Yanbo Pan

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Research Interests

Observational Near-Field Cosmology; Dwarf Galaxies; Stellar Dynamics; Stellar Populations; Large Sky Surveys; Computational and Machine Learning Applications in Astrophysics; Astrostatistics

Education

- **University of Virginia** — *2025 – 2030 (Expected)*
  PhD in Astronomy — Charlottesville, VA
- **University of Michigan** — *2022-2025*
  Bachelor of Science: Astronomy & Astrophysics (with High Honors), Statistics, Interdisciplinary Physics — Ann Arbor, MI
  - GPA: 3.99/4.00 (High Distinction)
- **University of Wisconsin** — *2021-2022*
  Physics & Astronomy — Madison, WI
  - GPA: 4.00/4.00

Honors & Awards

1. Provost's Fellowship, University of Virginia ($32,500) — 2025–2030
2. Graduate Public Service Fellows, University of Virginia — 2026-2027
3. Double Hoo Research Award, University of Virginia ($6,000) — 2026
4. University Graduate Fellowship, Penn State University (Declined) — 2025
5. Homer F. Braddock/Nellie H. and Oscar L. Roberts Fellowship, Penn State University (Declined) — 2025
6. Jerome and Isabella Karle Physical Sciences Award, University of Michigan ($2,000) — 2025
7. Outstanding Undergraduate Major Award, Department of Statistics, University of Michigan — 2025
8. Graduation Speaker, Department of Statistics, University of Michigan — 2025
9. Dorrit Hoffleit Undergraduate Research Scholarship, Yale University ($4,600) — 2024
10. ERES IX Conference Travel Award, Cornell University — 2024
11. James B. Angell Scholar, University of Michigan — 2023–2025
12. University Honors, University of Michigan — 2022–2025
13. Dean's List, University of Wisconsin — 2021–2022

Publications

J=Journal, S=Submitted, P=In Prep

[J.2] **Pan, Y.**, et al. (2026). **JWST MEP—A World Under Spotty Starlight: Detection of CO_2 and H_2O in the Hot Saturn WASP-52b with JWST NIRSpec G395H**. *AJ*.

[J.1] Fournier-Tondreau, M., **Pan, Y.**, et al. (2025). **Transmission spectroscopy of WASP-52 b with JWST NIRISS: water and helium atmospheric absorption, alongside prominent star-spot crossings**. *MNRAS*.

[S.3] Holmberg, M., Espinoza, N., **Pan, Y.**, et al. (2026). **JWST-MEP: Limb Asymmetries and Possible Evidence for Time Variability in Kepler-12 b**. Submitted to *ApJL*.

[S.2] Kennedy, T. D., Steinrueck, M., Cukier, W., et al. (including **Pan, Y.**) (2026). **Interpreting Kepler-12b's Asymmetric NIRSpec/PRISM Transmission Spectrum with 2-D Microphysical Cloud Modeling**. Submitted to *ApJ*.

[S.1] Ou, X., Pace, A. B., Kallivayalil, N., et al. (including **Pan, Y.**) (2026). **From observing strategies to velocity dispersion bias: forward modeling unresolved binaries in ultra-faint dwarf galaxies**. Submitted to *ApJ*.

[P.1] **Pan, Y.**, et al. (2026). **Sgr dSph Unveiled in XP: Metallicity Distributions and 3D Kinematics in the Main Body of a Disrupting Satellite Galaxy**. In preparation.

Research Talks

APOGEE's Galactic Odyssey, Teruel, Spain 2026
Sgr dSph Unveiled: Metallicity Distributions and 3D Kinematics in the Main Body of a Disrupting Satellite Galaxy

Bob Rood Memorial Symposium, Charlottesville, VA 2026
HARLEE: Your Next RV Observing Partner with `theJoker`

UVa Astronomy Journal Club, Charlottesville, VA 2025
JWST MEP - A World Under Spotty Starlight: Atmospheric Forecast for the Hot Jupiter WASP-52b

AAS 245, National Harbor, MD 2025
Exploring the Chemical Recipes of a Hot Jupiter Behind the Shade of Spotty Starlight

Yale Summer Research Symposium, New Haven, CT 2024
Riding Two Dark Horses: A Spectroscopic Study of Ultra-faint Milky Way Satellites

ERES IX @ Cornell, Ithaca, NY 2024
The Effect of Stellar Features on Atmospheric Retrievals of WASP-52b's Transmission Spectrum

Student Astronomical Society Research Talk, Ann Arbor, MI 2023
Modelling Binary Orbits in the WIYN Open Cluster Survey - The alternative evolutionary tracks for binary stars

Posters

2nd Annual Cosmic Horizons Conference, Charlottesville, VA 2026
Less is More: Constraining Binary Orbits using the Helper for Analyzing RV with Limited Epochs and Error

AAS 244, Madison, WI 2024
Modelling Binary Orbits in the WIYN Open Cluster Survey

University of Michigan Undergraduate Research Fair, Ann Arbor, MI 2024
Mining Ultra-Faint Galaxies in the Local Group: Are Missing Satellites All Found?

