Dax L. Feliz, PhD | Curriculum Vitae

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American Museum of Natural History
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Education

PhD Astrophysics, Vanderbilt University (VU), May 2022. Advisor: Dr. Keivan Stassun, Dissertation Link

M.A. Physics, Fisk University, May 2018. Advisors: Drs. Keivan Stassun and Karen Collins

B.S. Astrophysics, University of Massachusetts at Amherst, May 2013. Advisor: Dr. Min Yun

Academic Positions

Postdoctoral Researcher, Flatiron Center for Computational Astrophysics (CCA), September 2024 – Present
Postdoctoral Advisor: Dr. David Hogg

Postdoctoral Researcher, American Museum of Natural History (AMNH), September 2022 – September 2024
Postdoctoral Advisor: Dr. Ruth Angus

Postdoctoral Researcher, Vanderbilt University, May 2022 - August 2022
Postdoctoral Advisor: Dr. Keivan Stassun

Research Interests

My research is focused on the detection of extra-solar planets that orbit cool, dim stars. I specialize in the use and data processing of transit photometry to search for these planets from ground and space based telescopes (KELT, Kepler, TESS, PLATO). I also specialize in identifying stellar activity, including measuring stellar rotation and identifying stellar flares.

Research Experience

Transit Survey of M-Dwarf stars in TESS data, VU/AMNH/CCA 2018 – Present

PhD Thesis: Processing Full Frame Images to produce light curves, identify and remove instrumental systematics, conduct algorithmic periodic detection for potential transit events of orbiting planets.

PLATO Flare Removal Working Group, European Space Agency, 2020 – Present

Constructing an algorithm to detect and remove flare events from the photometric time series data that will be produced by the ESA PLATO mission for solar type stars.

Kilodegree Extremely Little Telescope (KELT), Vanderbilt University, TN 2017 – 2022

Operating KELT data reduction pipeline for detection of transiting exoplanets orbiting bright, hot stars with a network of ground-based telescopes.

Multi-Year Transit Survey of Proxima Centauri, Fisk and Vanderbilt Universities, TN 2016 – 2019

Master's Thesis Project: Processing images from observations of the star Proxima Centauri, production and detrending analysis of light curves and utilization of periodic transit search algorithms to hunt for transit events of the Earth-sized planet, Proxima b.

Light Curve Analysis of high proper motion M-Dwarfs in Kepler data, American Museum of Natural History, NY 2012

REU Summer Project: Analysis and signal processing of photometry from the Kepler Space Telescope, conducted a search for transiting exoplanets and gravitational mircolensing events. Advisor: Dr. Sebastine Lepine.

Using Spectropolarimetry to Study Extrasolar Planets, American Museum of Natural History, NY 2010

REU Summer Project: A theoretical project where I sought to answer if exoplanet atmospheres could be detected and characterized from ground-based telescopes. Advisors: Drs. Rebecca Oppenheimer & Douglas Brenner.

👥 Mentoring Experience

Barnard Summer Research Institute AMNH Project

Detection and Validation of Transiting Exoplanets Around Nearby M-dwarf Stars, May 2024 – August 2024
Graduate Student: Madeline J. Maldonado Gutierrez, Barnard College of Columbia University.

CUNY Master's in Astrophyiscs, Bridge Thesis Project

Using Gaussian Processes to model stellar rotation in Zwicky Transient Facility photometry, 2023 – Present
Graduate Student: Ryan Lebron, City University of New York, Co-Advised with Dr. Ruth Angus.

AMNH Research Experience for Undergraduates (REU) Program

Detecting Exoplanets Around Nearby M-dwarf Stars from the Revised TESS Habitable Zone Catalog, Summer 2023 – Present. Undergraduate Student: Maliyah Adams, Arizona State University

AMNH Science Research Mentoring Program

Detection of Transiting Exoplanets and Eclipsing Binaries Around Nearby M-dwarf Stars, 2022 – Present
High School Students: August Fischer, Donovan Bradley, Jashcelyn Canada (2022 – 2023), Kylor Ghai, Shreeya KC, Thamim Chowdhury (2023-2024)

Central American-Caribbean Bridge Program

Project: Recovery of known TESS Objects of Interest from Full Frame Images of TESS observations, 2020 – 2021. Undergraduate Student: Bryan Villarreal Alvarado, University of Costa Rica.

Summer Research Internship

Project: Transiting Exoplanet Survey Satellite: A Search for New Worlds, 2019 – 2020.
Undergraduate Student: Samantha Bianco, Vanderbilt University.

