

# Megan Taylor Tillman

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## Education

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**Rutgers University** - *Ph.D. Physics and Astronomy* 2020-2026

Advisor: Blakesley Burkhart

**Texas A&M University** - *B.S. Physics* 2016-2020

Minors - *Mathematics, Astrophysics*

*Magna Cum Laude w/ Honors*

## Software Skills

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**Python (Expert)** - Over 8 years of experience using Python as a tool in a research context to analyze and visualize data. Experience working with and modifying the public framework *Fake Spectra Flux Extractor*. Experience writing parallel code using *MPI for Python*.

Experience optimizing code for runtime. Experience with a wide range of common Python packages including Numpy, SciPy, Astropy, Matplotlib, H5py, and Pandas.

**Fortran95 (Intermediate)** - Experience using Fortran95 working with and updating the publicly available *Magnetizer* code repository on GitHub.

**High-Performance Computing** - Experience running jobs on several computing clusters, including CIERA, Rusty, and Popeye.

## Collaborations

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**CAMELS Collaboration** - Over 5 years working in the CAMELS collaboration: writing documentation for the public data release, collaborating with groups working on tangential projects with CAMELS data, contributing to the inclusion and analysis of new simulation products.

**Habitable Worlds Observatory IGM/CGM Working Group** - Working with members of the group, led the production and publication of a driving science case for Habitable Worlds Observatory instrumentation.

## Research Interests

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**Theoretical Astrophysics:** Galaxy evolution, galactic feedback, active galactic nuclei, large-scale structure, intergalactic medium, cosmological hydrodynamic simulations, gravitational waves, black hole modeling, ionizing sources.

## Mentoring

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**Megan Pirecki** - Undergraduate Researcher, Rutgers University 2022-2025

*Corresponding publication Pirecki et al. accepted.*

## Teaching

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<b>Computational Astrophysics</b> - Rutgers University	Fall 2023 & 2024
<i>Duties: office-hours, occasional lectures, grading, class supervision, project supervision</i>	
<b>Physics Mechanics Lab</b> - Rutgers University	Spring 2022
<i>Duties: office-hours, lectures, grading, material development</i>	
<b>Physics E&amp;M Recitation</b> - Rutgers University	Spring 2021
<i>Duties: office-hours, grading, material development, class supervision</i>	
<b>Physics E&amp;M Lab</b> - Rutgers University	Fall 2020
<i>Duties: office-hours, lectures, grading, material development</i>	
<b>E&amp;M for Engineers Lab</b> - Texas A&M University	Spring 2020
<i>Duties: office-hours, lab supervision, grading, troubleshoot equipment</i>	
<b>Mechanics for Engineers Lab</b> - Texas A&M University	Fall 2019
<i>Duties: office-hours, lab supervision, grading, troubleshoot equipment</i>	

## Outreach and Service

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<b>Rutgers Minorities in Physics and Astronomy - Communications Officer</b>	2024-2025
<i>Took meeting notes each week, sent emails updating members of the organization on activities and events.</i>	
<b>Equity and Inclusion Journal Club Organizer and Host</b>	2024-2025
<i>Organized a monthly journal club addressing topics related to equity and inclusion.</i>	
<b>Rutgers Minorities in Physics and Astronomy - Web Master</b>	2023-2024
<i>Managed and updated the organization's website using HTML.</i>	
<b>Discover, Explore, and Enjoy Physics and Engineering</b>	2017-2019
Texas A&M University	
<i>Designed demonstrations for physics education and outreach events.</i>	
<i>Volunteered at the yearly physics festival, a large outreach event hosted by the Department of Physics and Astronomy for the larger community.</i>	

## Awards and Fellowships

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<b>NSF Graduate Research Fellowship Program</b>	2022
<i>Honorable Mention</i>	
<b>Faculty Student Achievement Award</b>	2020
<i>Texas A&amp;M University - Department of Physics and Astronomy</i>	
<b>CIERA Research Fellow</b>	2019 & 2020
<i>Summer research fellow, 10 weeks</i>	
<b>CIERA NSF REU</b>	2018

