MELANIE ROWLAND

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EDUCATION

Ph.D, The University of Texas, Austin, TX *Expected Summer 2025*
Dissertation: *The Complex Clouds and Chemistry of Directly Imaged Exoplanets and Brown Dwarfs*

M.A., The University of Texas, Austin, TX *2022*
Thesis: *Towards Robust Atmospheric Retrieval on Cloudy L Dwarfs: The Impact of Thermal and Abundance Profile Assumptions*
Advisor: Caroline Morley

B.S. University of Maryland, College Park, MD *2019*
Astronomy (High Honors), Physics, Minor in Planetary Science GPA: 3.87
Thesis: *Mapping water ice and silicates in interstellar dust clouds using background spectra and broad-band photometry*
Advisors: Lee Mundy, Tracy Huard

B.S. Towson University, Towson, MD *2014*
Psychology and Family Science GPA: 3.93, summa cum laude

RESEARCH AND TEACHING EXPERIENCE

Graduate Research Assistant *2019 - Present*
The University of Texas at Austin, Austin, TX
Worked with CHIMERA, an atmospheric retrieval code in Python, to incorporate the effects of clouds, disequilibrium chemistry, and variability in brown dwarf and exoplanet atmospheres. Worked with PICASO and VIRGA, an atmospheric and cloud model in Python, to forward model the effects of silicate grains on brown dwarf and directly-imaged exoplanet spectra.

Graduate Teaching Assistant *2019, 2023*
The University of Texas at Austin, Austin, TX
Ran a coding bootcamp tutorial, held biweekly office hours where assisted with both computational and theoretical problem sets, held hour-long review sessions, graded exams and projects, and assisted students in learning course objectives during class time.

Undergraduate Research Assistant *2018 - 2019*
University of Maryland, College Park, MD
Characterized interstellar dust clouds and molecular cores including star forming regions by analyzing spectra and broadband photometry of background stars. Modified and a spectra fitting code in IDL to measure characteristic absorption features of water ice and silicates in the infrared.

Research Associate *2014 - 2019*
WRMA, Inc., A Trimetrix Company, Rockville, MD
Worked on several social science research contracts for the Department of Health and Human Services (DHHS) which included overseeing the data collection and data standardization of all federally reported child abuse and neglect data from the 50 states, District of Columbia, and Puerto Rico as the data collection and validation task lead. Conducted data analyses on large data sets (more than 45 million records of 152 variables) for annual reports publicly released by DHHS, national conferences, reporters, and members of congress using Tableau and SPSS software.

Mathematics Tutor *2011 - 2013*
Towson University, Towson, MD
Tutored developmental math and pre-calculus to undergraduates.

Undergraduate Research Assistant *2012 - 2013*
Towson University, Towson, MD
Conducted physiological psychology research studying the effects of the striatum on memory in mice. Conducted literature reviews and assisted in developing the maze apparatus.

GRANTS AWARDED

2024, Fred T. Goetting, Jr. Memorial Endowed Presidential Scholarship ($8,500)

2020, Future Investigators in NASA Earth and Space Science and Technology (FINESST) ($135,000)

SEMINARS, COLLOQUIA, AND CONFERENCE TALKS

AAS Winter Meeting 245, (*Dissertation Talk*), National Harbor, MD, January 15, 2025

NASA Ames Research Center, Space Science & Astrobiology Seminar, Moffett Field, CA, December 5, 2024

University of California, Santa Cruz, Planetary Lunch Seminar (*invited*), Santa Cruz, CA, December 2, 2024

Amherst College Physics Colloquium (*invited*), Amherst, MA, October 29, 2024

Texas Area Planetary Science Meeting, San Antonio, TX, August 15, 2024

Challenge Accepted: Linking Planet Formation with Present-Day Atmospheres, Heidelberg, Germany, July 10, 2024

Cool Stars 22, San Diego, CA, June 24, 2024

Extreme Solar Systems V, Christchurch, New Zealand, March 18, 2024

Other Worlds Laboratory, Santa Cruz, CA, July 18, 2023

Arizona State University Stars/Brown Dwarfs/Exoplanets Seminar (*invited*), March 3, 2023

The American Museum of Natural History Astros Seminar (*invited*), New York, NY, February 21, 2023

CloudZweiCon, Ringberg Castle, Germany, January 26, 2023

POSTER PRESENTATIONS

Texas Area Planetary Science Meeting, San Antonio, TX, August 17, 2023

Sagan Summer School, Pasadena, CA, July 24, 2023

Cool Stars 21, Toulouse, France, July 4, 2022.

