Javier A. García Sepúlveda

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Education

University of Puerto Rico at Mayagüez (UPRM) — Mayagüez, Puerto Rico
Master of Science – Physics **GPA: 3.18** — *Aug 2021 – Present*
Thesis title: The Past and Present Habitat Suitability of Venus (thesis in process)
Advisor: Abel Méndez, M.S.
Bachelor of Science - Theoretical Physics — *Jan 2017 – Dec 2020*
Bachelor of Science - Environmental and Agricultural Systems — *Aug 2011 – Jun 2016*

Publications

- O'Leary, V. M., Ruperto, W. A., Vélez-Soto, X., Matías-Pérez, A., Alcantara, I., Rivera-Méndez, F., Rodríguez Otero, R., Matos, N., Rodríguez, M., Vega, N., Calcagno, B. O., Santiago, Y., Rivera, R., Morales, V., Cintrón, B., Quiles, A., Gutiérrez, J., Villegas, H., Pérez, A., Santiago, I., Rodríguez, A., Soto, N., **García, J.**, Mestres, S., Cruz, A., Díaz, C., Quiñones, D., Berríos, D., Soto, K., Morales, A., Justiano, C., Torres, J., Pérez, J., Aponte, D., and Mercado, E., "Permanent Research Outpost for Mars and Interplanetary Space Exploration (PROMISE)," 2023. https://doi.org/10.2514/6.2023-4777

Research Experience

Department of Physics, UPRM — Mayagüez, PR
Research Assistant — *Jan 2019 - Dec 2019*
Advisor: Henri A. Radovan, Ph.D.

- As part of a regular course (FISI 4999), generated auditory and 3D-printable visual representations of radio pulsar data used in outreach events for educational purposes.
- Created a 3D-printable version of a 3D dynamic spectrum data (time, frequency, flux density) of a pulsar to be used in expositions for educational purposes.
- With the data given in three separate txt files, I wrote a Python script for the scripting tool in the Blender 3D rendering software to read the data from the txt files and generate a 3D mesh from that data. Later, I exported it as a stl format file for 3D printing.
- Was given a time series data of various pulsars (time, flux density) in a csv format file. Used the ascii2binary program in Linux to convert the data into its binary equivalent so it could be read by the SoX sound processing program and generate an audio file.

Bayer CropScience — Guánica, PR
Intern — *Jan 2016 - May 2016*
Advisor: Javier González, M.S.

- Assessed the effects of pesticides and herbicides on various strains of experimental soybean and cotton crops to determine their resistance.
- Gathered data on the types and number of insects on crops to assess their resistance to pests.
- Monitored crops for signs of nutrient deficiency, sickness and their overall health.

Teaching Experience

Department of Physics, UPRM Mayagüez, PR
Teaching Assistant and Tutor *Aug 2021 – Present*
Supervisor: Erick A. Roura, Ph.D.

- Taught the General Physics Lab I (FISI 3173) two semesters and General Physics Lab II (FISI 3174) two semesters for a total of 214 students. Each of these courses consisted of 10 – 12 experiments.
- Eased the learning process and quickened experimentation by emphasizing hands-on demonstrations rather than giving lectures, after requesting and receiving feedback from my students on my teaching methods.

Tutor *Aug 2021 – Present*

- Tutored students at the Tutoring Center of the university's Physics Department during 4 semesters. I tutored once a week for a total of 34 hours. Tutored approximately 15 students in total.
- Assisted students with assignments and practice problems regarding the General Physics Courses (FISI3171 and FISI3172).

Educational Challenge Experience

2023 NASA Revolutionary Aerospace Systems Concepts – Academic Linkage (RASC-AL) Mayagüez, PR
Team member *Aug 2022 – Jun 2023*

Student competition to design concepts for aerospace systems. I am a member of the University of Puerto Rico at Mayaguez team, which took on the challenge of "Homesteading Mars". This consisted of designing a crewed mission to Mars that would last a minimum of 7 years in the surface. As part of the Planetary Science Division, the main goal was to determine the research that will be done during the mission. Each member of the division reviewed a theme in planetary science to have a complete perspective of the science that could be done on Mars. Some of my responsibilities:

- Determined the science objectives regarding atmospheric sciences, investigate regions of interest for a possible landing site and select the necessary instruments for science stations and a surface laboratory.
- Calculated solar insolation levels on exploration zone to design solar panels.
- Worked with the Surface Operations division to properly place instruments in science stations.
- Key achievement: Our team was awarded second place.

NASA's Lucy Student Pipeline Accelerator and Competency Enabler (L'SPACE) Mission Concept Academy Remote
Alumnus *Sep - Nov 2019*

Online academy that consisted of bi-weekly lectures and a project to design a mission concept to an asteroid. My team developed a robotic mission to study the composition and physical properties of 433 Eros in situ using a rover of our own design. I posed as a member of the science division. Tasks were divided between team members and were to be completed by a deadline when the work was discussed in a science division meeting. This experience taught me about asteroid science, aerospace systems, project development and working in a multidisciplinary team. Some of my responsibilities:

- Reviewed the target asteroid's properties and discussed with my colleagues to determine science mission objectives.
- Used Java Mission-planning and Analysis for Remote Sensing (JMARS) geospatial information system to find a proper landing site based on proximity to regions of scientific interest. This was chosen to be close to the Psyche crater to allow the rover to study at different stages of morphology of the surface.
- Researched specifications of legacy instruments, performed trade studies to select the appropriate instrumentation for the mission, Devised a validation and verification plan for each instrument.

