Andrés Cuéllar Vega

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Education

Master of Science in Physics Dec, 2021
University of Texas Rio Grande Valley.
Thesis: 'Dynamical Casimir Effect in a Superconducting Circuit Periodic Lattice'

Bachelor of Science in Physics May, 2019
University of Texas Rio Grande Valley.

Research Experience

Graduate Research Assistant Jan, 2019. - Dec, 2021
Department of Physics & Astronomy, UTRGV.
Supervised by Andreas Hanke.

- Developed a theoretical and computational model to study the dynamical Casimir effect in a newly proposed superconducting circuit architecture.
- Characterized the non-classical microwave radiation output of a tunable lattice structure composed of superconducting quantum interference devices (SQUID) embedded in a coplanar waveguide. Publication in process.

Undergraduate Research Assistant 2012 -2016
UTRGV Center for Advanced Radio Astronomy.
Supervised by Fredrick Jenet and Joseph Romano.

- Performed frequent observations through using the Arecibo Radio Telescope, as well as the Green Bank Radio Telescope and the Long Wavelength Array. Reviewed thousands of radio signal profiles and identified their likelihood to be neutron stars. Responsible for the discovery of a radio pulsar (J0640-00) as part of AO 327MHz Drift Survey.
- Performed in-situ pulsar timing observations of double neutron star system at the Arecibo Radio Telescope in Puerto Rico. 2013.
- Acted as team leader, supervising undergraduate and graduate students in the center. 2015-2016
- Performed early testing of radio antennas phased array design. Supervised by Richard Price. Developed program to search for X-Ray Binaries in data from NASA's Swift telescope. Supervised by M. Benacquista.

Summer Research Intern May 2014 - Aug. 2014
Max Planck Institute for Gravitational Physics (Albert Einstein Institute).
Supervised by Holger Pletsch, and Colin J. Clark.

- Developed a data analysis pipeline to implement gamma ray pulsar blind search method developed by collaborators.
- Pipeline made use of the HTCondor parallel computing software with the Atlas Computing Cluster (∼40,000 CPUs) to perform automated daily processing of data from the Fermi Large Area Telescope, uploading suitable pulsar candidates to follow up website.

Teaching Experience

Part-time Lecturer (Adjunct Faculty) Jan. 2022 - Present
Department of Physics & Astronomy
Responsibilities include teaching face-to-face and online laboratory sections for introductory physics and astronomy courses.

Graduate Teaching Assistant Aug. 2019 - Dec. 2022
Department of Physics & Astronomy
Responsibilities included course planning and teaching of online laboratory sections, as well as grading and holding recitation sessions for various introductory physics and astronomy courses.

Computational Skills

Computational experience: Modeling of physical systems, data analysis, and data visualization.
Programming languages: Python (primary). Proficient in scientific libraries such as Numpy, Sympy, and Matplotlib.
Other programming experience: Matlab, Mathematica, Julia, Bash.
Operating systems: Linux, Mac OS, Microsoft.
Others: Jupyter, Git, HTML, LaTeX.

Journal Publications

Einstein@Home discovers a radio-quiet gamma-ray millisecond pulsar
C. J. Clark et al. Science Advances, 4, eaao7228 (2018)
The Einstein@Home Gamma-Ray Pulsar Survey II. Source Selection, Spectral Analysis and Multi-wavelength Follow-up
C.J. Clark et al. ApJ 854 99 (2018)
The Einstein@Home Gamma-ray Pulsar Survey. I. Search Methods, Sensitivity and Discovery of New Young Gamma-ray Pulsars.
CJ Clark, J Wu, HJ Pletsch, Lucas Guillemot, B Allen, C Aulbert, C Beer, O Bock, *A Cuéllar*, HB Eggenstein, H Fehrmann, M Kramer, B Machenschalk, L Nieder. The Astrophysical Journal 834 106 (2017)
The Braking Index of a Radio-quiet Gamma-ray Pulsar
CJ Clark, HJ Pletsch, J Wu, Lucas Guillemot, F Camilo, TJ Johnson, M Kerr, B Allen, C Aulbert, C Beer, O Bock, *A Cuéllar*, HB Eggenstein, H Fehrmann, M Kramer, B Machenschalk, L Nieder. The Astrophysical Journal Letters 832 L15 (2016)
PSR J1906+0722: An Elusive Gamma-ray Pulsar
C. J. Clark et al. The Astrophysical Journal Letters 809 L2 (2015)

Posters & Presentations

Dynamical Casimir Effect in a Superconducting Circuit Periodic Lattice
UTRGV College of Science Annual Research Conference (Nov. 2021)
Dynamical Casimir Effect in a Superconducting Circuit Periodic Lattice
Colloquium, UTRGV Department of Physics & Astronomy (Nov. 2020)
Quantum: The Next Step In Computing
Public Outreach Talk. Monday Night Science Cafe sponsored by the UTRGV Department of Physics & Astronomy (June 2015).
Looking for Periodicity in X-Ray Emission Data.
Poster Presentation. American Physical Society Meeting, Texas Chapter (Oct. 2013).

Looking for Periodicity in X-Ray Data.
Oral Presentation. 3rd. Texas Undergraduate Astronomy Research Symposium. Houston, TX. (Oct. 2013).

Awards & Honors

Presidential Graduate Research Assistantship 2019
Graduate research assistantship program covering tuition and stipend from the Graduate College at UTRGV.

Arecibo Remote Command Center Scholarship 2013-2015.
Undergraduate research assistantship program covering tuition and stipend from the Center for Advanced Radio Astronomy at UTRGV.

International Student Talent Scholarship April 2014, Oct.2014.
Awarded by the Office of Global Engagement at the University of Texas at Brownsville.

German Academic Exchange Service (DAAD) RISE May 2014.
Scholarship awarded by the DAAD Research Internships in Science and Engineering (RISE) scholarship program.

Communication & Outreach Experience

Guest in 'The Millennial Scientist Podcast'. Mexican Science communication podcast. Discussed work on Black holes that led to the 2020 Nobel Price in Physics. (2020)

Event planning committee. German Language and Culture Club at UTRGV (2018-2019).

Main organizer. Monday Night Science Cafe. Monthly general-public outreach event sponsored by the UTRGV department of Physics & Astronomy (2015-2016).

Secretary. Society of Physics Students University of Texas at Brownsville chapter. organized multiple outreach activities with the SPS including frequent "physics circus" events, as well as science talks for highschool and middle school students. (2012-2014).

Non-Professional Interests

Music Composition and Performance.
Language Learning and Exchange.
Bicycle touring. Literature. Philosophy.

References

Andreas Hanke

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Texas Tech University.
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