David R. Rice

Contact Information

Astrophysics Research Center
Open University of Israel
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Research Interests

Planet Interiors, Dynamics, and Formation; Exoplanet Demographics; Computational Techniques; Geology & Material Physics; Interdisciplinary Collaborations

Appointments

Postdoctoral Researcher **Aug. 2023–Present**
Astrophysics Research Center of the Open University of Israel (ARCO)
Research Group: Allona Vazan

Education

University of Nevada, Las Vegas, Las Vegas, NV

Ph.D. in Astronomy **May 2023**
Dissertation Advisor: Jason H. Steffen
Dissertation Title: *Inferring the compositions and interior structures of small planets*

M.S. in Astronomy **Dec. 2019**
M.S. Thesis Title: *The timing of dynamical interactions between planets*

Northwestern University, Evanston, IL

B.A. in Integrated Science with Honors, Physics & Astronomy, and Earth & Planetary Sciences (triple major) **Jun. 2016**
Honors Thesis Advisor: Fred Rasio
Honors Thesis: *Revisiting the relationship between orbital spacing and the time until an instability in planetary systems*

Awards & Certifications

President's Foundation Graduate Research Fellowship, UNLV **2022**
Graduate Mentorship Certificate, UNLV **2022**
1st Place, GPSA Research Forum Podium Session, UNLV **2021, 2022**
Community Engagement Student Service Honorable Mention, UNLV **2021**
Donna Weistrop & David B. Shaffer Scholarship, UNLV **2018, 2019**
Nevada Space Grant Graduate Fellowship, NASA **2018**
Dean's List, Northwestern University **Fall 2013, Fall 2014, Spring 2016**
Illinois Undergraduate Space Grant, NASA **2015**

Mentoring

Srivishal Sudharsan, High School **Dec. 2022–Sep. 2023**
Tristan Benally, Undergraduate **Aug. 2021–Aug. 2022**
Rosalie Chaleunsouck, Undergraduate **Aug. 2021–Aug. 2022**

Teaching Experience

Camp Cosmos Instructor, Las Vegas, NV **4 Camps, 2023**

Developed and delivered a 5-day summer day camp to Middle School aged students covering topics of astronomy from planets to cosmology.

Lab Instructor, University of Nevada, Las Vegas **2017–2022**

Phys. 180L, Mechanics Lab	**9 Sections, 5 Terms**
Phys. 181L, Electromagnetism Lab	**2 Sections, 1 Term**
Phys. 151L, General Physics I Lab	**6 Sections, 3 Terms**
Phys. 152L, General Physics II Lab	**5 Sections, 4 Terms**

SAGA Education Math Teacher, Chicago, IL **Aug. 2016–Jun. 2017**

Delivered a daily, individualized, small-group class in algebra and geometry at Phillips Academy High School with 96% low-income students.

Professional Activities, Outreach, and Service

Conference Organizer

SOC, Layers of Understanding: Model Intercomparisons of Exoplanet Interiors, Max Planck Institute for Astronomy **Apr. 2026**

LOC, Planet Formation from an Interior Perspective, ARCO **Nov. 2025**

Workshop/Seminar Organizer

Let's Build a Planet: Improving Interior Models, **Jul. 2022**
Rocky Worlds II Conference, 50 break-out session participants

Journal Club and Astro Coffee, UNLV **Aug. 2018–May 2019**

Journal Referee

ApJ, ApJ Letters, Nat. Astron, MNRAS, and PASJ.

Journal of Emerging Investigators Referee **Aug. 2024–Present**

Provide constructive and encouraging reviews for high school scientists.

Outreach

Astronomy on Tap, Las Vegas **Jun. 2018–Dec. 2023**
Founder, Lead Organizer, and Emcee
Led quarterly events with over 50 attendees per event

Skype a Scientist

Invited video Q&A, 5th grade project	**Feb. 2022**
Invited video lecture, 5th grade class: "Are Exoplanets Habitable?"	**Feb. 2021**
Invited video lecture, high school astronomy club	**Feb. 2021**
Invited video lecture, 11th grade physics class	**Apr. 2020**

STEM Nova Award Scouts Day Camp **Jan. 2022**
Science Advisor and Station Organizer

Dallas Center-Grimes High School **Jan. 2022**
Invited lecture, AP Physics class

Camp Hippocampus Employee Astronomy Night **Sep. 2021**
Invited lecture: "Our Cosmic Address"

Las Vegas Astronomical Society monthly meeting **Jun. 2020**
Invited lecture: "Exoplanets"

The CSN Planetarium Astronomy Q&A livestream **Apr. 2020**
Invited lecture: "The Pluto Controversy", [https://youtu.be/EnzSoXZJtIs]

Volunteer Service

Judge for AAS Chambliss Student Achievement Awards **Jan. 2023**

Judge for Southern NV Regional Science & Engineering Fair **Mar. 2022**

Volunteer Observer with Project RECON **Oct. 2021**

Computer Skills

Expert/Proficient

Programming: Python, C++, shell script, MatPlotLib, and LaTeX
Software: Mercury6 and REBOUND (n-body integrators)
Supercomputing with Cherry Creek, UNLV and QUEST, Northwestern

