

José Rafael Arce Gamboa

Avenida 2, calles 18 y 20
Heredia, Costa Rica, Central America
ID: 115750062
Licence: B1
Civil Status: Single

Telephone: (506) 8813-3404
Email: jose.arcegamboa@ucr.ac.cr

Education

Bachelor's degree in Physics, *Universidad de Costa Rica*, February, 2016
GPA 9.33/10.0

Licentiate degree in Teaching, *Universidad Estatal a Distancia*, April, 2021
GPA 9.05/10.0

Master's degree in General Physics, *Universidad de Costa Rica*, October, 2019
GPA 9.60/10.0

Master's degree in Educational Technology, *Universidad Estatal a Distancia*, since September, 2021

Master's degree in Mathematical Methods and Applications, *Universidad de Costa Rica*, since March, 2023

Dissertations

Teoría de los materiales ferroeléctricos relaxores

Propuesta de estrategias didácticas mediante el simulador interactivo Physics Education Technology (PhET) para el fortalecimiento de los contenidos de la asignatura de Física Básica del estudiantado de décimo año del Colegio Científico Costarricense, Sede San Pedro de Montes de Oca, durante el II semestre 2020

Research and Professional Experience

Undergraduate Research Assistant, CICIMA (Research Center on Materials Science and Engineering), *Universidad de Costa Rica*, September 2015 – December 2018

- Model for Relaxor Ferroelectrics: Cubic Symmetry

Non-Member State (NMS) Summer Student Programme, ISOLDE (Isotope mass Separator On-Line facility), *European Organization for Nuclear Research*, June-August 2015

- On the simulation of limit thresholds for ISOLDE decay station neutron detector

Undergraduate Research Assistant, CICIMA (Research Center on Materials Science and Engineering), *Universidad de Costa Rica*, January – July 2015

- Characterization of manganese oxide processed compounds through cathodic co-pulverization with magnetrons in Argon and/or Nitrogen plasmas for future application in hydrogen energy storage

Undergraduate Research Assistant, CICANUM (Research Center on Atomic, Nuclear and Molecular Sciences), *Universidad de Costa Rica*, January 2014 – July 2015

- Employ UV-VIS and NIR spectroscopy to characterize chemical variations in orange peels for monitoring the crop quality

Teaching Assistant, *Universidad de Costa Rica*, March 2013 – November 2014

- Proctored and graded exams/homework for ~30 General Physics students

Teaching Experience

Acting Professor, *Universidad de Costa Rica*, August 2016 – July 2017 & August 2019 - Present

- Teaching General Physics I and General Physics II for Engineers in class sizes averaging 50 students, ten hours, including lesson planning.

Acting Professor, *Colegio Científico Costarricense sede San Pedro de Montes de Oca*, July 2016-Present

- Teaching Physics to tenth and eleventh grade class averaging 20 students. Eight lessons of 45 minutes each.

Acting Professor, *Colegio Marista, Alajuela*, February 2019-Present

- Teaching Science to seventh grade class averaging 45 students, nine lessons of 40 minutes each
- Teaching Physics to tenth and eleventh grade class averaging 35 students, fourteen lessons of 40 minutes each
- Chemistry lab assistant, eight lessons of 40 minutes each
- Physics lab assistant, eight lessons of 40 minutes each

Professional affiliations

Colegio de Licenciados y Profesionales en Letras, Filosofía, Ciencias y Artes (COLYPRO),
march 2020 – present

Colegio de Físicos, January 2021 - present

Other

- Assisted the First Costa Rican Summer School on Plasma Physics, held in January, 2014
- Assisted the “Simposio en Ciencia de Materiales Avanzados y Nanotecnología 2016 (SCiMAN 2016),” held in December, 2016
- Assisted the workshop “Introducción a la programación con Python para Científicos,” organized by the Centro Nacional en Alta Tecnología (CENAT), held in July, 2017
- Assisted the workshop “Computación de alto rendimiento,” organized by the Centro Nacional en Alta Tecnología (CENAT), held in July, 2017
- Assisted the “Simposio en Ciencia de Materiales Avanzados y Nanotecnología (SCiMAN 2017),” held in December, 2017
- Assisted the “XXI International Symposium on Mathematical Methods Applied to the Sciences (SIMMAC),” held in February, 2018
- Assisted the “Simposio en Ciencia de Materiales Avanzados y Nanotecnología (SCiMAN 2018),” held in December, 2018
- Assisted the Smithsonian K-12 Science Education Action Planning Institute, held in July, 2020
- Assisted the “VII Simposio Costarricense de Enseñanza de las Ciencias”, held in July, 2020
- Partner of Warden Indagatum since February 2021, a venture dedicated to reconstruction of vehicular accidents.
- Assisted the online activity for high school teachers “El Proceso de la Ciencia” organized by the International Centre for Theoretical Physics (ICTP), held in April 2021
- Assisted the online activity for high school teachers “Einstein Cotidiano: GPS y Relatividad” organized by the International Centre for Theoretical Physics (ICTP), held in April 2021
- Assisted the online activity for high school teachers “La Expansión del Universo” organized by the International Centre for Theoretical Physics (ICTP), held in April 2021
- Assisted the online activity for high school teachers “La firma de las estrellas” organized by the International Centre for Theoretical Physics (ICTP), held in May 2021
- Assisted the “Jornada virtual de Tecnología e Informática Educativa,” organized by the Escuela de Ciencias de la Educación, Universidad Estatal a Distancia, held in November, 2021
- Costa Rican Physics Olympiad (OLCOFI) tutor, Colegio Marista, since 2020
- Costa Rican Astronomy and Astronautics (OCAA) tutor, Colegio Marista,

since 2021

- Costa Rican Astronomy and Astronautics (OCAA) tutor, Colegio Científico Costarricense sede San Pedro de Montes de Oca, since 2021
- Assisted the lecture “Una nueva visión de la Catástrofe del Virilla, conmemorando su 96 aniversario,” held at the Costa Rican National Assembly, April 2022

Publications

- J. R. Arce-Gamboa “La justicia y la misericordia en Los Miserables,” Revista de Lenguas Modernas 1, 19 (2014).
- J. R. Arce-Gamboa, “On the simulation of limit thresholds for ISOLDE decay station neutron detector,” CERN Document Server (2015).
- J. R. Arce-Gamboa and G. G. Guzmán-Verri, “Random electric field instabilities of relaxor ferroelectrics,” npj Quantum Materials 2, 28 (2017).
- J. R. Arce-Gamboa and G. G. Guzmán-Verri, “Quantum ferroelectric instabilities in superconducting SrTiO₃,” Phys. Rev. Materials 2, 104804 (2018).
- J. R. Arce-Gamboa and F. Frutos-Alfaro, “Classical general relativity effects to second order in mass, spin, and quadrupole moment,” J. Phys. Commun 3, 085018 (2019).

Computer Skills

Software Proficiencies - Microsoft Office, Latex, Mathematica, Scilab, LabView

Programming languages - Java, C, Python

Teaching platforms – Moodle, Google Classroom, Cengage Webassign, Mediación Virtual (UCR)

Languages

Spanish and English – C1

TOEIC 965 point (2022)

Awards and Honors

Highest GPA in Basic Sciences at the *Universidad de Costa Rica* (9.4/10.0), 2012