Summer Research Internship

Project: Blind Transit Survey of TESS Data for M Dwarf Systems, 2019 – 2020.
Undergraduate Student: Mary Jimenez, George Mason University.

School for Science and Math at Vanderbilt

Project: Detecting exoplanet transits in TESS light curves, Spring 2019.
High School Student: Felix Bean, Hunter's Lane High School.

East Harlem Tutorial Program, New York, NY, 2008 – 2010.

Tutored and mentored many high-school and middle school students in math, science and the college application process. I was also a mentor in the For Inspiration and Recognition of Science and Technology (FIRST) robotics competition.

📖 Teaching Experience

CUNY Master's in Astrophysics Bridge Program

Project: 🔗Programming Bootcamp, August 2022, August 2023 & August 2024

A two week programming bootcamp designed to teach new astronomy graduate students skills they may require in their academic journeys.

Teaching Assistant

ASTR-101L: Introductory Solar System Laboratory, Vanderbilt University, TN Fall semesters, 2018 – 2020.

ASTR-102L: Introductory Stars & Galaxies Laboratory, Vanderbilt University, TN Spring semesters, 2018 – Spring 2020.

Laboratory Technician / Teaching Assistant

Electronics Laboratory, Bronx Community College, NY Spring 2014 – Fall,2015.

Outreach

East Harlem Scholar's Academy, New York, NY, Alumni Day Speaker, 2010 – 2015
- Answering questions of elementary school students about astronomy and physics and my research experience.

Central Park East High School, New York, NY, College Panel Speaker, 2009 – 2013
- Answering questions of high-school students about the my experiences in science and in higher education.

Central Park East High School, New York, NY, Robotics Consultant, 2009 – 2011
- Volunteered to assist high school students in the FIRST Robotics Competition.

Awards, Grants, Activities & Honors

Visiting Graduate Student Fellow at George Mason University, 2021 – 2022.

NSF AGEP Fellowship, Spring 2021 – 2022.

Fisk-Vanderbilt Bridge Fellowship, Fall 2018 – 2021.

McMinn Summer Research Award, 2018.

Graduate Opportunities at Fisk in Astronomy and Astrophysics Research (GO-FAAR) grant, 2016 – 2018.

East Harlem Scholars Academy Heroes Classroom Namesake, Jackie Robinson Educational Complex, New York, NY, 2013

New York Space Consortium Research Grant, Summer of 2012.

Invited Talks, Presentations, and Posters

"NEMESIS II: Exoplanet Transit Survey of Nearby M-dwarfs in TESS FFIs", TESS Science Conference III, #July 2024.`https://zenodo.org/records/12973447`
"Can Photometric Flares Detected by Ground and Space Based Telescopes Be Used To Identify Activity Cycles in M-dwarf stars¿', Cool Stars 22 Conference, #July 2024.`https://zenodo.org/records/13146889`
"Twinkle, Twinkle Little Star", Twinkle and the Next Generation of Exoplanet Scientists Conference, #29 September 2021.

"NEMESIS: Exoplanet Transit Survey of Nearby M-dwarfs in TESS FFIS I", Center for Exoplanets & Habitable Worlds Seminar, Pennsylvania State University, #13, September 2021.

"NEMESIS: Exoplanet Transit Survey of Nearby M-dwarfs in TESS FFIS I", TESS Science Conference II, August 2021. `http://doi.org/10.5281/zenodo.5115302`

"NEMESIS: Exoplanet Transit Survey of Nearby M-dwarfs in TESS FFIS I", Rubin LSST Transients and Variable Stars Science Seminar, #21, June 2021.

"NEMESIS: Exoplanet Transit Survey of Nearby M-dwarfs in TESS FFIS I", TESS Science Talk at Massachusetts Institute of Technology, and TESS Science Team Meeting #25, March 2021.

"NEMESIS: Exoplanet Transit Survey of Nearby M-dwarfs in TESS FFIS I", Cool Stars 20.5 Conference Poster, March 2021. `http://doi.org/10.5281/zenodo.4562794`

"A Multi-Year Transit Search of Proxima Centauri", Master's Thesis Defense, Fisk University, August 2018.

"A Multi-Year Transit Search of Proxima Centauri", ERES III conference, Yale University, June 2017 and the Sagan Summer Workshop, California Institute of Technology, August 2017.

"Using BLS modeling on photometry of Proxima Centauri", KELT workshop, Lehigh University, June 2017.

"How to deflect an incoming asteroid", University of Massachusetts at Amherst, May 2013.

