

# LAURA D. VEGA

## CURRICULUM VITAE

### Astrophysicist | CRESST II & Heising-Simons Foundation Postdoctoral Fellow

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Center for Research and Exploration in Space Science & Technology II (CRESST II)

### Research Interests

My research interests include multi-wavelength astronomy, late-stage stellar evolution, post-AGB binaries, circumbinary disks, and X-ray/UV flares in M-dwarf stars.

### Education

Astrophysics Ph.D., 2021 – Vanderbilt University	Advisor: Keivan Stassun
Physics M.A., 2017 – Fisk University	Advisor: Keivan Stassun
Physics B.Sc., 2013 – The University of Texas at San Antonio (UTSA)	Advisor: Eric Schlegel

### Publications ([Number] = Number of citations for refereed papers as of CV's date-of-update)

1. Vega L.D. et al. 2022, In Prep.; *Simultaneous TESS and Swift Observations of Wolf 359*.
2. Vega L.D. et al. 2022, In Prep.; *Multiwavelength Observations of the YZ CMi System*.
3. Chavali, S. et al. 2022; *A Pilot Survey of an M Dwarf Flare Star with Swift's UV Grism*, Research Notes of the AAS, 6, 201. []
4. Wittrock, Justin M. et al. 2022; *Transit Timing Variations for AU Microscopii b and c*, The Astronomical Journal, 164, 27. [2]
5. Gilbert E.A. et al. 2022; *Flares, Rotation, and Planets of the AU Mic System from TESS Observations*, The Astronomical Journal, 163, 147. [24]
6. Paudel R.R. et al. 2021; *Simultaneous Multiwavelength Flare Observations of EV Lacertae*, The Astrophysical Journal, 922, 31. [8]
7. Vega L.D. et al. 2021; *Multiwavelength Observations of the RV Tauri Variable System U Monocerotis: Long-Term Variability Phenomena Can Be Explained by Binary Interactions With a Circumbinary Disk*, The Astrophysical Journal, 909, 138. (NASA Feature). [3]
8. Gilbert E.A. et al. 2020; *The First Habitable Zone Earth-sized Planet from TESS. I: Validation of the TOI-700 System*, The Astronomical Journal, 160, 116. (NASA Feature). [64]
9. Kostov, V.B. et al. 2019; *The L 98-59 System: Three Transiting, Terrestrial-size Planets Orbiting a Nearby M Dwarf*, The Astronomical Journal, 158, 32. (NASA Feature). [73]

10. Vega, L.D. et al. 2017; *Evidence for Binarity and Possible Disk Obscuration in Kepler Observations of the Pulsating RV Tau Variable DF Cygni*, The Astrophysical Journal, 839, 48. [9]
11. Schlegel, E.M. et al. 2016; *NGC 5195 In M51: Feedback ‘Burps’ After a Massive Meal?*, The Astrophysical Journal, 823, 75. (**NASA Feature**). [8]

### Relevant Skills

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**Languages:** English; Spanish

**Computer (varying levels of proficiency):** Unix; Python; LaTeX; Lightkurve; HEASARC: FTOOLS, XSPEC; SAOImage DS9

**Data experience (varying levels of proficiency):** X-ray/Ultraviolet (NICER, *Swift*); Optical (*Kepler*, TESS, AAVSO, DASCH); and Radio (SMA)

### Fellowships/Grants

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NASA TESS Cycle 4 Guest Investigator Program	2021 - 2022
NASA TESS Cycle 3 Guest Investigator Program	2020 - 2021
NASA Minority University Research Education Project (MUREP)/Advanced STEM Training and Research (ASTAR): Harriett G. Jenkins Pre-doctoral Fellowship	2015 - 2020
Smithsonian Latino Center - LIP (Research at the Center for Astrophysics and Outreach at National Air & Space Museum)	2017, 2018, 2019
Vaughan Family Grant (AAS Conference Travel (UTSA))	2011, 2012, 2014
National Institute on Minority Health and Health Disparities – Nanotechnology and Human Health Core Grant (2012 Summer Undergraduate Nanoparticles Research at UTSA)	2012
Bill & Alicia Hoover Grant (For 2010 Summer Research at UTSA)	2010