Exoplanets IV, Las Vegas, Nevada, May 2, 2022.

Cool Stars 20.5, Virtual Conference, March 2, 2021.

Exoplanets 3, Virtual Conference, July 30, 2020

AAS Winter Meeting 2019, Seattle, WA, January 8, 2019

PROFESSIONAL DEVELOPMENT AND MENTORING

Founder of the Planetary Peer Network, a part of the Center for Planetary Systems Habitability aimed at increasing interdisciplinary collaboration across 5 departments and 3 colleges (*Summer 2024 - Present*)

Research mentor of an undergraduate student performing atmospheric retrievals on cold Y dwarfs observed with JWST (*January 2024 - Present*)

Peer mentor for the Graduate-Undergraduate Mentorship in astronMY (GUMMY) program and for summer students participating in the NSF and TAURUS Research Experiences for Undergraduates at the University of Texas at Austin (*Fall 2021 - Summer 2023*)

Participant in Communicating Science for Public Policy Course (*Spring 2022*)

OUTREACH AND DEI WORK

Graduate student representative for the Department of Astronomy, which included identifying and initiating steps to register the Astronomy Equity and Inclusion Journal Club as a student-led organization in response to Texas State Bill 17 and participating in external programatic and culture reviews (*Summer 2023 - Summer 2024*)

Equity & Inclusion Journal Club participant in the Department of Astronomy, which includes presenting articles and participating in discussions aimed at making the astronomy department more diverse, equitable, inclusive, and accessible (*Fall 2019 - Present*)

Girl Day volunteer at UT's annual outreach event aimed at school-age children, which includes preparing and performing astronomy demos and explaining scientific concepts to the public (*2020 - Present*)

PUBLICATIONS (7 TOTAL; 2 FIRST-AUTHOR)

[1] Alejandro, S.; + 27 others, including **Rowland, M.J.**. Diversity of Cold Worlds: A Near Complete Spectral Energy Distribution for 2MASS J04151954-0935066 using JWST, The Astrophysical Journal, submitted (2025).

[2] Hoch, K.; **Rowland, M.J.**; + 28 others. (2nd author; led modeling effort) Direct detection of silicate clouds in a multiplanet system around a Sun-like star, Nature, in review (2025).

[3] Bardalez Gagliuffi, D.C.; + 24 others, including **Rowland, M.J.**. The Diversity of Cold Worlds: a blended-light binary straddling the T/Y transition in brown dwarfs, The Astrophysical Journal, accepted (2025).

[4] **Rowland, M.J.**; Morley, C.V.; Miles, B.E.; Suarez, G.; Faherty, J.K; Skemer, A.J.; Beiler, S.A.; Line, M. R.; Bjoraker, G.L.; Fortney, J.J.; Vos, J.M.; Alejandro Merchan, S.; Marley, M.S.; Burningham, B.; Freedman, R.; Gharib-Nezhad, E.; Batalha, N.; Lupu, R.; Visscher, C.; Schneider, A.C.; Geballe, T.R.; Carter, A.; Allers, K.; Mang, J.; Apai, D.; Limbach, M.A.; Wilson, M.J. Protosolar D-to-H abundance and one part per billion PH_3 in the coldest brown dwarf, The Astrophysical Journal Letters, Volume 977, Issue 2, id.L49, 12pp. (2024)

[5] Faherty, J.K.; + 23 others, including **Rowland, M.J.** Methane emission from a cool brown dwarf, Nature, Volume 628, Issue 8008, p.511-514 (2024).

[6] Finkelstein, S.; + 58 others, including **Rowland, M.J.** The Complete CEERS Early Universe Galaxy Sample: A Surprisingly Slow Evolution of the Space Density of Bright Galaxies at $z \sim 8.5$–14.5, The Astrophysical Journal Letters, Volume 969, Issue 1, id.L2, 32 pp. (2024).

[7] **Rowland, M.J.**; Morley, C.V.; Line, M. R. Toward Robust Atmospheric Retrieval on Cloudy L Dwarfs: the Impact of Thermal and Abundance Profile Assumptions, The Astrophysical Journal, Volume 947, Issue 1, id.6, 17 pp. (2023).