"Light Curve Characterization of High Proper Motion M-Dwarf Stars with the Kepler Space Telescope", Linder Theater in the American Museum of Natural History for the Annual REU Symposium, August 2012.

"Using Spectropolarimetry to Study Extrasolar Planets", Linder Theater in the American Museum of Natural History for the Annual REU Symposium, August 2010.

Publication Metrics

Refereed: 28 / 1st Author: 3 / Citations: 545 / h-index: 13 (2024-08-04, via ADS).

Peer Reviewed Publications (1st Author)

1. **Dax L. Feliz**, Peter Plavchan, Samantha N. Bianco, Mary Jimenez, Kevin I. Collins, Bryan Villarreal Alvarado, and Keivan G. Stassun. NEMESIS: Exoplanet Transit Survey of Nearby M-dwarfs in TESS FFIs. I. *The Astronomical Journal*, 161(5):247, May 2021

2. **Dax L. Feliz** L., David L. Blank, Karen A. Collins, and ... A Multi-year Search for Transits of Proxima Centauri. II. No Evidence for Transit Events with Periods between 1 and 30 days. *The Astronomical Journal*, 157(6):226, Jun 2019

3. David L. Blank, **Dax L. Feliz** , Karen A. Collins, and ... A Multi-year Search for Transits of Proxima Centauri. I. Light Curves Corresponding to Published Ephemerides. *The Astronomical Journal*, 155(6):228, Jun 2018** **Corresponding author**

Peer Reviewed Publications (Nth Author)

1. Rishi R. Paudel, Thomas Barclay, Allison Youngblood, ..., **Dax L. Feliz**, and ... A Multiwavelength Survey of Nearby M Dwarfs: Optical and Near-ultraviolet Flares and Activity with Contemporaneous TESS, Kepler/K2, Swift, and HST Observations. *The Astrophysical Journal*, 971(1):24, August 2024
2. Lionel J. Garcia, Daniel Foreman-Mackey, Catriona A. Murray, ..., **Dax L. Feliz**, and ... nuance: Efficient Detection of Planets Transiting Active Stars. *The Astronomical Journal*, 167(6):284, June 2024
3. Christopher R. Mann, Paul A. Dalba, David Lafrenière, ..., **Dax L. Feliz**, and ... Giant Outer Transiting Exoplanet Mass (GOT 'EM) Survey. III. Recovery and Confirmation of a Temperate, Mildly Eccentric, Single-transit Jupiter Orbiting TOI-2010. *The Astronomical Journal*, 166(6):239, December 2023
4. Justin M. Wittrock, Peter P. Plavchan, Bryson L. Cale, ..., **Dax L. Feliz**, and ... Validating AU Microscopii d with Transit Timing Variations. *The Astronomical Journal*, 166(6):232, December 2023
5. Ismael Mireles, Diana Dragomir, Hugh P. Osborn, ..., **Dax L. Feliz**, and ... TOI-4600 b and c: Two Long-period Giant Planets Orbiting an Early K Dwarf. *The Astronphysical Journal Letters*, 954(1):L15, September 2023
6. Keivan G. Stassun, Guillermo Torres, Marina Kounkel, ..., **Dax L. Feliz**, and ... An Eclipsing Binary Comprising Two Active Red Stragglers of Identical Mass and Synchronized Rotation: A Post-mass-transfer System or Just Born That Way? *The Astronphysical Journal*, 950(2):99, June 2023
7. Joseph E. Rodriguez, Samuel N. Quinn, Andrew Vanderburg, ..., **Dax L. Feliz**, and ... Another Shipment of Six Short-Period Giant Planets from TESS. *Monthly Notices of the Royal Astronomical Society*, February 2023
8. Mohammed El Mufti, Peter P. Plavchan, Howard Isaacson, ..., **Dax L. Feliz**, and ... TOI 560: Two Transiting Planets Orbiting a K Dwarf Validated with iSHELL, PFS, and HIRES RVs. *The Astronomical Journal*, 165(1):10, January 2023
9. Keivan G. Stassun, Guillermo Torres, ..., **Dax L. Feliz**, and ... A Low-mass Pre-main-sequence Eclipsing Binary in Lower Centaurus Crux Discovered with TESS. *The Astrophysical Journal*, 941(2):125, December 2022
10. S. Ulmer-Moll, M. Lendl, S. Gill, ..., **D. L. Feliz**, and ... Two long-period transiting exoplanets on eccentric orbits: NGTS-20 b (TOI-5152 b) and TOI-5153 b. *arXiv e-prints*, page arXiv:2207.03911, July 2022

