

# Manuel Pichardo Marcano

manuelpm.me

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Pronouns: he/him/his

## Research Interests

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Compact Objects; Compact Objects in Globular Clusters; White Dwarf Binaries; Cataclysmic Variables; AM CVns; Variable Stars, Binary systems, Data analysis, Big data.

## Postdoctoral Research Experience

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- ▶ *Fisk/Vanderbilt University, Nashville, TN*  
EMIT (Establishing Multimessenger Astronomy Inclusive Training) Postdoctoral Fellow  
September 2023 - Present
- ▶ *American Museum of Natural History, New York, NY*  
Kalbfleisch Postdoctoral Research Fellow / Research Associate  
September 2022 - Present

## Education

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- ▶ *PhD., Physics*  
Texas Tech University, 2018-2022  
Project: Variability of Accreting White Dwarf Binaries and Other Compact Objects  
Advisors: Professor Thomas J. Maccarone and Professor Liliana E. Rivera Sandoval
- ▶ *Master of Science in Physics*  
Texas Tech University, 2016-2018
- ▶ *Joint European Master Degree in Space Science & Technology*  
Project: MUSE observations of the compact objects NGC 6397  
M.S., Space and Science Technology, Luleå tekniska universitet (2014 - 2016)  
M.S., Astrophysics, Université Paul Sabatier Toulouse III, Mention Assez Bien (2014 - 2016)  
Advisors: Dr. Natalie Webb and Dr. Sebastien Guillot
- ▶ *Bachelor of Science, Physics*  
Utah State University, Cum Laude (2014)

## Publications

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### Papers

#### Refereed

- ▶ Pattie, E. C., Maccarone, T. J., Tetarenko, A. J., Miller-Jones, J. C. A., **Pichardo Marcano, M.**, & Rivera Sandoval, L. E. (2024). Variable Radio Emission of Neutron Star X-ray Binary Ser X-1 during Its Persistent Soft State, *The Astrophysical Journal*, 970, 136.
- ▶ **Pichardo Marcano, M.**, Rivera Sandoval, L. E., Maccarone, T. J., Rohrmann, R. D., Heinke, C. O., Belloni, D., Althaus, L. G., & Bahramian, A. (2023). A candidate magnetic helium-core white dwarf in the globular cluster NGC 6397, *Monthly Notices of the Royal Astronomical Society*, 521, 5026.

- **Pichardo Marciano, M.**, Rivera Sandoval, L. E., Maccarone, T. J., & Scaringi, S. (2021). TACOS: TESS AM CVn Outbursts Survey, *Monthly Notices of the Royal Astronomical Society*, 508, 3275.
- **Pichardo Marciano, M.**, Rivera Sandoval, L. E., Maccarone, T. J., Zhao, Y., & Heinke, C. O. (2021). A 2-d orbital period for a redback millisecond pulsar candidate in the globular cluster NGC 6397, *Monthly Notices of the Royal Astronomical Society*, 503, L51.
- Schwöpe, A., Buckley, D. A. H., Kawka, A., König, O., Lutovinov, A., Maitra, C., Mereminskiy, I., Miller-Jones, J., **Pichardo Marciano, M.**, Rau, A., Semena, A., Townsend, L. J., & Wilms, J. (2021). Identification of SRGt 062340.2-265715 as a bright, strongly variable, novalike cataclysmic variable, *arXiv e-prints*, arXiv:2106.14538.
- Rivera Sandoval, L. E., Maccarone, T. J., & **Pichardo Marciano, M.** (2020). A Year-long Superoutburst from an Ultra-compact White Dwarf Binary Reveals the Importance of Donor Star Irradiation, *The Astrophysical Journal*, 900, L37.
- Zhao, Y., Heinke, C. O., Tudor, V., Bahramian, A., Miller-Jones, J. C. A., Sivakoff, G. R., Strader, J., Chomiuk, L., Shishkovsky, L., Maccarone, T. J., **Pichardo Marciano, M.**, & Gelfand, J. D. (2020). The MAVERIC survey: a hidden pulsar and a black hole candidate in ATCA radio imaging of the globular cluster NGC 6397, *Monthly Notices of the Royal Astronomical Society*, 493, 6033.
- S.W. McIntosh, W.J. Cramer, **M. Pichardo Marciano**, R.J. Leamon. *The detection of Rossby-like waves on the Sun*. *Nature Astron.* 1, 0086 (2017). doi:10.1038/s41550-017-0086