### Honors and Awards

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Most Outstanding Student Publication - Vanderbilt Physics & Astronomy Department	2018
NASA Office of Education’s MUREP: Harriett G. Jenkins Pre-doctoral Fellow	2015
Best Poster in Physics - Fisk University Science Symposium	2016
Toastmasters International - Competent Leader	2015
Toastmasters International - Competent Communicator	2015
The Sam Madrid Jr. Endowed Scholarship - UTSA	2012
The Dr. B. Thyagarajan Endowed Scholarship - UTSA	2009
Dean’s List - UTSA	2007, 2008
Honor Roll - UTSA	2009, 2010, 2011

### Observation Proposals

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1. ALMA - Cycle 9 - April 2022  
Co-I: ACCEPTED; The Origin and Impact of Flares in M Dwarf Systems; PI: Meredith MacGregor
2. TESS - Cycle 5 - January 2022  
Co-I: ACCEPTED; Multiwavelength TESS-Swift-NICER Observations of Pulsations in Flares on Solar-Type Stars; PI: Teresa Monsue
3. Swift - Cycle 18 - September 2021  
Co-I: ACCEPTED: A Swift and Alma View of the Origin and Impact of M-Dwarf Flares; PI: Ward Howard

4. TESS - Cycle 4 - January 2021  
Co-I: ACCEPTED; Using Tess 20-S Cadence Data To Study Flares On M Dwarfs; PI: Rishi Paudel
5. NICER - Cycle 3 - November 2020  
Co-I: ACCEPTED; A Study of M Dwarf Flares Using Simultaneous High Cadence Multi-wavelength Data; PI: Rishi Paudel
6. XMM-Newton - Announcement of Opportunity 20 - October 2020  
Co-I: ACCEPTED; Pilot Study of RV Tau Variables: A new class of X-ray emitting stars? PI: Rodolfo Montez Jr.
7. Hubble Space Telescope Cycle 28 - October 2020  
Co-I: ACCEPTED; Confirming a Tentative Detection of an Atmosphere Around a Potentially Rocky Planet; PI: Thomas Barclay
8. Swift - Target of Opportunity - July 2020  
**PI: ACCEPTED**; 20 kilo-second UVOT observations of the AU Mic system
9. Joint TESS-Swift - Cycle 3 - January 2020  
**PI: ACCEPTED**; Exploring the Star-Planet Connection via Simultaneous TESS and Swift Observations of Highly Active M Dwarfs
10. TESS Cycle 3 - January 2020  
Co-I: ACCEPTED; Discovering Circumbinary Planets With Tess; PI: Veselin Kostov
11. NICER - Cycle 2 - November 2019  
Co-I: ACCEPTED; Multiwavelength Observations of Highly Active M Dwarfs; PI: Rishi Paudel
12. Hubble Space Telescope Cycle 27 - April 2019  
Co-I: ACCEPTED; Searching for Secondary Atmospheres in a System of Benchmark Worlds; PI: Thomas Barclay
13. NOAO - Center for High Angular Resolution Astronomy - April 2019  
Co-I: ACCEPTED; Diving into the close stellar environment of the magnetic RV Tauri star U Mon; PI: Laurence Sabin
14. SAO - Submillimeter Array - March 2019  
**PI: ACCEPTED**; Hunting for Disks Around Pulsating RV Tau Stars
15. SAO - Submillimeter Array (Filler Program) - March 2019  
Co-I: ACCEPTED; Disks around RV Tauri Variable Stars: U Mon in High Resolution; PI: Rodolfo Montez Jr.
16. SAO - Submillimeter Array (Filler Program) - October 2018  
Co-I: ACCEPTED; Disks around RV Tauri Variable Stars: U Mon (0.8 mm); PI: Rodolfo Montez Jr.
17. SAO - Submillimeter Array (Filler Program) - October 2018  
Co-I: ACCEPTED; Disks around RV Tauri Variable Stars: U Mon; PI: Rodolfo Montez Jr.

