

# Thara Rubi Caba Pineda

Doctoral Researcher

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## SUMMARY

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Astrophysicist specializing in multi-messenger astrophysics, with research experience at IceCube, MAGIC, CTAO, SWIFT and others. Skilled in data analysis, machine learning, and tools for high-energy astrophysics, with strong outreach and leadership experience.

## EDUCATION

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### Doctor of Philosophy (PhD)

Nov 2025 - Present

- Karlsruhe Institute of Technology
- Working with the Pierre Auger Observatory. Supervised by Dr. Michael Unger.

### Erasmus Mundus Joint Master Program in Astrophysics & Space Science Sep 2023 - Sep 2025

- First semester at University of Rome Tor Vergata, Italy; second and third semester at University of Belgrade, Serbia; fourth semester at University of Rome Tor Vergata, Italy.
- Thesis “Constraining the High-energy Emission of NGC 1068” graduated with the highest marks (110/110).
- Supervised by Dr. Francesco Tombesi, Dr. Alessandra Lamastra, Dr. Dragana Ilic and Dr. Francesco Saturni.

### Bachelor's Degree in Physics

Sep 2017 - Apr 2023

- Autonomous University of Santo Domingo (UASD), Dominican Republic. Thesis conducted at the University of Padova, Italy.
- Thesis “Deriving very high energy gamma-ray flux upper limits on sky maps using the SkyPrism software”. Graduated with honors (cum laude).
- Supervised by Dr. Elisa Bernardini, Dr. Konstancja Satalecka, Dr. Nelphy de la Cruz and Dr. Kety Jimenez.

## RESEARCH EXPERIENCE

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### Gamma-ray observation simulations

*Master's thesis, University of Rome Tor Vergata / Observatory of Rome*

Feb 2025 – Sep 2025

- Evaluated the Cherenkov Telescope Array Observatory’s ability to detect gamma-ray emission from NGC 1068 under different spectral models using `Gammapy`.
- Assessed the potential to localize the origin of this emission within the galaxy.
- Supervised by Dr. Francesco Tombesi, Dr. Alessandra Lamastra, Dr. Dragana Ilic and Dr. Francesco Saturni.

### Neutrino-blazar Association Modeling

*Internship, Max Planck Institute for Physics*

Jul 2024 – Sep 2024

- Analyzed IceCube data using Bayesian-based software to calculate the association probability be-

tween TXS 0506+056 and IC170922A given different spectral models.

- Contributed to the publication “Impact of multi-messenger spectral modelling on blazar-neutrino associations”.
- Supervised by Dr. Francesca Capel.

### **Gamma-ray Follow-ups of IceCube Events**

*Bachelor's thesis, University of Padova*

Feb 2022 – Feb 2023

- Analyzed MAGIC telescope data following IceCube neutrino alerts.
- Created test statistic and flux upper-limit sky maps using **SkyPrism**.
- Supervised by Dr. Elisa Bernardini, Dr. Konstancja Satalecka, Dr. Nelphy de la Cruz and Dr. Kety Jimenez.

### **Galaxy Morphology and Environmental Dependence**

*Internship, University of Louisville*

Aug 2022 – Nov 2022

- Part of the CENCA Bridge in Astrophysics research program.
- Conducted a study on spiral galaxies, examining how environmental factors influence the number of spiral arms.
- Analyzed data from Zooniverse and the GAMA survey using Python for classification and statistical analysis.
- Supervised by Dr. Benne Holwerda.

## **TEACHING EXPERIENCE**

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### **Teaching Assistant**

2021 - 2023

Modern Physics, 7th Semester, UASD. Assisted in lectures, graded assignments and exams, and provided academic support to students.

### **Teaching Assistant**

2023

Basic Physics, 1st Semester, UASD. Assisted with student queries and evaluated coursework.

## **WORK EXPERIENCE**

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### **Student Coordinator**

*National Radio Astronomy Observatory*

Aug 2025 – Present

Coordinate logistics for the remote internship program by the CENCA Bridge in Astrophysics program, including participant selection, event scheduling, communication management, workshop planning, and support for travel and visa arrangements.

### **Research Administration**

*Autonomous University of Santo Domingo*

Sep 2019 – Present

Support administrative and research activities for the Institute of Physics. Assist in collaborative research projects, report writing, and the organization of academic events.

### **Astronomy for Mental Health Program Development**

*Office of Astronomy for Development*

Jun 2023 – Oct 2023

Contributed to the Astronomy for Mental Health flagship project. Developed student engagement strategies and organized workshops promoting mental health through astronomy.

