Marissa N. Perry

The University of Wisconsin at Madison
Department of Astronomy
2535 Sterling Hall, 475 N. Charter St.
Madison, WI 53706

E-mail: mperry.5262@gmail.com
GitHub: Marissa-Perry
Website: marissa-perry.github.io

RESEARCH INTERESTS

I am interested in the evolution of galaxies over cosmic time, leveraging large spectroscopic and imaging surveys as well as statistical and machine learning approaches to data analysis.

EDUCATION

The University of Texas at Austin — Aug. 2021—May 2025
Degree: B.S. Astronomy
Certificate: Programming and Computation

The University of Wisconsin at Madison — Aug. 2025—Present
Degree: Ph.D. Astronomy
Doctoral Minor: Computer Science

APPOINTMENTS

Research Assistant, UW Madison Dept. of Astronomy — Aug. 2025—Present
Advisors: Prof. Christy Tremonti and Dr. Marsha Wolf

Research Assistant, UT Austin Dept. of Astronomy — Jan. 2023—Aug. 2025
Advisor: Prof. Steven Finkelstein

NSF REU Intern, MIT Haystack Observatory — June 2023—Aug. 2023
Advisor: Dr. Jens Kauffmann

Freshman Research Initiative, UT Austin Dept. of Astronomy — Jan. 2022—Dec. 2022
Advisor: Prof. Michael Montgomery

PUBLICATIONS

Refereed

1. Perry, M. N., Taylor, A. J., Chavez Ortiz, O. A., Finkelstein, S. L., et al. 2025, *The Prevalence of Bursty Star Formation in Low-Mass Galaxies at z = 1–7 from Hα-to-UV Diagnostics.* Submitted to ApJ

Non-refereed

1. Perry, M. N., Sheen, D., and Kauffmann, J. 2024, *The Foundations of Multi-Line Molecular Cloud Population Synthesis*, Research Notes of the AAS, 8, 300, doi: 10.3847/2515-5172/ad9b2d

HONORS & AWARDS

Dean's Honored Graduate 2025
Awarded to ~1% of graduates in the College of Natural Sciences at UT Austin

Graduate of Distinction in Research 2025
Awarded to <5% of graduates in the College of Natural Sciences at UT Austin

Departmental Honors 2025
Honors thesis completed in the Dept. of Astronomy at UT Austin

NSF Graduate Research Fellowship Program, Honorable Mention 2025
Awarded to <24% of applicants

Ralph Cutler Green Endowed Scholarship ($2,500) 2025
Most prestigious undergraduate award from the Dept. of Astronomy at UT Austin

Summer Undergraduate Research Stipend ($2,500) 2024
Funded to conduct part-time research in the Dept. of Astronomy at UT Austin

NSF REU Fellowship ($6,000) 2023
Funded to conduct full-time research at MIT Haystack Observatory

Freshman Research Initiative Summer Fellowship ($2,000) 2022
Funded to conduct part-time research within the FRI Program at UT Austin

RESEARCH EXPERIENCE (1 NSF REU, 5 Other Research Assistantships)

Post-Starbursts as Laboratories **Aug. 2025—Present**

Dept. of Astronomy, The University of Wisconsin at Madison

Advisors: Prof. Christy Tremonti and Dr. Marsha Wolf

- Rare "post-starburst" galaxies provide ideal environments to study the physics driving the shut-down of star formation. Using the new near infrared (NIR) integral field spectrograph called NIRWALS on the 11-meter SALT telescope, we contribute to the optimization of the data reduction process and measure NIR emission lines to analyze star-formation rates (SFRs), gas supply, and any black hole feedback in several post-starburst galaxies.

Bursty Star Formation in Galaxies **Jan. 2024—Aug. 2025**

Dept. of Astronomy, The University of Texas at Austin

Advisor: Prof. Steven Finkelstein

- Used large-scale JWST surveys—CEERS and RUBIES—to obtain spectral and imaging data for a sample of ~350 high-redshift ($1 < z < 7$) galaxies and analyzed the timescale of their star formation events. This involves using two star formation rate (SFR) indicators: Balmer and UV continuum emission, which are sensitive to different star-forming timescales. The ratio of these SFR indicators serves as a proxy for galaxy burstiness.