University of Michigan Undergraduate Research Fair, Ann Arbor, MI 2023
Uncovering Ultra-Faint Galaxies in the Local Group

Workshops

Gaia Relay, Chicago, IL 2026
AI Boot Camp for Astronomers, Austin, TX 2026

Research Collaborations

Sloan Digital Sky Survey (**SDSS-V**)
NSF-Simons AI Institute for Cosmic Origins (**CosmicAI**)

Observing Experiences

APO 3.5m/DSSI 1 night

Research Experiences

Graduate Research, Astronomy Department | University of Virginia, VA 2025 – Present

Research Assistant (Advisors: Steve Majewski & Nitya Kallivayalil & Andrew Pace)

Chemo-dynamical analysis of resolved stellar populations in Milky Way dwarf galaxies

Construct binary star catalogs from multi-epoch SDSS/APOGEE spectroscopy across stellar populations

Develop algorithms to forecast radial velocities, optimize follow-up observations, and assess binary orbital constraints

Undergraduate Research, Astronomy Department | University of Michigan, MI 2024 – 2026

Research Assistant (Advisor: Ryan MacDonald)

Multidimensional atmosphere analysis of WASP-52b using JWST Cycle 2 NIRISS & NIRSpec transmission spectra

Undergraduate Research, Astronomy Department | Yale University, CT 2024 Summer

Dorrit Hoffleit Scholar (Advisor: Marla Geha)

A spectroscopic study of two ultra-faint Milky Way satellites' dynamics using Keck DEIMOS spectroscopy

Undergraduate Research, Astronomy Department | UW-Madison, WI 2023 – 2024

Research Assistant (Advisor: Robert Mathieu)

Evaluate the potential of theJoker in binary orbit modeling for the WIYN Open Cluster Survey

Undergraduate Research, Astronomy Department | University of Michigan, MI 2023 – 2024

Research Assistant (Advisor: Eric Bell)

Mining M31 ultra-faint dwarf satellites in the DECam Local Volume Exploration Survey DR2 footprint

Student Mentorship

Emma Breier (Structure Finding; UVa) 2026
Nikhil Limgala (Binary orbits modeling; UVa) 2026
James McDowell (Binary orbits modeling; UW-Madison) 2025
General Advising: Ava Love, Mudrika Patel 2026

Teaching Experiences

Teaching Assistant, ASTR 3130: Observational Astronomy Spring 2026, Spring 2027
Led Python and data analysis discussion sessions/labs on observational techniques; held weekly office hours; Graded lab reports

Instructor and Co-developer, Coding in Astronomy Workshop Series Fall 2026
Co-developed workshop materials; taught Python and machine learning techniques through hands-on coding sessions

Outreach Talks

McCormick Observatory Public Nights, Charlottesville, VA 2026
How do we find what we can't see? Small galaxies with big science

Fan Mountain Observatory Public Nights, Covesville, VA 2026
How do we find what we can't see?

Astronomy on Tap, Charlottesville, VA 2026
Hard-to-Find Cosmic Seasoning in Our Galactic Boiling Soup

Graduation Remarks, Department of Statistics, Ann Arbor, MI 2025
From Statistical Toolbox to the Expanding Universe

Student Astronomical Society Outreach Talk, Ann Arbor, MI 2025
Dwarf Galaxies: Hidden Gems in Our Cosmic Neighborhood

Year of the Dragon Planetarium Talk, Ann Arbor, MI 2024
The Great Race - The Origin of the Chinese Zodiac

University of Michigan Physics 391 Talk, Ann Arbor, MI 2023
The Missing Satellite Problem

Science Communication & Public Outreach

Scientific blogger AstroPie@RedNote

Doghouse telescope operator @ UVa McCormick Observatory

Graduate reviewer for ASPIRE program @ UVa

Panelist for the 2026 summer Building Leaders for Advancing Science and Technology (BLAST) program

Undergraduate mentor of the U-M Student Astronomical Society (SAS) UFD group

Undergraduate co-representative of the U-M Astronomy Climate committee

Guest writer of the Astrobites Undergraduate Research Series

Volunteer tutor @ the Greater University Tutoring Service (GUTS)

Community speaker of the Chinese New Year Show @ the U-M Planetarium and Dome Theater

Travel agent summer intern @ China CYTS Tours Holding Co., Ltd

Astronomy Data Science Skills

- **Proficient:** Python, R, Markdown, Jupyter, LaTeX
- **Intermediate:** SQL, MESA-web, Cloud Computing, Unix Shell, WSL, Version Control
- **Familiar:** C++, HTML/CSS, Docker, MATLAB, DS9
- **Datasets:** DECam Local Volume Exploration Survey (DELVE), ESA - Gaia, WIYN Open Cluster Survey (WOCS), JWST Transmission Spectra (NIRISS & NIRSpec), Keck DEIMOS Spectra
- **Packages:** pandas, numpy, matplotlib, seaborn, scikit-learn, PyTorch, TensorFlow, scipy, sqlite3, emcee, pymultinest, pymc3, theJoker, POSEIDON, ezpadova, gala, fitsio, astropy, astroquery

Professional Experiences

- **Member of the Astrobiology Team** *2022 - 2023*
  MRover | *University of Michigan, MI* [🌐]
  ◦ Developed chemical tests for life detection and collaborated on implementation for the University Rover Challenge
- **Museum Docent** *2021 - 2022*
  The L.R. Ingersoll Physics Museum | *UW-Madison, WI* [🌐]
  ◦ Facilitated physics demonstrations and conducted educational events during the Wisconsin Science Festival
- **Part-time Tutor** *2021 - 2022*
  The Jingrui Academy of Science | *Ningbo, China*
  ◦ Provided academic tutoring in math, physics, and economics to IB students through customized instruction