### Oral Presentations

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1. Simultaneous Multiwavelength Observations of the Highly Active M Dwarf YZ CMi, SACNAS, San Juan, Puerto Rico, Oct. 2022

2. [The APS Bridge Program and my journey to the PhD](#); Session L05: Experiences from the APS Bridge Program, APS April Meeting 2022, New York, NY, Apr. 2022.
3. [Multiwavelength observations of Highly Active M Dwarf stars using Swift, TESS, and NICER](#); Ultraviolet Science at Goddard, NASA Goddard Space Flight Center, Greenbelt, MD, Apr. 2022.
4. [Simultaneous Multiwavelength Swift, TESS, and NICER Observations of Highly Active M Dwarf Stars](#); Invited Talk Colloquium, Virtual Meeting, UTSA Department of Physics & Astronomy, San Antonio, TX, Apr. 2022.
5. Stellar Evolution at the Crossroads: Resolving the Nature of RV Tauri Variable Systems Using Unprecedented Observations from Kepler and XMM-Newton Space Telescopes; Invited Talk Colloquium, Virtual Meeting, Howard University, Washington, DC, Mar. 2021.
6. Astrophysics with TESS; NASA Hyperwall; American Astronomical Society, AAS 235th Meeting. Honolulu, HI, Jan. 2020.
7. Observations of Disks Around RV Tauri Variable Stars with the Submillimeter Array; SACNAS Conference, the Henry B. González Convention Center, San Antonio, TX, Oct. 2018.
8. [Evidence for Disk Obscuration in Kepler Observations of the RV Tau Star DF Cyg](#); 5<sup>th</sup> Annual Astrophysics Conference - DC, The George Washington University, Washington DC, Jul. 2017.
9. [Kepler's Unprecedented High Temporal Precision Observations of the RV Tauri variable DF Cygni](#), Astronomy Journal Club, Vanderbilt University, Nashville, TN, Sep. 2016.
10. [M51 and the Effect of the Arm Resonance and Interaction on Diffuse X-ray Emission](#); American Astronomical Society, AAS 225th Meeting. Seattle, WA, Jan. 2015.
11. [Cosmic Background Radiation and the Evolution of the Universe](#); UTSA's Friday Nights, Celestial Lights Series. San Antonio, TX, April 18, 2014.
12. Diffuse X-ray & Multi-wavelength Emission in Nearby, Face-on Spiral Galaxies; San Antonio, Texas Astrophysics Researchers Meeting. San Antonio, TX, Mar. 22, 2013.
13. "Diffuse X-ray & Multi-wavelength Emission in Nearby, Face-on Spiral Galaxies" and poster presentation "Diffuse X-ray Emission and Star Clusters in Nearby, Face-on Spiral;" UTSA College of Science, COS, Research Conference. San Antonio, TX, Oct. 5, 2012.

## Poster Presentations

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1. [Simultaneous Multiwavelength Swift, TESS, and NICER Observations of Highly Active M Dwarf Stars](#); Cool Stars 21, Toulouse, France, Jul. 4-9, 2022.
2. [Simultaneous Multiwavelength Observations of the Highly Active M Dwarf YZ CMi](#); TESS Science Conference II, Virtual Meeting, Aug. 2021.
3. [Multiwavelength Observations of the RV Tau Variable U Monocerotis](#); American Astronomical Society, AAS 235th Meeting. Honolulu, HI, Jan. 2020.
4. [X-ray & Submillimeter Observations of the Pulsating RV Tau Variable U Mon](#); 2019 Spring Symposium - The Deaths and Afterlives of Stars; Space Telescope Science Institute; April 2019.