11. Ian Stotesbury, Billy Edwards, ..., **Dax L. Feliz**, and ... Twinkle: a small satellite spectroscopy mission for the next phase of exoplanet science. In Laura E. Coyle, Shuji Matsuura, and Marshall D. Perrin, editors, *Space Telescopes and Instrumentation 2022: Optical, Infrared, and Millimeter Wave*, volume 12180 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 1218033, August 2022
12. Justin M. Wittrock, Stefan Dreizler, Michael A. Reefe, Brett M. Morris, ..., **D. L. Feliz**, and ... Transit Timing Variations for AU Microscopii b and c. *The Astronomical Journal*, 164(1):27, July 2022
13. Michael A. Reefe, Rafael Luque, Eric Gaidos, ..., **D. L. Feliz**, and ... A Close-in Puffy Neptune with Hidden Friends: The Enigma of TOI 620. *The Astronomical Journal*, 163(6):269, June 2022
14. Jiayin Dong, Chelsea X. Huang, George Zhou, ..., **D. L. Feliz**, and ... NEID Rossiter-McLaughlin Measurement of TOI-1268b: A Young Warm Saturn Aligned with Its Cool Host Star. *The Astrophysical Journal Letters*, 926(2):L7, February 2022
15. Christina Hedges, Alex Hughes, George Zhou, ..., **D. L. Feliz**, and ... TOI-2076 and TOI-1807: Two Young, Comoving Planetary Systems within 50 pc Identified by TESS that are Ideal Candidates for Further Follow Up. *The Astronomical Journal*, 162(2):54, August 2021
16. Keivan G. Stassun, Guillermo Torres, Cole Johnston, ..., **Dax L. Feliz**, and ... Discovery and Characterization of a Rare Magnetic Hybrid β Cephei Slowly Pulsating B-type Star in an Eclipsing Binary in the Young Open Cluster NGC 6193. *The Astrophysical Journal*, 910(2):133, April 2021
17. S. A. Rappaport, D. W. Kurtz, G. Handler, ..., **D. L. Feliz**, and ... A tidally tilted sectoral dipole pulsation mode in the eclipsing binary TIC 63328020. *Monthly Notices of the Royal Astronomical Society*, February 2021
18. Joseph E. Rodriguez, Samuel N. Quinn, George Zhou, ..., **Dax L. Feliz**, and ... TESS Delivers Five New Hot Giant Planets Orbiting Bright Stars from the Full-frame Images. *The Astronomical Journal*, 161(4):194, April 2021
19. Joni-Marie C. Cunningham, **Dax L. Feliz**, Don M. Dixon, and ... A KELT-TESS Eclipsing Binary in a Young Triple System Associated with the Local "Stellar String" Theia 301. *The Astrophysical Journal*, 160(4):187, October 2020
20. Peter Plavchan, Thomas Barclay, Jonathan Gagné, ... **Dax Feliz** , and ... A planet within the debris disk around the pre-main-sequence star AU Microscopii. ***Nature***, 582(7813):497–500, June 2020
21. Romy Rodríguez Martínez, B. Scott Gaudi, Joseph E. Rodriguez, ..., **Dax L. Feliz** , and ... KELT-25 b and KELT-26 b: A Hot Jupiter and a Substellar Companion Transiting Young A Stars Observed by TESS. *The Astronomical Journal*, 160(3):111, September 2020
22. Weicheng Zang, Subo Dong, Andrew Gould, . .., **Dax L. Feliz**, and . .. Spitzer + VLTI-GRAVITY Measure the Lens Mass of a Nearby Microlensing Event. *The Astrophysical Journal*, 897(2):180, July 2020
23. Joseph E. Rodriguez, Jason D. Eastman, George Zhou, ..., **Dax L. Feliz** , and ... KELT-24b: A 5M $_J$ Planet on a 5.6 day Well-aligned Orbit around the Young V = 8.3 F-star HD 93148. *The Astronomical Journal*, 158(5):197, Nov 2019
24. Jonathan Labadie-Bartz, Joseph E. Rodriguez, Keivan G. Stassun, ..., **Dax L. Feliz** , and ... KELT-22Ab: A Massive, Short-Period Hot Jupiter Transiting a Near-solar Twin. *The Astrophysical Journal*, 240(1):13, Jan 2019
25. Karen A. Collins, Kevin I. Collins, Joshua Pepper, ..., **Dax L. Feliz** , and ... The KELT Follow-up Network and Transit False-positive Catalog: Pre-vetted False Positives for TESS. *The Astronomical Journal*, 156(5):234, Nov 2018