## Presentations

C=Conference Talk, P=Poster, O=Other Talk

[C] AGN and Energy Flows - Flatiron Institute	01/2026
[O] ITC Luncheon Talk - Harvard CfA	11/2025
[O] American Museum of Natural History Astronomy Seminar - NYC	09/2025
[P] Towards the Habitable Worlds Observatory Washington, DC	07/2025
[C] Cosmology and Astrophysics with Simulations and Machine Learning - Flatiron Institute	12/2024
[C] UCSC Galaxy Workshop - University of California Santa Cruz	07/2024
[C] STScI Spring Symposium - Space Telescope Science Institute	04/2024
[C] Baryons in the Universe - Kavli IPMU Kashiwa, Japan	04/2024
[C] Black Holes on Broadway - Flatiron Institute	12/2023
[C] Modeling Multiphase Astrophysical Media - Bavaria, Germany	06/2023
[O] Max Planck Institute for Astrophysical Media - Garching, Germany	05/2023
[C] Simba Collaboration Workshop - Flatiron Institute	05/2023
[C] Galaxy Formation and Evolution in the Data Science Era - KITP University of California Santa Barbara	03/2023
[C] Joint KITP-CCA Workshop - Flatiron Institute	01/2023
[C] CAMELS Workshop - Flatiron Institute	12/2022
[P] APS Mid-Atlantic Section Meeting - Rutgers University	12/2021
[C] AAS Meeting 235 - Honolulu, HI	01/2020
[O] Society of Physics Students - Texas A&M University, College Station	02/2019
[P] CUWiP- Texas A&M University, Corpus Christi	01/2019
[P] AAS Meeting 233 - Seattle, WA	01/2019
[C] Texas Astronomy Undergraduate Research Symposium - University of Texas, Austin	10/2018

## Publications

F=First Author [6], C=Co-authored [5], M=Student Mentored [1]

- [F] Tillman, Burkhart Mingarelli et al. 2026. *“Implications of the nanoHertz Gravitational-Wave Background for Galactic Feedback and Massive Black Hole Growth.”* under review, arxiv:2602.15938
- [M] Pirecki et al. 2025. *“Exploring the impact of AGN feedback model variations on the Lyman- $\alpha$  Forest Flux Power Spectrum.”* Accepted to ApJ, arxiv:2509.18260
- [C] Iyer et al. 2025. *“How does feedback affect the star formation histories of galaxies?”* ApJ 994, 174, arXiv:2508.21152
- [F] Tillman et al. 2025b. *“Reconstructing galactic feedback history via the Lyman- $\alpha$  forest with Habitable Worlds Observatory.”* JATIS, 11, 042219, arXiv:2507.13442
- [F] Tillman et al. 2025a. *“The Effects of AGN Feedback on the Lyman- $\alpha$  Forest Flux Power Spectrum.”* ApJ, 980, 72, arXiv:2410.05383

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- [F] **Tillman et al. 2023b.** “*An Exploration of AGN and Stellar Feedback Effects in the Intergalactic Medium via the Low-redshift Lyman- $\alpha$  Forest.*” *ApJ*, 166, 6, arXiv:2307.06360
- [F] **Tillman et al. 2023a.** “*Efficient Long-range Active Galactic Nuclei Feedback Affects the Low-redshift Lyman- $\alpha$  Forest.*” *ApJL*, 945, L17, arXiv:2210.02467
- [C] **Butler Contreras et al. 2023.** “*X-ray absorption lines in the warm-hot intergalactic medium: probing Chandra observations with the CAMEL simulations.*” *MNRAS*, 519, 2, arXiv:2211.15675
- [C] **Villaescusa-Navarro et al. 2023.** “*The CAMELS Project: Public Data Release.*” *ApJS*, 265, 54, arXiv:2201.01300
- [C] **Burkhart et al. 2022.** “*The Low-redshift Lyman- $\alpha$  Forest as a Constraint for Models of AGN Feedback.*” *ApJL*, 933, L46, arXiv:2204.09712
- [F] **Tillman et al. 2022.** “*Running late: testing delayed supermassive black hole growth models against the quasar luminosity function.*” *MNRAS*, 511, 4, arXiv:2109.14647
- [C] **Cohn et al. 2018.** “*ZFOURGE Extreme 5007 $\text{\AA}$  Emission May Be a Common Early-lifetime Phase for Star-forming Galaxies at  $z > 2.5$ .*” *ApJ*, 86, 141C, arXiv:1811.00025