5. [Submillimeter Array Observations of the Large Disk Around RV Tau Star U Mon](#); 7th National Capital Area Disks Meeting; Johns Hopkins University / Space Telescope Science Institute; 26 Sep., 2018.
6. [Observations of Disks Around RV Tau Variables with the Submillimeter Array](#); Cool Stars Conference; Boston University, Boston, MA, July 2018.
7. Evidence for Disk Obscuration in Kepler Observations of the Pulsating RV Tau Variable DF Cyg; Kepler-K2 Science Conference; NASA Ames, Mountain View, CA, Jun. 2017.
8. [Evidence for Binariness in Kepler Observations of the Pulsating RV Tau Variable DF Cygni](#); American Astronomical Society, AAS 229th Meeting. Grapevine, TX, Jan. 2017.
9. [Stellar Evolution at the Crossroads: A Closer Look at the RV Tauri Variable Star DF Cygni](#); 4<sup>th</sup> Annual DC/MD/VA Astrophysics Meeting, The George Washington University, Washington DC, Jun. 2016.
10. Stellar Evolution at the Crossroads: A Closer Look at the RV Tauri Variable Star DF Cygni; Fisk University Symposium, Nashville, TN, Aug. 2015.
11. Stellar Evolution at the Crossroads: A Closer Look at the RV Tauri Variable Star DF Cygni; Fisk-Vanderbilt Masters-to-PhD Bridge Program, Research Celebration Day. Nashville, TN, Aug. 2015.
12. [Diffuse Hot Gas in M51](#); Chandra's X-ray View of Galaxy Ecosystems; Schlegel, Eric M.; **Vega, L. D.**; Moore, M.; Boston, MA. Jul. 2014.
13. [Diffuse Emission in Nearby, Face-on Spiral Galaxies](#); AAS 223rd Meeting; Schlegel, Eric M.; **Vega, L. D.**; Moore, M.; Washington, DC, Jan. 5-9, 2014.
14. [Diffuse X-ray Emission and Star Clusters in Nearby, Face-on Spiral Galaxies](#); AAS 219th Meeting. Austin, TX, Jan. 7-12 2012.
15. [X-ray Eclipses in the 2010 Outburst of the Recurrent Nova U Sco? & Observations of the 2010 January Outburst of the Recurrent Nova U Sco using NASA's Swift](#); AAS 117th Meeting; McMaster, Laura; **Vega, L.**, et al.; Seattle, WA, Jan. 9-13 2011.
16. ["X-ray Eclipses in the 2010 Outburst of the Recurrent Nova U Sco?" & "Observations of the 2010 January Outburst of the Recurrent Nova U Sco using NASA's Swift"](#); Joint Fall 2010 Meeting of the Texas Sections of the APS, AAPT, Zone 13 of SPS and the National Society of Hispanic Physicists, San Antonio, TX, October 21-23, 2010.

## Leadership & Outreach

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### Better Astronomy for the New Generation! (BANG!) Organizing Committee Member, Sept. 2022 - present

- The University of Maryland's Astronomy Department's BANG! Seminar features speakers and discussions on issues of equity and inclusion, career paths, and soft skills for astronomers.

### Research Mentor, Oct. 2020 - Jan 2021

- Mentoring a high school senior in Madison County, VA, developing a research project on classifying M-dwarf flares based on the Solar-flare classification system.

### **Colorado Springs Cool Science Festival - Zoom-a-Scientist, Oct. 2020**

- Virtual (Zoom) chat sessions with children in Fairbanks, AK (3rd grade) and in Colorado Springs, CO (1st grade) about astronomy and what it's like to be a scientist.

### **Smithsonian National Air & Space Museum Volunteer Astronomer, Oct. 2017 - Present**

- [Astronomy Chats](#) & Hispanic Heritage Month Outreach: Innovators in Air and Space Family Day, Wash. DC.

### **Barrera Veterans Elementary School - Career Day, Von Ormy, TX, May 2019**

- Chat with children at different grade levels about astronomy and what it's like to be a scientist.