Familiarity

MESA (stellar evolution), IDL, Perl, Perl Data Language, HTML, and ArcGIS

Publications

9. **Rice, D. R.**, Chenliang, H., Steffen, J. H., Vazan, A., (2025) *Uncertainties in the Inference of Internal Structure: The Case of TRAPPIST-1 f*, ApJ [arXiv:2504.16201].
8. **Rice, D. R.**, Steffen, J. H., Vazan, A., (2024) *The Distribution of Planet Radius in Kepler Multiplanet Systems Depends on Gap Complexity*, ApJL, 973, L4 [arXiv:2406.12239].
7. Anmol D., Turtelboom, E. V., Harada, C. K., Dressing, C., **Rice, D. R.**, et al., (2024) *The TESS-Keck Survey. XVIII. A Sub-Neptune and Spurious Long-period Signal in the TOI-1751 System*, AJ, 167, 194 [arXiv:2402.07110].
6. Childs, A. C., Yang, C., Shakespeare, C., **Rice, D.R.**, Steffen, J. H., (2023) *Composition constraints of the TRAPPIST-1 planets from their formation*, MNRAS, 524, 3748 [arXiv:2307.04989].
5. **Rice, D. R.**, Steffen, J. H., (2023) *Stable lifetime of compact, evenly-spaced planetary systems with non-equal masses*, MNRAS, 520, 4057 [arXiv:2206.11374].
4. Huang, C. H., **Rice, D. R.**, Steffen, J. H., (2022) *MAGRATHEA: An open-source spherical symmetric planet interior structure code*, MNRAS, 513, 5256 [arXiv:2201.03094].
3. MacDonald, M. G., Feil, L., Quinn T., **Rice, D. R.**, (2022) *Confirming the 3:2 Resonant Chain of K2-138*, AJ, 163, 162 [arXiv:2201.12687].
2. Huang, C., **Rice, D. R.**, Grande, Z. M., Smith, D., Smith, J. S., Boisvert, J. H., Tschauner, O., Salamat, A., Steffen, J. H., (2021) *Implications of an improved water equation of state for water-rich planets*, MNRAS, 503, 2825 [arXiv:2103.01410].

1. **Rice, D. R.**, Rasio, F. A., Steffen, J. H., (2018) *Survival of non-coplanar, closely packed planetary systems after a close encounter*, MNRAS, 481, 2205 [arXiv:1807.07668].
0. DeForest, C. E., Matthaeus, W. H., Howard, T. A., **Rice, D. R.**, (2015) *Turbulence in the solar wind measured with comet tail test particles*, ApJ, 812, 108

Invited Talks

9. Planet Formation from an Interior Perspective **Nov. 2025**
8. Indiana University, Exoplanet Group Meeting **Sep. 2024**
7. The Ohio State University, Planet Group Meeting **Sep. 2024**
6. University of Wisconsin, Monday Science Seminar **Sep. 2024**
5. Virtual Astronomy Software Talks, exoVAST **Sep. 2023**
4. The Ohio State Univeristy, Exoplanet Talk Series **Oct. 2022**
3. The University of Chicago, Exoplanet Journal Club **Oct. 2022**
2. Northwestern University, Astro Theory Group **Sep. 2022**
1. PennState, The Center for Exoplanets and Habitable Worlds Seminar **Sep. 2022**

Contributed Talks

8. NASA's Exoplanet Modeling and Analysis Center Workshop, Virtual **Feb. 2023**
   "Solving and visualizing planet interiors with MAGRATHEA"
7. 241st American Astronomical Society Meeting, Seattle, WA **Jan. 2023**
   "Interior models of small planets"
6. Exoplanets IV, Las Vegas, NV **May 2022**
   "Investigating systematic uncertainties in terrestrial interior models with MAGRATHEA", [https://my.aas.org/services/AASTCS9]
5. Graduate & Professional Student Research Forum, UNLV **Apr. 2022**
   "Systematic uncertainties in terrestrial interior models with MAGRATHEA", [https://youtu.be/6SNhho28NQ0]
4. Graduate & Professional Student Research Forum, UNLV **Apr. 2021**
   "Characterizing the composition of small exoplanets"
3. Habitable Worlds 2 Conference, Online **Feb. 2021**
   "MAGRATHEA: Terrestrial planet interior solver and the degeneracy of interiors", [https://youtu.be/1AXe-EvkPcc]
2. Chicago Exoplanet Meeting, The University of Chicago, IL **Jun. 2015**
   "Dynamical instability in exoplanetary systems"
1. LASP REU, Boulder, CO **Jul. 2014**
   "Analysis of comet tails for turbulence in the solar wind",

Contributed Posters

6. Extreme Solar Systems V, Christchurch, NZ **Mar. 2024**
   "MAGRATHEA 2.0: Advancements in Interior Structure Modeling for Exoplanets"

5. Rocky Worlds II, Oxford, UK **Jul. 2022**
   "Investigating systematic uncertainties in terrestrial interior models with MAGRATHEA"
4. Exoplanets III, Online **Jul. 2020**
   "MAGRATHEA: Terrestrial planet interior solver and the degeneracy of interiors", [https://www.physics.unlv.edu/d̃rice986/Exo3Poster/riceexoposter.html9]
3. Sagan Exoplanet Summer Workshop, Pasadena, CA **Jul. 2019**
   "Differentiated collisions and their effect on terrestrial planet composition"
2. Kepler & K2 Science Convention V, Glendale, CA **Mar. 2019**
   "The effect of differentiated collisions on the interiors of terrestrial planets"
1. 227th American Astronomical Society Meeting, Kissimmee, FL **Jan. 2016**
   "Understanding dynamical instability in 4-planet systems with equal orbital spacing"