New Arecibo Message Global Challenge Remote
Team Member of the Borikén Voyagers *Feb 2019 - Nov 2020*
Advisor: Henri A. Radovan, Ph.D.

Competition to create a message designed to contact a hypothetical alien civilization in commemoration of the original Arecibo Message sent to space in 1974. The initial stages of the challenge consisted of puzzles that teams had to solve to advance in the competition until the last stage, which was to create the message itself. A final report on our message was required, explaining the meaning, requirements, risks of sending the message, etc.

- Researched potential risks of sending the message to outer space and mitigation/plan of action.
- Key achievement: Our team was awarded first place.

Skills

Coding	Python - intermediate, C - intermediate, C++ - intermediate, Linux - beginner, LaTeX – beginner.
Software/platforms	JMARS, AutoCAD, Trello, Slack, Mendeley, Zotero, Google Colab, Google Drive.
Hard Skills	Research, Experimentation, Data Interpretation, Mathematical Modeling, Technical Writing, APA Format Writing.
Soft Skills	Critical Thinking, Problem-Solving, Teamwork, Independent Work, Passion for Learning, Initiative-taking, Communication.

Leadership Experience

Student Association for Science Communication and Journalism of the UPRM Mayagüez, PR
Treasurer and Writer *Mar 2020 - May 2021*

Co-founded the association, with the mission to inform and educate the public about issues of scientific nature. As treasurer, I ensured the financial security of the association by collecting membership payments, producing financial records, managing funds, and devising fundraising strategies. I also produced and edited short content to be published in social media posts to inform and educate the public about important and interesting topics like COVID-19, climate change, and space sciences.

Students for the Exploration and Development of Space, Mayagüez Chapter Mayagüez, PR
Secretary *Jun 2019 - Jun 2020*

Student association focused on outreach, aerospace projects and professional development opportunities for its members. I collaborated in managing and growing this association of 150+ members by collecting and safekeeping information in formularies, board meeting minutes, attendance records, and other documents. I also ensured members' participation in the association by promoting activities and professional development opportunities via email. During activities, I engaged as a staff member in social and fundraising events. Facilitated the tasks of other board members.

Other Experiences

2022 North American Nanohertz Observatory for Gravitational Waves (NANOGrav) Workshop Arecibo, PR
Workshop Participant, on-site *Aug 8 – 11, 2022*

- Completed tutorials on pulsar searching, timing, and scintillation. Processed data to obtain a prepfold plot of a pulsar and gave an oral presentation of the results.

2022 Sagan Summer Workshop Pasadena, CA
Workshop Participant, on-site *Jul 25 – 29, 2022*

- Learned about Astrometry, the importance of Gaia data for astrophysics, methods for the detection and characterization of exoplanets, and the future of Astrometry. Participated in hands-on tutorials to access and use Gaia data, visualize data, and perform orbital fits using Orvara open-source code.

2022 Single Dish Summer School Arecibo, PR
Alumnus, on-site *May 16-20, 2022*

- Produced a continuous wave spectra graph and a Doppler image of asteroid 3122 Florence by processing legacy data from the Arecibo Observatory planetary radar.

"Repaso Noticioso" Podcast Remote
Writer and Announcer *Jan 2021 – Mar 2021*

- Produced local news reports regarding the essential needs of the Puerto Rican public for a short section of the podcast. Scanned for and analyzed recent events to find news that are relevant to the podcast's objectives. Conducted interviews, reviewed press releases, and watched press conferences to gather sufficient information to draft my reports.

"El Colectivo Colegial" Newspaper Remote
Journalist and Editor *Apr 2020 - Jan 2021*

- Wrote 9 pieces about science, politics, and social issues that were published in the online newspaper "El Colectivo Colegial". To do so, I obtained information by reading and analyzing primary scientific literature and interviewing sources. Additionally, I edited news, stories, and creative content for other journalists and writers of the newspaper.

Asteroid Science, Technology, and Exploration Research Organized by Inclusive Education Systems Laboratory - Undergraduate Research and Education Program Remote
Alumnus *Sep – Dec 2020*

- Completed this educational program that allowed undergraduate students to learn about space systems engineering, planetary science, propulsion, and In-Situ Resource Utilization.

Puerto Rican Space Exploration Festival 2019 Mayagüez, PR
Co-coordinator and Staff Member *Sep 28, 2019*

- The first festival of its kind, which celebrated the contributions of Puerto Ricans to space exploration. Contributed to the coordination of this outreach event, which hosted 1,000+ people, by acquiring the necessary documentations and permits, and sponsorship from companies and organizations. During the festival, I assisted in the organization and management of various information tables.

Presentations

41st Puerto Rico Interdisciplinary Scientific Meeting and the 56th Junior Technical Meeting – Poster Session
Bayamón, PR *Apr 29, 2023*

- Presented a poster on my thesis project *The past and Present Habitat suitability of Venus.*

Awards

2023 NASA Revolutionary Aerospace Systems Concepts – Academic Linkage (RASC-AL)
Cocoa Beach, FL *Jun 14, 2023*

- Second Place Overall winners for the development of *Permanent Research Outpost for Mars and Interplanetary Space Exploration (PROMISE)*.

New Arecibo Message Global Challenge
Remote *Nov 17, 2020*

- First Place winners for the development of the New Arecibo Message.

Languages

Spanish (Fluent)
English (Fluent)