Dr. Brianna Irene Lacy - Curriculum Vitae

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Positions Held

51 Pegasi b Post-doctoral Fellow — Santa Cruz, CA
University of California Santa Cruz — *September 2023 – present*

51 Pegasi b Post-doctoral Fellow — Austin, TX
University of Texas at Austin — *September 2021 – August 2023*

Graduate Research Assistant — Princeton, NJ
Princeton University — *September 2016 – August 2021*

Post-Baccalaureate Research Assistant — Seattle, WA
University of Washington — *August 2015 – August 2016*

Education

Princeton University — Princeton, NJ
Ph.D. in Astrophysical Sciences — *September 2016 – August 2021*

University of Washington — Seattle, WA
Bachelor of Science in Physics and Astronomy — *September 2011 – May 2015*

Awards

2024 – Heising-Simons Foundation Early-Faculty Development Award (PI) — $125,000

2021 – 51 Pegasi b Postdoctoral Fellowship in Planetary Astronomy (PI) — $375,000

2015 – UW Physics Department's Mary L. Boas Endowed Scholarship — $3,000

Teaching Experience

Texas Prison Education Initiative Instructor — Austin, TX
University of Texas at Austin — *September 2022 – September 2023*

Prison Teaching Initiative Instructor — Princeton, NJ
Princeton University — *September 2018 – March 2020*

Assistant Instructor — Princeton, NJ
Princeton University — *February 2017 – May 2017*

Telescope Proposals

CoI - Solving a Solar Neighborhood Crime Scene by Imaging 14 Her c — JWST GO 3337
PI: Daniella Bardalez-Gagliuffi — *7.8 hrs cycle 2*

Peer-reviewed Publications

13. **Lacy, B.**; Faherty, J.K.; Burningham, B.; Suarez, G.; et al., *Mapping Disequilibrium Chemistry Trends in JWST Observations of Late T and Y Dwarfs*, (submitted 2024)

12. El Morsy, M.; Currie, T.; ... ; **Lacy, B.**; et al., *Dynamical and Atmospheric Characterization of the Substellar Companion HD 33632 Ab from Direct Imaging, Astrometry, and Radial-Velocity Data*, (submitted 2024) — Consulted on model interpretation

11. Tobin, T. L.; Currie, T.; ... ; **Lacy, B.**; et al., *Direct-imaging Discovery of a Substellar Companion Orbiting the Accelerating Variable Star HIP 39017*, The Astronomical Journal, Volume 167, Issue 5, id.205, 20 pp. (2024) — Consulted on model interpretation

10. Faherty, J. K.; Burningham, B.; ... ; **Lacy, B.**; et al., *Methane emission from a cool brown dwarf*, Nature, Volume 628, Issue 8008, p.511-514 (2024) — Contributed models, interpretation and editing

9. **Lacy, B.** & Burrows, A., *Self-consistent Models of Y Dwarf Atmospheres with Water Clouds and Disequilibrium Chemistry*, The Astrophysical Journal, Volume 950, Issue 1, id.8, 30 pp. (2023)

8. Currie, T.; G. Brandt, M.; Brandt, T. D.; **Lacy, B.**; et al., *Direct Imaging and Astrometric Discovery of a Superjovian Planet Orbiting an Accelerating Star*, Science, 380, 198. (2023) — Contributed model grid to aid in prediction of planet's optical brightness

7. **Lacy, B.** & Burrows, A., *JWST Transit Spectra II: Constraining Aerosol Species, Particle-size Distributions, Temperature, and Metallicity for Cloudy Exoplanets*, The Astrophysical Journal, Volume 904, Issue 1, id.25, 43 pp. (2020)

6. **Lacy, B.** & Burrows, A., *JWST Transit Spectra I: Exploring Potential Biases and Opportunities in Retrievals of Tidally-locked Hot Jupiters with Clouds and Hazes*, The Astrophysical Journal, Volume 905, Issue 2, id.131, 38 pp. (2020)

5. **Lacy, B.** & Burrows, A., *Prospects for Directly Imaging Young Giant Planets at Optical Wavelengths*, Astrophysical Journal, Volume 892, Issue 2, article id. 151, 20pp. (2020)

4. **Lacy, B.**; Shlivko, D.; Burrows, A., *Characterization of Exoplanet Atmospheres with the Optical Coronagraph on WFIRST*, The Astronomical Journal, Volume 157, article id. 132, 132 pp. (2019)