### **Bancroft Elementary Saturday Academy - Astronomy Chat, Wash. DC, January 2019**

- Visited 2nd and 3rd grade Latinx bilingual students at Bancroft Elementary to talk about astronomy and science. Presentation facilitated by the Smithsonian Air & Space Museum and sponsored by the Smithsonian Latino Center.

### **Smithsonian Astrophysical Observatory - Rising Stars Camp, St. Katharine Drexel, Roxbury Crossing, MA, July 2018**

- Facilitated a number of activities such as the use of the Micro Observatory Robotic Telescopes and software to introduce the children to the life cycle of stars, and other astronomy topics. I also gave a short talk about my research.

### **Fisk-Vanderbilt Bridge Program Recruitment at SACNAS, Long Beach, CA, Oct 2016**

- Booth at SACNAS to recruit undergraduate student for the Fisk-Vanderbilt Bridge Program.

### **DCA Stars at The University of Maryland - College Park, Summer 2016**

- Students and mentors met weekly and discussed our research, goals, setbacks, and successes.

### **Inclusive Astronomy Conference at Vanderbilt, Nashville, TN, June 17-19, 2015**

- Volunteer host for the inaugural conference on diversity and inclusion.

### **Astronomy Torus 2012 Workshop at UTSA, San Antonio, TX, December 5-7, 2012**

- International workshop focused on active galactic nuclei; Local Organizing Committee Member: Logistics planning; Registration desk.

### **Toastmasters International, 10/2013- Present**

- Vanderbilt Toastmasters Vice President of Public Relations (05/2015-Present); UTSA Roadrunner Toastmasters Treasurer (01/2014-07/2014); Deliver prepared and extemporaneous speeches as well as evaluating other speakers.

### **Society for Advancement of Chicanos & Native Americans in Science (SACNAS)**

- Founding officer (Treasurer) for the *first* SACNAS chapter in the state of Tennessee.

### **The Physics Honor Society | Sigma Pi Sigma at UTSA – President, 04/2013–01/2014**

- Organized student study sessions for the Physics GRE; Tutored students in physics and Mathematics; Supplemental officer for Society of Physics Students: Public Relations & Secretary.

### **Society of Physics Students at UTSA**

- *Outreach*: Various on-campus STEM outreach events for high school students like Nano Day with

Partnership for Education & Research in Materials at UTSA & Hispanic Chamber of Commerce's CORE4 STEM Familia Day Expo at UTSA; Space Day for elementary school children at Forest Hills Public Library; Student Panelist for Engineering-Day at UTSA; On-campus liquid-nitrogen ice cream sales with physics demonstrations.

- **Public Relations Officer:** Made posters and flyers of meetings, fundraisers, talks, and events; Managed social media accounts such as SPS' Facebook page; UTSA Physics & Astronomy's "Friday Nights, Celestial Lights" monthly outreach event.

### Professional Memberships/Affiliations

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Vanderbilt Association of Hispanic and Latinx Alumni	2021 - Present
Sigma Xi   The Scientific Research Society ( $\Sigma\Xi$ )	2015 - Present
National Society of Hispanic Physicists (NSHP)	2013 - Present
Toastmasters International	2013 - Present
Society for Advancement of Chicanos & Native Americans in Science (SACNAS)	2013 - Present
American Physical Society (APS)	2011 - Present
American Astronomical Society (AAS)	2011 - Present
Sigma Pi Sigma   The Physics Honor Society ( $\Sigma\Pi\Sigma$ )	2011 - Present
LeaderShape Institute Alumna & Pebble Club	2011 - Present
UTSA Alumni Association	2013 - 2014
San Antonio Astronomical Association	2013 - 2014
UTSA San Antonio Texas Astrophysics Researchers (STAR)	2011 - 2014
Society of Physics Students (SPS)	2010 - 2013
National Society of Collegiate Scholars (NSCS)	2008 - 2013