### Non-refereed

- Maccarone, T. J., Beardmore, A., Mukai, K., Page, K., **Pichardo Marciano, M.**, & Rivera Sandoval, L. (2021). X-ray Pulsations from Nova Her 2021, *The Astronomer's Telegram*, 14776, 1.
- **Pichardo Marciano, M.** (2020). A period of 3.9 hours in the TESS light curve of SRGt 062340.2-265715, *The Astronomer's Telegram*, 14222, 1.
- Jeffrey S. Hazboun, **Manuel Pichardo Marciano** and Shane L. Larson. *Limiting alternative theories of gravity using gravitational wave observations*  
preprint <http://arxiv.org/abs/1311.3153>

### Talks and Posters

- *From ADS to SciX: Extending ADS to all NASA Science*  
Talk. Vanderbilt Astronomy Seminar Series. August 2024.
- *Variability of Accreting White Dwarf Binaries*  
Talk. V International Congress of Dominican Society of Physics. 2024.
- *MARES Survey: Magnetic Remnants in Symbiotics*  
Poster. XVII Latin American Regional IAU Meeting. 2023.
- *SCOVaS: Survey for Compact Objects and Variables Stars*  
Talk. Two in a Million - The interplay of binaries and star clusters. 2023
- *SCOVaS: Survey for Compact Objects and Variables Stars*  
Talk. The Transient and Variable Universe. 2023
- *Variability of accreting white dwarf binaries and other compact objects* (Invited)  
Lunch Talk. Carnegie Observatories. 2023
- *A candidate magnetic helium core white dwarf binary in the globular cluster NGC 6397*  
Talk. 241th AAS Meeting. 2023.
- *A search for variable stars and compact binaries in globular clusters with HST* (Invited)  
Talk. Trinity University Physics Department Seminar. 2022

- ▶ *TACOS: TESS AM CVn Outbursts Survey*  
Talk. AM CVn 4.5 Meeting. September 2022.
- ▶ *Variability of Accreting White Dwarf Binaries and Other Compact Objects*  
Dissertation Talk. 240th AAS Meeting. 2022.
- ▶ *A search for variable stars and compact binaries in globular clusters with HST* (Invited)  
Talk. UTRGV Physics Department Colloquium. 2022
- ▶ *Results from the TESS AM CVn Outbursts Survey (TACOS)*  
Talk. TESS Science Team Meeting #26. 2021.
- ▶ *Astronomía en Ultravioleta*. (Invited)  
Talk. Alpha-Cen Summer School. 2021.
- ▶ *A Search for Variable Stars and Compact Binaries in Globular Clusters with HST*  
Talk. Alpha-Cen Annual Meeting and General Assembly. 2020
- ▶ *SSCOVaS: Survey for Studying Compact Objects and Variables Stars*  
Poster. 36th Annual New Mexico Symposium. 2020
- ▶ *"Compact Binaries in the globular cluster NGC 6397"*  
Talk. Texas APS Section. Lubbock, TX. 2019
- ▶ *"MUSE integral field unit observations of the compact objects in the globular cluster NGC 6397"*  
Poster. Stellar Remnants at the Junction. Junction, TX. 2016
- ▶ *"Measuring Water Level Fluctuations of Two Connected Wetlands in the Dominican Republic Using InSAR"*  
Poster. SHPE National Conference. Dallas, TX. 2012
- ▶ *"Measuring Water Level Fluctuations of Two Connected Wetlands in the Dominican Republic Using InSAR"*  
Talk. USU Physics Department Colloquium. 2012

## Proposals

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- ▶ Transiting Exoplanet Survey Satellite (TESS) G06158: *"TESS Survey For Magnetic White Dwarfs In Symbiotic Binaries"* Small Program. (Principal Investigator)
- ▶ Transiting Exoplanet Survey Satellite (TESS): *"COPAS: Compact Objects And The Physics Of Accretion Survey"* Large Program. (Co-Investigator)
- ▶ The Gemini Observatory: Cycle 2023B (16 hrs). (Co-Investigator)
- ▶ Hubble Space Telescope (HST): Archival research grant proposal. *A search for variable stars and compact binaries in globular clusters with HST* (Co-Investigator)
- ▶ Transiting Exoplanet Survey Satellite (TESS): *"Studying the outbursts of AM CVns with TESS"* (Co-Investigator)
- ▶ Multi Unit Spectroscopic Explorer (MUSE): *The Hydrogen Alpha Disk Emission from the Compact Binaries of the Globular Cluster NGC 6397* (Co-Investigator 1.5 h)

