Dr. Ryan C. Challener

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Positions

Research Associate, Cornell University, Ithaca, New York, 2025 – present
Postdoctoral Researcher, Cornell University, Ithaca, New York, 2023 – 2025
Visiting Lecturer, Cornell University, Ithaca, New York, Fall 2025
Postdoctoral Researcher, University of Michigan (UM), Ann Arbor, Michigan, 2020 – 2023

Education

University of Central Florida (UCF), PhD Physics, 2020
University of Rochester (UR), BS Physics & Astronomy and BA Mathematics, 2014

Awarded Grants and Observing Time

TESS, Cycle 8, ∼30 targets (PI, TESS-GI-08132) $0
"The Spatial Extent of Clouds in Hot-Jupiter Atmospheres"

JWST, Cycle 4, 31.7 hours (PI, PIs Mullens + Challener, JWST-GO-07686) $120,773
"Brown Dwarf Broiler: Probing Chemical Quenching and Heat Redistribution in a Highly-Eccentric Brown Dwarf"

JWST, Cycle 4, 37.7 hours (Co-I, PIs Mullens + Moran, JWST-GO-08309) $96,885
"It's (poly)Morphin Time! Solving the quartz quandary of WASP-17b"

2024 NASA ROSES XRP (Science PI) $631,485
"Extending 3D Eclipse Mapping to Cooler Atmospheres"

JWST, Cycle 3, 26.0 hours (Co-I, PI Valentine, JWST-GO-05687) $91,458
"Unlocking New Dimensions in Eclipse Mapping with KELT-8b"

2019 NASA ROSES TWSC (PI Harrington) $25,000
Travel funding for Exoclimes V conference attendees

Spitzer, Cycle 13 DDT, 86.5 hours (Co-I, PI Jenkins, Spitzer-DDT-13155) $10,000
"Search for Transits by the Earth Analogue around Proxima Centauri"

2016 NASA ROSES XRP (Co-I, PI Harrington) $551,614
"Atmospheric Retrievals from Exoplanet Observations and Simulations with BART"

Member of JWST GTO collaborations: NIRSpec, TST-DREAMS, and MANATEE

Member of the EXoplanet Climate Infrared TElescope (EXCITE) team

Selected Talks

Penn State Center for Exoplanets and Habitable Worlds Seminar	Winter 2026
Exoclimes VII Conference, Université de Montréal, Canada	Summer 2025
Aspen Exoplanet Conference, Aspen, USA	Spring 2025
Cornell University Department of Astronomy Colloquium	Fall 2024
Exoplanets V Conference, Leiden University, Netherlands	Summer 2024
American Astronomical Society Conference, New Orleans, USA	Winter 2024
University of Rochester Department of Physics & Astronomy Colloquium	Fall 2023
Exoclimes VI Conference, University of Exeter, UK	Summer 2023

Teaching, Mentoring, Service, and Outreach

Cornell, Fall 2025. Visiting lecturer for graduate-level course on planetary atmospheres. 10 lectures.

Cornell, 2025. Public talk to the Cornell Friends of Astronomy.

Cornell, 2024 - present. Organizer of the Cornell exoplanet journal club.

Cornell, 2024. Participant in a postdoctoral course on becoming an effective leader.

Cornell, 2023 - 2025. Research mentor to a Cornell graduate student (ad hoc committee member) and two undergraduate students.

UM/Cornell, 2022 - 2025. Guest lecturer for undergrad- and grad-level courses.

UM/Cornell, 2022 - 2025. Research mentor to a graduate student at Penn State University.

UM, 2022 - 2023. UM Exoplanet Journal Club organizer.

UM, 2022. Public talk to the Ford Amateur Astronomy Club.

UM, Spring 2022. Participant in a postdoctoral course on teaching in higher education.

UM, 2021 - 2022. UM Department of Astronomy colloquium series organizer.

UM, 2021 - 2022. Mentor for two undergraduate research projects.

UCF, 2019 - 2020. Assisted with planning and executing the UCF JWST Master Class workshop.

UCF, 2018 - 2020. Volunteer mentor for 1st year graduate students.

UCF, 2015 - 2020. Volunteer for an outreach program at the UCF observatory.

Publications (Full List)

Challener, R. C., M. Weiner Mansfield, *et al.*, Horizontal and vertical exoplanet thermal structure from a JWST spectroscopic eclipse map, *Nature Astronomy* **9**, 1821–1832, 2025.

Challener, R. C., Z. Rustamkulov, E. K. H. Lee, *et al.*, Latitudinal Asymmetry in the Dayside Atmosphere of WASP-43b, *ApJ* **969**, 2, L32, 2024.

Challener, R. C., L. Welbanks, and P. McGill, Bringing 2D Eclipse Mapping out of the Shadows with Leave-one-out Cross Validation, *AJ* **166**, 6, 251, 2023.

Challener, R. C. and E. Rauscher, The eclipse-mapping null space: Comparing theoretical predictions with observed maps, *AJ* **166**, 4, 176, 2023.

Challener, R. C. and E. Rauscher, ThERESA: Three-dimensional Eclipse Mapping with Application to Synthetic JWST Data, *AJ* **163**, 3, 117, 2022.

Challener, R. C., J. Harrington, P. E. Cubillos, J. Blecic, and B. Smalley, Spitzer Dayside Emission of WASP-34b, *PSJ* **3**, 4, 86, 2022.

Challener, R. C., J. Harrington, J. Jenkins, *et al.*, Identification and Mitigation of a Vibrational Telescope Systematic with Application to Spitzer, *PSJ* **2**, 1, 9, 2021.

