

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

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

- ▶ *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
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)

Research Experience

- ▶ Spring 2016: *Research Project*, Research Institute in Astrophysics and Planetology (IRAP).
MUSE observations of the compact objects NGC 6397. <https://github.com/manuelmarcano22/MasterThesis>
- ▶ Summer 2015: *Summer Project*, Institute for Gravitational Research, University of Glasgow.
<https://github.com/manuelmarcano22/aLIGO-wxPython>
- ▶ 2013-2014: *Undergraduate Researcher*, Utah State University, Astrophysics Group.
<http://arxiv.org/abs/1311.3153>
- ▶ Summer 2013: *Undergraduate Researcher*, National Center for Atmospheric Research
<http://manuelpm.me/papers/posterhao.pdf>
- ▶ Summer 2012: *Undergraduate Researcher*, Stanford University, Geophysics Dep.
<http://manuelpm.me/papers/posterinsar.pdf>

Publications

Papers

Refereed

- **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 Marcano, 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 Marcano, 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.
- Schwope, A., Buckley, D. A. H., Kawka, A., König, O., Lutovinov, A., Maitra, C., Mereminskiy, I., Miller-Jones, J., **Pichardo Marcano, 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 Marcano, 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 Marcano, 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 Marcano**, 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 Marcano, M.**, & Rivera Sandoval, L. (2021). X-ray Pulsations from Nova Her 2021, *The Astronomer's Telegram*, 14776, 1.
- **Pichardo Marcano, 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 Marcano** and Shane L. Larson. *Limiting alternative theories of gravity using gravitational wave observations*
preprint <http://arxiv.org/abs/1311.3153>

Talks and Posters

- *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

- ▶ 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.

Recognition & Leadership Experiences

- ▶ 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

- | | |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| ▶ <i>Programming Languages</i> : Proficient in Python (Jupyter/iPython notebooks) and shell scripting (bash). | ▶ <i>Software</i> : IRAF/PyRAF, DOLPHOT, SAOImageDS9/JS9 |
| ▶ <i>Markup Languages</i> : L ^A T _E X, Markdown | ▶ <i>Version Control Systems</i> : Git |
| ▶ <i>Operating Systems</i> : GNU/Linux, OS X, Windows | ▶ <i>Virtualization and Cloud Services</i> : Docker (basic) |

Languages

- | | |
|------------------------------------|-----------------------------------------------|
| ▶ <i>Spanish</i> : Native Language | ▶ <i>French</i> : Intermediate knowledge (B1) |
| ▶ <i>English</i> : Fluent | |

Professional Development

Workshops

- ▶ **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

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

Talks

- ▶ *Stellar Astrophysics.* Talk. Universidad Autónoma de Santo Domingo. 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

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

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. 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. Craig Heinke

Professor
University of Alberta
Department of Physics
CCIS 4-183
Edmonton, AB, T6G 2E1, Canada
PHONE: (780) 222-4815 eMAIL: heinke@ualberta.ca