## Teaching and Mentoring Experience

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### Teaching

- ▶ Graduate Part-Time Instructor PHYS 1403/1404: Instructor of record for Algebra-based, Inquiry-based, Laboratory-based Introductory Physics. TTU, 2017.
- ▶ Teaching Assistant PHYS 1401/2401: Principles of Physics I/II. Lead the laboratories and discussions for the calculus based introductory physics. TTU, 2016-2017.
- ▶ Undergraduate Teaching Fellow PHYS 2215: Physics for Scientists and Engineers Lab I - Utah State, Fall 2013.

## Mentoring

- ▶ Research advisor for the *Women and girls in astronomy program*. Finding variable White Dwarfs in Old Open Clusters. Fall 2024.
- ▶ Research advisor for *The Central American-Caribbean bridge in astrophysics (CENCA)*. CENCA is a remote research experience for undergraduates. Fall 2024.
- ▶ *Fisk University*: Mentor 3 groups of computer science students on an Astronomy Data Science project. Spring 2024.
- ▶ Mentor for *The Science Research Mentoring Program (SRMP)* at the American Museum of Natural History. Mentored 3 high school students to conduct research in machine learning in astronomy. Sept 2022 - June 2023
- ▶ Mentor for *Alpha-Cen: Astrophysics in Central America and the Caribbean*. Spring 2023.
- ▶ Mentor for *The Central American-Caribbean bridge in astrophysics (CENCA)*. CENCA is a remote research experience for undergraduates. Spring 2021, Fall 2022/23

## Recognition & Leadership Experiences

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- ▶ SciX Lead Ambassadors. 2024-2026
- ▶ Outstanding Ph.D. Student: *TTU Physics & Astronomy Department*. 2022
- ▶ FAMOUS (Funds for Astronomical Meetings: Outreach to Underrepresented Scientists) travel grant for the 239th meeting of the AAS.
- ▶ Co-organizer First ComSciCon en Español. The communicating science workshop for graduate students.
- ▶ Bucy Scholarship in Applied Physics: *TTU Physics & Astronomy Department*. 2020-2021
- ▶ Erasmus Mundus Scholarship: 2-year scholarship awarded by the European Commission
- ▶ Presidential Scholarship: Full 4-year scholarship awarded by the Dominican Government
- ▶ Member: *Sigma Pi Sigma*, The Physics Honor Society
- ▶ Lawrence R. and Abeline Megill Scholarship: *USU Physics Department*

## Technical Skills

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| <ul style="list-style-type: none"> <li>▶ <i>Programming Languages</i>: Proficient in Python (Jupyter/iPython notebooks) and shell scripting (bash). Basic knowledge of R, RStudio and Tidyverse packages.</li> <li>▶ <i>Markup Languages</i>: <math>\LaTeX</math>, Markdown</li> <li>▶ <i>Operating Systems</i>: GNU/Linux, OS X, Windows</li> </ul> | <ul style="list-style-type: none"> <li>▶ <i>Software</i>: IRAF/PyRAF, DOLPHOT, SAOImageDS9/JS9</li> <li>▶ <i>Version Control Systems</i>: Git</li> <li>▶ <i>Virtualization and Cloud Services</i>: Docker (basic)</li> </ul> |
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## Languages

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| <ul style="list-style-type: none"> <li>▶ <i>Spanish</i>: Native Language</li> <li>▶ <i>English</i>: Fluent</li> </ul> | <ul style="list-style-type: none"> <li>▶ <i>French</i>: Intermediate knowledge (B1)</li> </ul> |
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## Professional Development