## HONORS, AWARDS & GRANTS

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<b>Erasmus Mundus Joint Master Scholarship</b>	2023 - 2025
Awarded by Erasmus+ to support my master's degree in Astrophysics and Space Science.	
<b>Women and Girls in Astronomy Mini-Grant (€ 3,000)</b>	2023 - 2025
Granted by the North American Regional Office of Astronomy for Development (NA-ROAD) to organize the Month of Astronomy in the Dominican Republic.	
<b>Hanrieder Fellowship</b>	2024
Granted by the Max Planck Institute for Physics and the Hanrieder Foundation to support my internship at the Max Planck Institute for Physics.	
<b>Italian Ministry of Foreign Affairs and International Cooperation Scholarship</b>	2023 - 2024
Awarded by the Italian Ministry of Foreign Affairs to support my master's degree in Astrophysics and Space Science.	
<b>International Astronomy and Astrophysics Competition National Award</b>	2023
Awarded for achieving the highest nationwide score in the final round of the International Astronomy and Astrophysics Competition 2023 (Verify-ID: FN-2023-F3E6271733C).	
<b>Idelisa Bonnelly Scholarship for Women in STEM</b>	2021 - 2023
Awarded by the Ministry of Youth of the Dominican Republic to support the completion of my bachelor's in physics.	
<b>National Scholarship</b>	2018 - 2021
Granted by the Ministry of Higher Education, Science, and Technology of the Dominican Republic to support my bachelor's in physics.	

## SELECTED POSTERS & TALKS

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<b>Poster:</b> Comparison of SDSS and Gaia QSO data: Searching for anomalies in QSO spectra, <i>15th SCSLSA</i> , Serbia.	Jun 2025
<b>Workshop:</b> Use of Programming for Teaching Astronomy, <i>Astronomy Workshop for Teachers at the Dominican Republic</i> , Online.	Dec 2024
<b>Talk:</b> Month of Astronomy in the Dominican Republic, <i>6th Shaw-IAU Workshop on Astronomy for Education</i> , Online.	Nov 2024
<b>Panel:</b> Astronomy for a Better World, <i>American Astronomical Society Winter Meeting</i> , United States.	Jan 2024
<b>Poster:</b> The Multi-messenger Astrophysics Approach and the MAGIC Telescopes, <i>Giambiagi Winter School on Cosmology</i> , Argentina.	Jul 2023
<b>Poster:</b> Study of Spiral Galaxies and Their Environment, <i>PLANCKS</i> , Italy.	May 2023

## VOLUNTEER & OUTREACH WORK

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<b>Social Media Manager</b>	2023 - Present
Managed social media for the Dominican Physical Society, promoting events and scientific outreach.	

## jIAPS Editor-in-Chief

2024 - 2025

In charge of the 2025 issue of the journal for the International Association of Physics Students (IAPS), a non-profit organization run by physics students worldwide.

## Month of Astronomy in the Dominican Republic

2023 - 2025

Organized a month-long series of talks and activities introducing high school and university students to astronomy. Supported by NA-ROAD, Heising-Simons Foundation, and IAPS.

## CENCA Bridge in Astrophysics Mentor

2023 - 2024

Mentored two students during their first research experience: **Leiany De Oleo Rodríguez** (Investigating the Circumgalactic Medium) and **Daniela Azucena Cardona Cuc** (Binarity in young star clusters).

## Teaching Committee Student Representative of MASS

2023 - 2024

Represent students in the MASS Teaching Committee, contributing to decisions on academic program changes and course consistency.

## Secretary

2022 - 2023

Managed administrative duties, including communications and organization of events, for IAPS.

## Member of Affiliated Commission 5

2022 - 2023

Maintained relations between IAPS and the International Union of Pure and Applied Physics, with a focus on communications.

## PR Manager

2021 - 2022

Led the social media and public relations efforts for IAPS, promoting events and engaging with the global physics student community.

## President of the Association of Physics Students UASD

2020 - 2021

Strengthened the student association's connection to IAPS, increasing opportunities for students. Managed administrative duties and facilitated communication between students and faculty.

## PROFESSIONAL TRAINING

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1st MAGIC Open Data-Analysis School, **Astrophysics Centre for Multi-messenger studies in Europe** 2025

Code/Astro, **Northwestern University** 2025

Establishing Multimessenger Astronomy Inclusive Training Summer School, **Vanderbilt University** 2025

2nd VHEgam Meeting, **University of Bari** 2025

Hands-on Activity on Spectroscopic Data Reduction, **MASS Winter School 2024** 2024

Observational Astronomy and Data Processing, **MASS Summer School 2024** 2024

Giambiagi Winter School on Cosmology, **International Center for Theoretical Physics and University of Buenos Aires** 2023

Gravitational Wave Open Data Workshop, **LIGO Scientific Collaboration and VIRGO Collaboration** 2022

## CERTIFICATIONS

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Python Essentials 2, <b>Cisco Networking Academy</b>	2024
Introduction to Quantum Computing, <b>The Coding School</b>	2024
Designing Effective Science Communication, <b>University of Colorado Boulder</b>	2023
Introduction to Data Science, <b>Cisco Networking Academy</b>	2022
Python Essentials 1, <b>Cisco Networking Academy</b>	2022
C for Everyone: Structured Programming, <b>University of California</b>	2021

## SKILLS

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<b>Programming</b>	Python, C/C++, FORTRAN, ROOT, SQL, Git, Bash.
<b>Web</b>	HTML5, CSS.
<b>Academic Tools</b>	LaTeX, Microsoft Office.
<b>Languages</b>	Spanish (native), English (fluent).