High-Redshift Galaxy Catalog Cleaning with ML **Jan. 2023—Dec. 2023**

Dept. of Astronomy, The University of Texas at Austin

Advisor: Prof. Steven Finkelstein

- This work was included in JWST Cycle 3 and Cycle 4 Proposals (PI: Prof. Finkelstein)
- Background: develop an automated method for cleaning catalogs of high-redshift galaxies using public JWST NIRCam imaging data. Catalogs contain spurious (e.g., non-astrophysical) sources—such as bad pixels on the NIRCam detector or contamination from nearby stars—that typically require visual inspection to ensure a clean galaxy sample.
- Method 1: Used the t-Distributed Stochastic Neighbor Embedding algorithm to simplify the images while preserving important patterns and applied a clustering algorithm to group similar sources. This method significantly reduced the amount of data one would visually inspect by automatically flagging spurious sources.
- Method 2: Built a convolutional neural network (CNN) binary image classifier. Given a sample of galaxy images, the CNN is able to isolate and remove spurious sources, allowing for a quicker sample selection process.

The Foundations of Multi-Line Molecular Cloud Population Synthesis **June 2023—Aug. 2023**

MIT Haystack Observatory - NSF REU

Advisor: Dr. Jens Kauffmann

- Wrote Markov Chain Monte Carlo (MCMC)-based Python programs to theoretically observe unresolved molecular clouds in extragalactic systems. In the future, these investigations point us in the direction of overcoming the resolution gap between local and extragalactic environments in radio astronomy.

Chemical Cartography of the Milky Way Galaxy **Jan. 2022—Dec. 2022**

Dept. of Astronomy, The University of Texas at Austin

Advisors: Prof. Michael Montgomery and Prof. Keith Hawkins

- Tested recent findings of an apparent spiral structure in the chemical composition of stars in the Milky Way Galaxy (Poggio+2022; Hawkins+2023). These studies had shown a strong correlation between the galaxy's spiral structure and the chemical pattern observed in stars within the galaxy using data from the Gaia Data Release 3. However, this correlation was not found with data from the LAMOST survey. We further tested these findings using data from the APOGEE survey but similarly found no significant correlation.

Classifying White Dwarf Stars **June. 2022—Aug. 2022**

Dept. of Astronomy, The University of Texas at Austin

Advisor: Prof. Michael Montgomery

- Analyzed white dwarf stars from the Gaia Data Release 3, compared their spectra to corresponding SDSS spectra, identified their surface composition, observed crystallizing white dwarfs, and discussed the potential ages and binary origin of targets within the instability strip.

POSTERS AND TALKS (2 Talks, 2 AAS Meeting Posters, 7 Other Posters)

COSMIC FRONTIER CENTER CONFERENCE 2025 | Austin, TX

[Talk]: Perry, M. N., Taylor, A. J., Chavez Ortiz, O. A., Finkelstein, S. L., and Leung, G. C. K. (May. 2025), *The Burstiness of Star Formation: The Hα-to-UV Ratio in Galaxies at z=1-7*

UNDERGRADUATE RESEARCH FORUM 2025 | UT Austin, College of Natural Sciences

[Poster]: Perry, M. N., Taylor, A. J., Chavez Ortiz, O. A., Finkelstein, S. L., and Leung, G. C. K. (Apr. 2024), *The Burstiness of Star Formation: The Hα-to-UV Ratio in Galaxies at z=1-7*

245TH MEETING OF THE AMERICAN ASTRONOMICAL SOCIETY | National Harbor, MD

[iPoster]: Perry, M. N., Taylor, A. J., Chavez Ortiz, O. A., Finkelstein, S. L., and Leung, G. C. K. (Jan. 2025), *Investigating the Evolution of Bursty Star Formation with JWST*

UNDERGRADUATE RESEARCH FORUM 2024 | UT Austin, College of Natural Sciences
[Poster]: Perry, M. N., Taylor, A. J., Chavez Ortiz, O. A., Finkelstein, S. L., and Leung, G. C. K. (Apr. 2024), *Measuring Bursty Star Formation with JWST CEERS*