### Workshops

- ▶ **Summer School in Open Science + Research Software Engineering:** One-week summer school with Lectures on open science and software development best practices. July 2024.
- ▶ **National Data Science Alliance-Research Affinity Cohorts:** Two-week summer research project. I worked with Professor Deborah Sunter on a project evaluating equitable energy access in the United States. Clark Atlanta University. June, 2024
- ▶ **Spring 2024 National Data Science Alliance Workshop:** Exploratory Data Analysis (EDA) & Data Visualization. March, 2024
- ▶ **Spring 2024 National Data Science Alliance Workshop:** Navigating the Data Science Landscape: The What, Why, and How? January, 2024
- ▶ **EMIT Summer School in Multimessenger Astronomy:** Lectures and tutorials in gravitational waves, statistics, multimessenger astronomy, STEM education and diversity and inclusion topics. Summer, 2023
- ▶ **Penn State Summer School in Statistics for Astronomers:** Lectures and tutorials in statistics, astronomy, computer science, and informatics. Summer, 2021
- ▶ **SciPy 2021:** Scientific Computing with Python conference. Summer, 2021
- ▶ **Wiki Scientist Course:** Elevating the Visibility of Quantum Scientists on Wikipedia by the American Physical Society and Wiki Education. Spring, 2021. Blog post: Improving the quality of Spanish language articles on Wikipedia
- ▶ **ComSciCon:** The communicating science workshop for graduate students. June, 2020.
- ▶ **Reclaiming STEM:** Diverse & inclusive SciComm workshop. Fall, 2020.
- ▶ **JWST proposal preparation workshop:** Instrument description, planning tools and hands-on sessions. Spring, 2020.
- ▶ **NRAO Community Days at TTU:** Two-day event, including hands-on sessions and observation preparation and data reduction. Spring, 2019.

## Public Outreach

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- ▶ *Past Author at Astrobites:* One of the original authors. Astrobites is the Spanish language version of Astrobites. URL: <https://astrobites.org/author/manuelmarcano22/>

### Talks

- ▶ *A Needle in a Haystack: Finding Exotic Binaries in Star Clusters.* Talk. "Astronomy on Tap". Nashville. March 2024.
- ▶ *Binarias de Enanas Blancas.* Talk. "Colegio Nuestra Señora De La Concepción". Colombia. March 2024.
- ▶ *Stellar Astrophysics.* Talk. "Mes de la Astronomía en la República Dominicana". Universidad Autónoma de Santo Domingo. Summer 2023.
- ▶ *Binarias de Enanas Blancas: Sirenas de Ondas Gravitacionales y Laboratorios Estelares.* Talk. American Association of Variable Star Observers. 2022.
- ▶ *Caminando en la Luna.* Talk. Planetario de San José UCR. 2021.

## AMNH

- ▶ *Part of the team translating to Spanish the "Machine Learning for Physics and Astronomy" course .*  
[https://openlearning.flatironinstitute.org/courses/course-v1:cca+ML\\_01+A/about](https://openlearning.flatironinstitute.org/courses/course-v1:cca+ML_01+A/about)

## Texas Tech

- ▶ *A needle in a Haystack: Finding Exotic Binaries in Star Clusters.*  
 Astronight. YWCA Lubbock. 2022.  
<https://slides.com/mmamarca22/ywca2022>
- ▶ *Unveiling Hubble 30th Anniversary Banner.*  
 Astronight. YWCA Lubbock. 2022.  
<https://hubblesite.org/hubble-30th-anniversary/events>
- ▶ *"Hubble's 30th Anniversary/30 aniversario del telescopio Hubble"*  
 Won a competition to host one of the anniversary banners.  
 Bilingual talk (Spanish/English) for Astronight event at TTU, Lubbock, TX. 2020
- ▶ *"A tour of the Milky Way/Un Tour por la Vía Lactea"*  
 Bilingual talk for Astronight event at TTU, Lubbock, TX. 2019
- ▶ *"Dimensionality Reduction applied to Large Spectroscopic Surveys"*  
 Emmy Noether High School Mathematics Day, Lubbock, TX. 2018

## Dominican Society of Amateur Astronomers (Astrodom)

- ▶ *"Una aguja en un pajar: Buscando remanentes estelares en cumulos globulares"*  
 Santo Domingo, Dominican Republic. 2020
- ▶ *"Galactic Bulge Survey: Fuentes de Rayos X del Bulbo Galactico"*  
 Santo Domingo, Dominican Republic. 2018
- ▶ *"Estudio de la poblacion de objetos compactos en el cumulo globular NGC 6397 con la unidad de campo integral MUSE"*  
 Santo Domingo, Dominican Republic. 2016

## References

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The University of Texas Rio Grande Valley  
Department of Physics and Astronomy  
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