Sotzen, K. S. *et al.*, Non-detection of Nightside Emission from HAT-P-26b due to Stellar Contamination, *Research Notes of the American Astronomical Society* **9**, 12, 352, 2025.

Lustig-Yaeger, J. *et al.*, JWST-TST DREAMS: The Nightside Emission and Chemistry of WASP-17b, *ApJ* **994**, 1, L4, 2025.

Valentine, D., H. R. Wakeford, M. Hammond, R. C. **Challener**, *et al.*, Eclipse mapping with Ariel: future prospects for a population-level mapping survey, *MNRAS* **544**, 4, 3647–3682, 2025.

Gressier, A. *et al.*, JWST-TST DREAMS: Sulfur Dioxide in the Atmosphere of the Neptune-mass Planet HAT-P-26 b from NIRSpec G395H Transmission Spectroscopy, *AJ* **170**, 5, 292, 2025b.

Glidden, A. *et al.*, JWST-TST DREAMS: Secondary Atmosphere Constraints for the Habitable Zone Planet TRAPPIST-1 e, *ApJ* **990**, 2, L53, 2025.

Espinoza, N. *et al.*, JWST-TST DREAMS: NIRSpec/PRISM Transmission Spectroscopy of the Habitable Zone Planet TRAPPIST-1 e, *ApJ* **990**, 2, L52, 2025.

Lally, M., R. C. **Challener**, *et al.*, Eclipse Mapping with MIRI: 2D Map of HD 189733b from 8 μm JWST MIRI LRS Observations, *ApJ* **983**, 1, L13, 2025.

Louie, D. R. *et al.*, JWST-TST DREAMS: A Precise Water Abundance for Hot Jupiter WASP-17b from the NIRISS SOSS Transmission Spectrum, *AJ* **169**, 2, 86, 2025.

Jacobs, B., J.-M. Désert, N. Lewis, R. C. **Challener**, *et al.*, Spectroscopically Resolved Partial Phase Curve of the Rapid Heating and Cooling of the Highly Eccentric Hot Jupiter HAT-P-2b with WFC3, *AJ* **169**, 2, 96, 2025.

Gressier, A. *et al.*, JWST-TST DREAMS: A Supersolar Metallicity in WASP-17 b's Dayside Atmosphere from NIRISS SOSS Eclipse Spectroscopy, *AJ* **169**, 2, 57, 2025a.

Valentine, D., H. R. Wakeford, R. C. **Challener**, *et al.*, JWST-TST DREAMS: Nonuniform Dayside Emission for WASP-17b from MIRI/LRS, *AJ* **168**, 3, 123, 2024.

Schlawin, E. *et al.*, Multiple Clues for Dayside Aerosols and Temperature Gradients in WASP-69 b from a Panchromatic JWST Emission Spectrum, *AJ* **168**, 3, 104, 2024.

Banerjee, A. *et al.*, Atmospheric Retrievals Suggest the Presence of a Secondary Atmosphere and Possible Sulfur Species on L98-59 d from JWST Nirspec G395H Transmission Spectroscopy, *ApJ* **975**, 1, L11, 2024.

Gressier, A. *et al.*, Hints of a Sulfur-rich Atmosphere around the 1.6 $R_\oplus$ Super-Earth L98-59 d from JWST NIRspec G395H Transmission Spectroscopy, *ApJ* **975**, 1, L10, 2024.

Sing, D. K. *et al.*, A warm Neptune's methane reveals core mass and vigorous atmospheric mixing, *Nature* **630**, 8018, 831–835, 2024.

Hammond, M., T. J. Bell, R. C. **Challener**, *et al.*, Two-dimensional Eclipse Mapping of the Hot-Jupiter WASP-43b with JWST MIRI/LRS, *AJ* **168**, 1, 4, 2024.

Bell, T. J. *et al.*, Nightside clouds and disequilibrium chemistry on the hot Jupiter WASP-43b, *Nature Astronomy* **8**, 879–898, 2024.

Coulombe, L.-P., B. Benneke, R. **Challener**, *et al.*, A broadband thermal emission spectrum of the ultra-hot Jupiter WASP-18b, *Nature* **620**, 7973, 292–298, 2023.

Schlawin, E., R. **Challener**, *et al.*, Planet Eclipse Mapping with Long-term Baseline Drifts, *AJ* **165**, 5, 210, 2023.

Harrington, J. *et al.*, An Open-source Bayesian Atmospheric Radiative Transfer (BART) Code. I. Design, Tests, and Application to Exoplanet HD 189733b, *PSJ* **3**, 4, 80, 2022.

Cubillos, P. E. *et al.*, An Open-source Bayesian Atmospheric Radiative Transfer (BART) Code. II. The TRANSIT Radiative Transfer Module and Retrieval of HAT-P-11b, *PSJ* **3**, 4, 81, 2022.

Blecic, J. *et al.*, An Open-source Bayesian Atmospheric Radiative Transfer (BART) Code. III. Initialization, Atmospheric Profile Generator, Post-processing Routines, *PSJ* **3**, 4, 82, 2022.

Jenkins, J. S., J. Harrington, R. C. **Challener**, *et al.*, Proxima Centauri b is not a transiting exoplanet, *MNRAS* **487**, 1, 268–274, 2019.

Hardy, R. A., J. Harrington, M. R. Hardin, N. Madhusudhan, T. J. Loredo, R. C. **Challener**, *et al.*, Secondary Eclipses of HAT-P-13b, *ApJ* **836**, 1, 143, 2017.