3. Wallerstein, G.; Anderson, R. I.; Farrell, E. M.; Guinan, E.; Albright, M.; **Lacy, B.**; et al., *The Behavior of the Paschen and Calcium Triplet Lines in Cepheid Variables II: The 16-day Variable X Cygni*, Publications of the Astronomical Society of the Pacific, Volume 131, Issue 1003, pp. 094203 (2019) — Assembled tables and figures, measured radial velocity shifts of diagnostic spectral lines

2. Hughes, J.; **Lacy, B.**; Sakari, C.; Wallerstein, G.; Davis, C.E.; et al., *A Multiwavelength Study of the Segue 3 Cluster*, The Astronomical Journal, Volume 154, Number 2, article id. 57, 18 pp. (2017) — Completed all data reduction and photometry

1. Agol, E.; Jansen, T.; **Lacy, B.**; Robinson, T.; Meadows, V.; *The Center of Light: Spectroastrometric Detection of Exomoons*, Astrophysical Journal, Volume 812, Issue 1, article id. 5, 16 pp. (2015) — Contributed to methods, results, discussion and conclusion sections, working in equal partnership with fellow undergraduate Tiffany Jansen while under the advice of Prof. Eric Agol

Conference Publications

1. Douglas, E. S.; Ashcraft, J. N.; Belikov, R.; Debes, J.; Kasdin, J.; Krist, J.; **Lacy, B.**; et al., *A Review of Simulation and Performance Modeling Tools for the Roman Coronagraph Instrument*, Proceedings of the SPIE, Volume 11443, id. 1144338 11 pp. (2020) — Contributed figure and paragraphs describing exoplanet spectral models

Select Research Presentations

2024 - *Exploring the Diversity of Cold Worlds: JWST's First Look at Late T and Y Dwarf Atmospheres*, San Francisco State Astronomy Department Colloquium, San Francisco, CA (invited)

2024 - *Explaining the Diversity of Cold Worlds: Nonequilibrium Chemistry in Late T and Y Dwarfs*, 51 Pegasi b Summit, San Francisco, CA

2024 - *Leveraging Substellar Worlds as Laboratories of Atmospheric Physics*, Other Worlds Laboratory, Santa Cruz, CA

2024 - *Explaining the Diversity of Cold Worlds: Nonequilibrium Chemistry in Late T and Y Dwarfs*, Coolstars Splinter Session, San Diego, CA (invited)

2024 - *Explaining the Diversity of Cold Worlds: A Forward Model Analysis of Late T and Y Dwarf JWST Observations*, California Institute of Technology Teatime Seminar, Pasadena, CA (invited)

2024 - *Explaining the Diversity of Cold Worlds: A Forward Model Analysis of Late T and Y Dwarf JWST Observations*, Bay Area Exoplanet Meeting, Mountainview, CA

2024 - *JWST Constraints on Vertical Mixing in Y Dwarf Atmospheres*, American Astronomical Society Annual Winter Meeting, New Orleans, LA

2023 - *Testing Cold Atmosphere Models with JWST Spectroscopy of Late T and Y Dwarfs*, CIPS Seminar, Berkeley, CA (invited)

2023 - *A New Grid of Cold H2-He Dominated Atmosphere Models with Water Clouds and Nonequilibrium Chemistry*, Exoclimes VI, Exeter, United Kingdom

2023 - *Self-consistent Y Dwarf Atmosphere Models with Disequilibrium Chemistry and Water Clouds*, Protstars and Planets VII, Kyoto, Japan

2023 - *New Models for JWST's Diversity of Cold Worlds*, AMNH Astronomy Seminar, New York, NY (invited)

2023 - *Water Clouds and Vertical Mixing in Y Dwarf Atmospheres*, Cloud Zwei Con, Ringberg Castle, Germany (invited)

2022 - *Water Clouds and Vertical Mixing in Y Dwarf Atmospheres*, OSU Exoplanet Seminar, Columbus, OH (invited)

2022 - *Water Clouds and Vertical Mixing in Y Dwarf Atmospheres*, 51 Pegasi b Summit, San Francisco, CA

2022 - *Self-Consistent Models of Y Dwarf Atmospheres with Water Clouds and Disequilibrium Chemistry*, Cool Stars 21, Toulouse, France

2022 - *Self-Consistent Models of Y Dwarf Atmospheres with Water Clouds and Disequilibrium Chemistry*, Exoplanets IV, Las Vegas, NV

2021 - *Modeling and Characterizing Substellar Atmospheres*, New Post-doc Colloquium, Austin, TX, 2021 (invited)

