Rosario Cecilio-Flores-Elie

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Research Interests

Ocean worlds, Enceladus, Europa, Titan, planet-moon interaction, exoplanet detection and characterization, exoplanet atmospheres, habitability dynamics, field research, cryosphere, and climate change

Education

The Graduate Center CUNY Aug. 2023 - Present
MS - Astrophysics *New York, NY*

Lehman College CUNY 2017 - 2022
BS - Physics *Bronx, NY*

Alfred University 2014 - 2015
MSEd - Literacy Education *Alfred, NY*

Lehman College CUNY 2008 - 2013
BA - Sociology, Minor: Childhood Bilingual Education, Dean's List *Bronx, NY*

Research Experience

Graduate Research Fellow - AMNH Dept. of Astrophysics; BDNYC Aug. 2022 – Present
Advisor: Dr. Jacqueline Faherty *New York, NY*

- Analyze NASA's TESS mission light curves from young co-moving stars to ascertain their rotational periods and detect stellar activities, including solar flares, fast rotators, and signs of binarity.
- Utilize Python for data visualization to map the mass ratio of gas giants and their moons, exploring dynamics and reciprocal influence between gas giants and associated moons, with a focus on active moons like Enceladus.
- Employ user-friendly tools such as "lightkurve" to master the methodologies for identifying transiting planets around remote stars.

REU -Water Quality in the Yucatan Penisula -Northern Illinois University June 2021 – August 2021
Advisor: Dr. Philip J. Carpenter *Dekalb, IL*

- Conducted geophysical surveys in the Riviera Maya, Mexico, using The SuperStingTM instrument to identify subsurface karst conduits near cenotes or sinkholes, deepening our understanding of karst hydrogeology in the region, particularly along the Holbox Fracture Zone.
- Utilized 2D-electrical and azimuthal resistivity methods near Cenote Verde Lucero and Agua Azul sites to detect air and water-filled conduits, fracture zones, and their orientations, revealing insights into water flow direction and karst dynamics. Notable findings include an air cavity of 3 meters depth beneath Agua Azul's soccer field and a saturated karst conduit just 5 meters below.
- Applied the spontaneous potential (SP) method to identify fractures with water seepage in the vadose zone, resulting in significant discoveries such as new conduits or openings at the Well-Field site.
- Analyzed water conductivity results from cenote water samples provided by the chemistry team, applying Archie's law to determine rock resistivity at 224 ohm-meters, corroborating findings from azimuthal resistivity surveys.

NASA L'SPACE Academy - Mission Concept Academy (MCA) Aug. 2020 – Dec. 2020
Team 11 - Northern Lights: Scientific Research and Outreach - (Student Project) *Online*

- Collaborated with a team of eleven students to develop a Preliminary Design Review (PDR) for a proposed second payload lander mission studying Enceladus' South Pole-Tiger Stripe region. Aimed to analyze organic and inorganic particles in the Baghdad sulcus and understand the moon's geological context and subsurface ocean dynamics.
- Carried out research encompassing landing site selection, scientific instrument evaluation, and lunar atmospheric conditions.
- Co-led the educational outreach initiative involving allocating funds for a STEM program benefiting forty-five low-income public schools across New York City's five boroughs.

- Gained valuable mission development skills through regular training sessions with NASA experts, acquiring expertise in mission planning, risk assessment, and project management.

NASA L'SPACE Academy - Proposal Writing and Evaluation Experience (NPWEE) May. 2020 – Aug. 2020
Team 7 - UV Voyagers: Investigating Water Quality Metrics - (Student Project) *Online*

- Collaborated with a team of seven students to develop water quality metrics for a pump-driven re-circulation lines prototype, incorporating ultraviolet (UV) disinfection to prevent microbial bio-film growth in water systems for the International Space Station (ISS) and future crewed spacecraft.
- Conducted thorough research on water quality metrics and UV disinfection techniques to ensure the proposed solution met technical feasibility and cost-effectiveness and aligned with NASA's mission objectives within a budget.
- Acquired valuable proposal writing and evaluation skills, including developing solid technical writing abilities and effective teamwork with subject matter experts to deliver a high-quality proposal.