243RD MEETING OF THE AMERICAN ASTRONOMICAL SOCIETY | New Orleans, LA
[iPoster]: Perry, M. N. and Kauffmann, J. (Jan. 2024), *The Foundations of Multi-Line Molecular Cloud Population Synthesis*

FRANK N. BASH SYMPOSIUM 2023 | UT Austin, Dept. of Astronomy
[Poster]: Perry, M. N., Chatur, L., and Thakurdesai, U. (Oct. 2023), *Spurious Source Rejection Algorithms for Galaxies from JWST*

REU SYMPOSIUM 2023 | MIT Haystack Observatory, Westford, MA
[Talk]: Perry, M. N. and Kauffmann, J. (Aug. 2023), *The Foundations of Multi-Line Molecular Cloud Population Synthesis*

NORTHEAST STAR AND PLANET FORMATION MEETING 2023 | CfA, Cambridge, MA
[Poster]: Perry, M. N., Chatur, L., and Thakurdesai, U. (June 2023), *Spurious Source Rejection Algorithms for Galaxies from JWST*

UNDERGRADUATE RESEARCH FORUM 2023 | UT Austin, College of Natural Sciences
[Poster]: Perry, M. N., Chatur, L., and Thakurdesai, U. (Apr. 2023), *Gaussian Mixture Clustering Algorithm to Inspect z = 6-8 Galaxies from JWST CEERS*

FRESHMAN RESEARCH INITIATIVE PRESENTATION | UT Austin, Dept. of Astronomy
[Poster]: Perry, M. N., Thakurdesai, U., Navarrete, C., and Keating, P. (Dec. 2022), *Chemical Cartography of the Milky Way Galaxy*

FRESHMAN RESEARCH INITIATIVE PRESENTATION | UT Austin, Dept. of Astronomy
[Poster]: Perry, M. N., Chatur, L., Navarrete, C., Shaji, R., and Thakurdesai, U. (Sept. 2022), *White Dwarfs Research - Gaia*

ACADEMIC OUTREACH, LEADERSHIP, AND WORK EXPERIENCE

McDonald Observatory Outreach **March 2022**
[volunteered] *Dept. of Astronomy, UT Austin*

- Engaged with the public at the observatory's visitor center star party—an event which draws visitors from around the world to view the darkest skies in North America—by operating the center's dobsonian telescopes and inviting visitors to ask questions about famous astronomical objects.

Women in Natural Sciences (WINS) Program **Aug. 2021—May 2022**

[member] *College of Natural Sciences, UT Austin*

- Selected as part of a cohort of first-year undergraduate women encouraged to pursue research, provided with peer mentoring, and supported in fostering a strong sense of community in STEM.

Research Group Leadership Positions **Jan. 2024—May 2025**

[volunteered] *Galaxy Evolution Vertically Integrated Project (GEVIP) research group, UT Austin*

- Paper leader: reviewed recent astrophysical publications on arXiv, identified those most relevant to our research group's focus, and facilitated discussions around them.
- Senior leader: held weekly office hours to mentor my peers with their ongoing research projects.

Freshman Research Initiative (FRI) Mentor **Jan. 2023—Dec. 2024**

[paid] *Dept. of Astronomy, UT Austin*

Supervisor: Prof. Michael Montgomery

- The FRI program at UT Austin is the largest undergraduate research program in the nation. I have worked directly with 70+ first-year students, assisting them through coding lab assignments and astronomy-based research projects.

Physics Demonstration Lab **Jan. 2022—Dec. 2023**

[paid] *Dept. of Physics, UT Austin*

Supervisor: Dr. Aida Torabi

- Set up, tested, and delivered physics demonstrations to faculty.
- Assisted in designing new demonstrations and upgrading outdated demonstrations.
- Maintained the demo lab website using HTML .

SKILLS

Programming: Python (Jupyter), R (RStudio), LaTeX (Overleaf), Data Visualization (Pandas, Matplotlib, Seaborn), Machine Learning (scikit-learn, TensorFlow, Keras), Numerical Optimization (SciPy), Probabilistic Programming (emcee, PyMC), Databases (SQL: MySQL, Postgres) (NoSQL: MongoDB, Neo4j)

Languages: English (native), ASL (intermediate)