2021 - *Windows into Alien Worlds: Modeling and Characterizing Substellar Atmospheres*, Thesis Seminar, Princeton, NJ

2021 - *A Closer Look at Cloudy Tidally-locked Exoplanets*, 51 Pegasi b Summit, held virtually

2020 - *Retrievals of Tidally-locked Hot Jupiters with Clouds and Hazes*, UT Austin Cosmos Seminar, Austin, TX (invited, given via zoom)

2020 - *Directly Imaging Young Giant Planets with Roman-CGI*, Roman-CGI SIT Student Symposium, held virtually

2020 - *Retrievals of Tidally-locked Hot Jupiters with Clouds and Hazes*, JPL Exoplanet Journal Club, Pasadena, CA (invited, given via zoom)

2020 - *Retrievals of Tidally-locked Hot Jupiters with Clouds and Hazes*, MPIA ExoCoffee, Heidelberg, Germany (invited, given via zoom)

2020 - *Prospects for Directly Imaging Young Giant Planets in the Optical*, Winter OWL Meeting, Honolulu, HI (invited)

2020 - *Combined Effects of Aerosols and Day-Night Temperature Gradients on Transit Spectra*, AAS, Honolulu, HI

2019 - *Characterizing Exoplanets with WFIRST-CGI*, Cornell Planet Seminar, Ithaca, NY

2019 - *Prospects for Directly Imaging Young Giant Planets in the Optical*, Brown Dwarf Exoplanet Connections III, Wilmington, DE

2019 - *Prospects for Directly Imaging Young Giant Planets in the Optical*, Extreme Solar Systems IV, Reykjavik, Iceland

2019 - *Combined Effects of Aerosols and Day-Night Temperature Gradients on Transit Spectra*, ExoClimes V, Oxford, UK

2018 - *Characterization of Exoplanet Atmospheres with the Optical Coronagraph on WFIRST*, Sagan Exoplanet Summer Workshop, Pasadena, CA

2018 - *Characterization of Exoplanet Atmospheres with the Optical Coronagraph on WFIRST*, AAS, Washington D.C.

2015 - *Modeling Spectroastrometric Detections of Exomoons*, Pathways to Habitable Planets II, Berne, Switzerland (invited)

Community Participation and Leadership

Mentorship: research mentor to two UT Austin undergraduate students 2021-2023, near-peer mentor to Princeton post-baccalaureate student 2018-2019, mentor to two Princeton undergraduates through Undergraduate Women in Physics 2018-2020
Leadership Roles: co-organizer UC Santa Cruz Planet Lunch 2024 - present, department post-doc rep at UT Austin 2022-2023, department rep to Princeton's Graduate Student Government 2018-2021, co-organizer of Graduate Student Mental Health Awareness Month 2019-2020, co-organizer of Princeton Astro's DEI journal club 2019-2021
Conference Organization: EXOMINTS 2025 SOC, Bash Symposium 2023 co-chair, Emerging Researchers in Exoplanet Science IV 2021 SOC
Departmental Committees: UT Austin graduate admissions 2022-2023, mock-TAC for UT Austin graduate student observing seminar 2022, graduate student rep for Princeton graduate admissions 2020
Referee: external reviewer for JWST TAC, Astronomy & Astrophysics, Nature Astronomy, Astrophysical Journal
Professional Development Training: AAS Equity in Graduate Admissions workshop 2021, Princeton Cultivating Culturally Competent Leaders workshop 2019, Princeton How to be an Effective Ally workshop 2018, Princeton Distress Awareness & Response training 2018
Recurring Outreach Roles: Princeton Public Observing Night Host 2016-2020, astro-news coordinator for Astronomy on Tap Trenton 2019
Outreach Talks: (4) *Exoplanet Atmospheres in High Definition*, McDonald Observatory Board of Visitors fundraising event, Jeff Davis County, TX, 2022 (3) *Tracking New Exoplanet Populations with WFIRST*, NASA Hyperwall Talk at AAS, Honolulu, 2020; (2) *Exploring Exomoons*, presentation at University of Washington Public Observing Night, Seattle, 2015; (1) *The Expanding Universe*, Planetarium Show at University of Washington, Seattle, 2015
One-time or Annual Outreach Events: UT Austin STEM Girl Day 2023, Princeton Astrophysics table at Dia de la Ciencia 2019, Princeton Astrophysics table at Young Women in Stem Day 2016, Activity Leader Girl Scout Space Science Badge Day 2016, Guest Lecture Trenton Young Scholars Institute 2016