Technology. Group:REsearch in Learning, Assessing, and Tutoring Effectively. Instructor: Dr. David E. Pritchard

Spring 2012

Teaching and Learning Seminar. University of Colorado, Boulder, CO, USA. Group:PER@C. Instructor: Dr. Jenny Knight

²Common European Framework of Reference (CEF)