Dr. Ryan C. Challener

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Research Positions

Postdoctoral Researcher, Cornell University, Ithaca, New York, 2023 – present
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

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

Selected Talks

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, 2024 - 2025. 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, 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., 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.

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, 2025.

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.