

Manuel Pichardo Marcano

manuelpm.me
Fisk University
Department of Life and Physical Sciences
Nashville, TN 37208
Email: mmarcano@fisk.edu
Pronouns: he/him/his

Research Interests

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

Postdoctoral Research Experience

- ▶ *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

- ▶ *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

Papers

Refereed

- ▶ **Pichardo Marcano, M.**, Yelikar, A. B., & Jani, K. (2025). Massive Double White Dwarf Binary Mergers from the Moon: Extending the Reach of Multi-messenger Astrophysics, arXiv e-prints, arXiv:2503.04936.
- ▶ **Pichardo Marcano, M.**, Rivera Sandoval, L. E., Maccarone, T. J., Rohrmann, R. D., Althaus, L. G., Heinke, C. O., Belloni, D., & Bahramian, A. (2025). A Second Candidate Magnetic Helium Core White Dwarf and 3 Other Variable White Dwarfs in the Globular Cluster NGC 6397, *The Astrophysical Journal*, 979, 167.

- Pattie, E. C., Maccarone, T. J., Tetarenko, A. J., Miller-Jones, J. C. A., **Pichardo Marciano, 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 Marciano, 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

- Macrie, C. W., Rivera Sandoval, L., Cavecchi, Y., Wong, T. L. S., & **Pichardo Marciano, M.** (2024), *Research Notes of the American Astronomical Society*, 8, 299.
- 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

- *Science Explorer: Not Your Adviser's ADS*
Talk. UTRGV Astronomy Journal Club. Feb. 2025.
- *Seeing the most massive white dwarf mergers with LILA*
Talk. 245th AAS Meeting. 2025.
- *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

- ▶ 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

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

- ▶ Science Explorer (SciX) Lead Ambassadors. 2024-2026
SciX is the expansion of the Astrophysics Data System (ADS) to all of NASA Science.
- ▶ 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"> ▶ <i>Programming Languages</i>: Proficient in Python (Jupyter/iPython notebooks) and shell scripting (bash). Basic knowledge of R, RStudio and Tidyverse packages. ▶ <i>Markup Languages</i>: \LaTeX, Markdown ▶ <i>Operating Systems</i>: GNU/Linux, OS X, Windows | <ul style="list-style-type: none"> ▶ <i>Software</i>: IRAF/PyRAF, DOLPHOT, SAOImageDS9/JS9 ▶ <i>Version Control Systems</i>: Git ▶ <i>Virtualization and Cloud Services</i>: Docker (basic) |
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Languages

- ▶ *Spanish*: Native Language
- ▶ *French*: Intermediate knowledge (B1)
- ▶ *English*: Fluent

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 and Community Service

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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/>
 - ▶ *Science Explorer (SciX) Ambassador*
SciX is the expansion of the Astrophysics Data System (ADS) to all of NASA Science. Blog Post. *From ADS to SciX: What I wish I knew about ADS/SciX during my Ph.D.*
 - ▶ *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

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.
- ▶ *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.

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

Universidad Autónoma de Santo Domingo (UASD)

- ▶ *Capacitación de Astronomía para Docentes Universitarios*
Panel. "Avances Recientes en Astronomía"
Universidad Autónoma de Santo Domingo. December 2024.
- ▶ *Capacitación de Astronomía para Docentes Universitarios.*
Talk. "Ciencia Ciudadana: Iniciativas en Astronomía para Involucrar a Estudiantes y Profesores en Investigaciones Astronómicas "
Universidad Autónoma de Santo Domingo. December 2024.
- ▶ *Variabilidad de las binarias de enanas blancas acretantes*
Talk. V Congreso Internacional de la Sociedad Dominicana de Física. Enero 2024.
- ▶ *Astronomía Estelar*
Talk. "Mes de la Astronomía en la República Dominicana".
Universidad Autónoma de Santo Domingo. Summer 2023.

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

Dr. Liliana Rivera Sandoval

Assistant Professor
The University of Texas Rio Grande Valley
Department of Physics and Astronomy
BINAB 2.102 One West University Blvd.
Brownsville 78520
PHONE: +1 9568825131 eMAIL: liliana.riverasandoval@utrgv.edu

Dr. Thomas Maccarone

Associate Professor
Texas Tech University
Department of Physics and Astronomy
Lubbock TX 79409-1051
PHONE: 1-806-742-3760 eMAIL: thomas.maccarone@ttu.edu

Dr. Kelly Holley-Bockelmann

Professor
Vanderbilt University
Department of Physics and Astronomy
PMB 401807, 2301 Vanderbilt Place
Nashville, TN 37240
PHONE: (615) 343-2153 eMAIL: k.holley@vanderbilt.edu