Teaching Experience

Second Grade - Dual Language Teacher Aug. 2013 – Sept. 2022
PS/IS 218 Rafael Hernandez Dual Language Magnet School *Bronx, NY*

- Implemented dual language methodologies and pedagogy to deliver instruction to 25-50 second-grade students, ensuring high levels of achievement through a side-by-side model in English and Spanish.
- Organized annual field trips to museums in New York City, such as the American Museum of Natural History, facilitating student engagement and learning, mainly through visits to notable exhibits like the Planetarium.

Second Grade Team - Curriculum Lead Aug. 2014 – Sept. 2022
PS/IS 218 Rafael Hernandez Dual Language Magnet School *Bronx, NY*

- Spearheaded the design and implementation of culturally responsive literacy units for second grade, amplifying students' urban upbringing within New York City and seamlessly weaving in Social Studies and Science elements.
- Developed targeted educational materials, including customized graphic organizers and literacy-focused bookmarks, designed to cater to diverse learners, including students with disabilities and English language learners, and employed scaffolding strategies to optimize their learning journey.

Student Teacher Mentor Sept. 2015 – Dec. 2021
PS/IS 218 Rafael Hernandez Dual Language Magnet School *Bronx, NY*

- Provided mentorship to 1-2 student-teachers annually, sharing my expertise and pedagogical knowledge to support their professional growth and development.
- Engaged in monthly teacher leader/mentor meetings, gaining insights from the US PREP Program and Lehman College CUNY to enhance support strategies for student-teachers.

Science Communication

Aprendizaje Automatico para Fisica y Astronomia - Course April 2023 – Present
Astromaquinarios-Spanish Translator *New York, NY*

- Collaborate within a team of four to translate Dr. Viviana Acquaviva's "Machine Learning for Physics and Astronomy" online course from English to Spanish, ensuring the precise translation of PowerPoint lessons, Jupyter notebook exercises, and quizzes involving machine learning terminology. This enables Spanish-speaking students to engage with the course materials comprehensively.
- Record concise and informative 10-15 minute lessons in Spanish, offering explanations of methods and guidance through Jupyter notebook exercises to enhance the learning experience.

Skills

Programming Python, Machine Learning, Java Mission-planning and Analysis for Remote Sensing (JMARS)

Editing Software Overleaf LaTeX editor

Instrumentation Supersting Geophysical Instrument

Languages Bilingual and bi-literate in English and Spanish

Certifications NYS Childhood Education (grade 1-6); Bilingual Extension (grade Pre-k-12)

Other American Red Cross First Aid/CPR/AED

Workshops and Training

AstroTech - Astronomical Instrumentation Summer School July 2023
UC Berkeley *Berkeley, CA*

- Engaged in a hands-on five-day workshop focused on crafting astronomical instruments. Learned optomechanics, optics, and instrumentation techniques under expert guidance.
- Collaborated within interdisciplinary teams, actively participating in an optics laboratory setting while honing expertise in optomechanical aspects of instrument development, contributing to the successful construction and testing of an astronomical spectrograph.

NExSci - Sagan Exoplanet Summer Workshop July 2023
California Institute of Technology *Pasadena, CA*

- Engaged in an immersive learning experience focused on the latest advancements in exoplanet atmosphere observations, theoretical modeling, and interpretation, led by prominent experts in the field.
- Participated in interactive sessions analyzing data from the James Webb Telescope and exoplanet atmospheres, advancing comprehension of formation, composition, and dynamic processes.

Scholarly Activities

"Ocean Worlds: To Enceladus and Beyond" June 2023
Poster - CUNY Science Communication Symposium *New York, NY*

"Karst Conduit Identification Using Geophysical Surveys in Northern Yucatán, México" October 2022
Poster - NDISTEM SACNAS Conference *San Juan, PR*

"Karst Conduit Identification Using Geophysical Surveys in Northern Yucatán, México" December 2021
Oral Presenter - AGU Conference *New Orleans, LA*

Fellowhips and Awards

Public Facing Translation CUNY SciCom - Best Poster June 2023
CUNY Science Communication Symposium

AGU Student Travel Grant December 2021

Outreach

Public Facing Translation - Poster Presenter June 2023
CUNY Science Communication Symposium *New York, NY*

"Decoding the Night Sky - Exploring Maya Astronomy" April 2023
Science StoryTellers - Variety Boys and Girls Club of Queens *Queens, NY*

Professional Society Memberships

American Astronomical Society (AAS)
American Geophysical Union (AGU)
Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS)
GeoLatinas