Dr. Ryan C. Challener

Cornell University, Space Sciences Building 204, 122 Sciences Drive, Ithaca, NY 14853

+1 (814) 720-1304 • rcc276@cornell.edu • sites.google.com/view/ryanchallener • rychallener

Research Positions

Postdoctoral Researcher, University of Michigan (UM), Ann Arbor, Michigan, 2020 – 2023
Postdoctoral Researcher, Cornell University, Ithaca, New York, 2023 – present

Education

University of Central Florida (UCF), Orlando, Florida PhD Physics, 2020
Challener, R. C., *Exoplanets: Correlated Noise and Cautionary Tales*, Ph.D. thesis, University of Central Florida, 2020.
University of Rochester (UR), Rochester, New York BS Physics and Astronomy, 2014
University of Rochester (UR), Rochester, New York BA Mathematics, 2014

Accepted Publications

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.

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

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.

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

Harrington, J., M. D. Himes, P. E. Cubillos, J. Blecic, P. M. Rojo, R. C. **Challener**, *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., J. Harrington, J. Blecic, M. D. Himes, P. M. Rojo, T. J. Loredo, N. B. Lust, R. C. **Challener**, *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., J. Harrington, P. E. Cubillos, M. Oliver Bowman, P. M. Rojo, M. Stemm, R. C. **Challener**, *et al.*, An Open-source Bayesian Atmospheric Radiative Transfer (BART) Code. III. Initialization, Atmospheric Profile Generator, Post-processing Routines, *PSJ* **3**, 4, 82, 2022.

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

Schlawin, E., R. **Challener**, M. Mansfield, E. Rauscher, A. Adams, and J. Lustig-Yaeger, Planet Eclipse Mapping with Long-term Baseline Drifts, *AJ* **165**, 5, 210, 2023.

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.

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

JWST Transiting Exoplanet Community Early Release Science Team, Nightside clouds and disequilibrium chemistry on the hot Jupiter WASP-43b, *Nature Astronomy* , accepted, 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, *arXiv e-prints* p. arXiv:2404.16488, 2024.

Selected Submitted Publications

Challener, R. C., M. Mansfield, *et al.*, A 3D map of the dayside of an extrasolar planet, *Nature* , submitted, 2024a.

Challener, R. C., Z. Rustamkulov, E. Lee, *et al.*, Latitudinal asymmetry in the dayside atmosphere of WASP-43b, *ApJ* , submitted, 2024b.

Selected Talks

University of Michigan Department of Astronomy Colloquium, Fall 2020

University of Rochester Department of Physics & Astronomy Colloquium, Fall 2023

Research Experience

UR, 2013 - 2014. Worked on protoplanetary disk mineralogy with William Forrest.

UCF, 2014 - 2020. Performed many light curve analyses. Atmospheric retrieval and light-curve modeling code developer. Developed elliptical aperture photometry.

UM, 2020 - 2023. Developed and applied methodologies for 2D and 3D exoplanet eclipse mapping.

Cornell University, 2023 – present. Worked on 2D and 3D mapping of exoplanets with JWST.

Member of the JWST Transiting Exoplanet Community Early Release Science Team, the MANATEE GTO team, the TST-DREAMS GTO team, and the NIRSpec GTO team.

Teaching, Mentoring, Service, and Outreach

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

UCF, 2016 - 2017. Teaching assistant for Advanced Astronomical Data Analysis and Introduction to Numerical Computing. Aided with course development and gave lectures.

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

UCF, 2019 - 2020. Assisted with planning and executing the UCF JWST Master Class workshop, to teach Florida regional observers about JWST observing options and proposal planning tools.

UM, 2021 - 2022. Mentor to two undergraduate students working on separate projects exploring the observable 3D properties of exoplanet atmospheres.

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

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

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

UM/Cornell, 2022 - 2024. Research mentor to a graduate student at Penn State University.

Cornell, 2023 - 2024. Research mentor to a graduate student and an undergraduate student working on exoplanet atmospheric characterization.