

David R. Rice

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EDUCATION

University of Nevada, Las Vegas | Las Vegas, NV

PhD Astronomy June 2023

M.S. Astronomy Dec. 2019

M.S. Thesis: The timing of dynamical interactions between planets in exoplanetary systems

Northwestern University | Evanston, IL

June 2016

B.A. Integrated Science with Honors, Physics & Astronomy, and Earth & Planetary Sciences

RESEARCH EXPERIENCE

Star & Planet Formation Group

Research advised by Jason H. Steffen at University of Nevada, Las Vegas

Diversity of Planet Interiors Aug. 2018 – Present

- Developed MAGRATHEA, an open-source interior structure model which features enhanced user-friendly flexibility and extensibility to many types of differentiated planets.
- Collaborated with high-pressure physicists and geologist to make a robust interior model of planets with the newest equation of state measurements.

Timescales of Instabilities in Planetary Systems

Aug. 2017 – Present

- Simulated tens of thousands of planetary systems across a range of orbital parameters to understand planet crossing times; simulated on Cherry-Creek, UNLV's computer cluster
- Analyzed instability time using techniques from Bayesian statistics

Center for Interdisciplinary Exploration & Research in Astrophysics

Research advised by Fred Rasio and Jason H. Steffen at Northwestern University

Survival of Closely Packed Planetary Systems Aug. 2014 – Aug. 2017

NSF REU - Laboratory for Atmospheric and Space Physics

Research advised by Craig DeForest at Southwest Research Institute, Boulder, CO

Turbulence in the Solar Wind June – Aug. 2014

PUBLICATIONS

1. **D.R. Rice**, J.H. Steffen. Stable lifetime of compact, evenly-spaced planetary systems with non-equal masses. MNRAS. *In Review*. arXiv: [arXiv:2206.11374](https://arxiv.org/abs/2206.11374).
2. C. Huang, **D.R. Rice** and J.H. Steffen. MAGRATHEA: An open-source spherical symmetric planet interior structure code. MNRAS. 513:5256. July 2022. DOI: [10.1093/mnras/stac1133](https://doi.org/10.1093/mnras/stac1133).
3. M. G. MacDonald, L. Feil, T. Quinn and **D.R. Rice**. Confirming the 3:2 Resonant Chain of K2-138. AJ. 163:162. Apr. 2022. DOI: [10.3847/1538-3881/ac524c](https://doi.org/10.3847/1538-3881/ac524c).
4. C. Huang, **D.R. Rice**, Z.M. Grande, D. Smith, J.S. Smith, J.H. Boisvert, O. Tschauner, A. Salamat and J.H. Steffen. Implications of an improved water equation of state for water-rich planets. MNRAS. 503:2825. Mar. 2021. DOI: [10.1093/mnras/stab645](https://doi.org/10.1093/mnras/stab645).
5. **D.R. Rice**, F.A. Rasio and J.H. Steffen. Survival of non-coplanar, closely packed planetary systems after a close encounter. MNRAS. 481:2205. Dec. 2018. DOI: [10.1093/mnras/sty2418](https://doi.org/10.1093/mnras/sty2418).

6. C.E. DeForest, W.H. Matthaeus, T.A. Howard and **D.R. Rice**. Turbulence in the solar wind measured with comet tail test particles. ApJ. 812:108. Oct. 2015. DOI: [10.1088/0004-637x/812/2/108](https://doi.org/10.1088/0004-637x/812/2/108).

PROFESSIONAL PRESENTATIONS

1. Investigating systematic uncertainties in terrestrial interior models with MAGRATHEA. Poster. Rocky Worlds II. Oxford, UK. 4 July 2022.
2. Investigating systematic uncertainties in terrestrial interior models with MAGRATHEA. Talk. Exoplanets IV. Las Vegas, NV. 3 May 2022. <<https://my.aas.org/services/AASTCS9>>
3. Characterizing the Composition of Small Exoplanets. Talk. 23rd Annual Graduate & Professional Student Research Forum. Las Vegas, NV. 4 Apr. 2021.
4. MAGRATHEA: Terrestrial planet interior solver and the degeneracy of interiors. Prerecorded Talk. Habitable Worlds Conference. Online. 23 Feb. 2021. <<https://youtu.be/1AXe-EvkPcc>>
5. MAGRATHEA: Terrestrial planet interior solver and the degeneracy of interiors. Poster. Exoplanets III. Heidelberg, Germany (online). 27 July 2020. <<http://www.physics.unlv.edu/~drice986/Exo3Poster/riceexoposter.html>>
6. Differentiated collisions and their effect on terrestrial planet composition. Poster and Pop talk. Sagan Exoplanet Summer Workshop. Pasadena, CA. 15 July 2019. <http://nexsci.caltech.edu/workshop/2019/posters/Rice_Sagan_Poster.pdf>
7. The effect of differentiated collisions on the interiors of terrestrial planets. Poster. Kepler & K2 Science Convention V. Glendale, CA. 4 Mar. 2019. <<http://keplerscience.arc.nasa.gov/data/KepSciConV/KeplerSciConV-Poster-Rice.pdf>>
8. Understanding dynamical instability in 4-planet systems with equal orbital spacing (Δ). Poster. 227th American Astronomical Society Meeting. Kissimmee, FL. 5 Jan. 2016. <<http://ui.adsabs.harvard.edu/abs/2016AAS...22713828R/abstract>>

PROFESSIONAL SERVICE AND COMMUNITY INVOLVEMENT

Supervised **two UNLV undergraduate students**, Rosalie Chaleunsouck and Tristan Benally, starting Aug. 2021 to present for the **Mentorship Certificate Program**.

Refereed for The Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, and Publications of the Astronomical Society of Japan.

Given **six public lectures** including through Skype a Scientist, the Las Vegas Astronomical Society, and the CSN Planetarium <<https://youtu.be/EnzSoXZJtIs>>.

Founded and emcee **Astronomy on Tap, Las Vegas** starting in June 2018: outreach events presenting astronomy and related research to the public in an engaging and accessible forum. Captured the occultation of Jupiter Trojan (3548) Eurybates with **Project RECON**.

AWARDS

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| Presidents UNLV Foundation Graduate Research Fellowship | April 2022 |
| • Awarded a \$25,000 fellowship for one year of doctoral research based on proposal | |
| 1 st Place, Podium Session Winner, 2 years in a row | Apr. 2021, Apr. 2022 |
| • Rated best talk by a panel of four judges at UNLV's GPSA Research Forum | |
| Donna Weistrop and David B. Shaffer Scholarship | Apr. 2018, Apr. 2019 |
| • Awarded yearly to one graduate student in physics, astronomy, chemistry, or geoscience | |

Nevada Space Grant Graduate Fellowship

July 2018

- Awarded an \$18,000 fellowship for one year of graduate research based on proposal Weinberg Dean's List

Dec. 2013, Dec. 2014, June 2016

- Achieved above a 3.7 GPA during 3 academic quarters

TEACHING EXPERIENCE

University of Nevada, Las Vegas | Las Vegas, NV

Sept. 2017 – Present

Graduate Assistant

- Taught two lab sections each semester and summer in mechanics and electromagnetism
- Rated 4.9/5.0 for “overall instructor evaluation” by students; averaged over 15 classes

SAGA Innovations | Chicago, IL

Aug. 2016 – June 2017

Tutoring Fellow

- Delivered a daily, individualized, two on one class in algebra and geometry to 14 at-risk high school students at Phillips Academy High School, a Chicago Public School with 96% low-income students and 98% African American students
- Developed teaching ability through in-depth training on educational techniques, curriculum design, and management of student behaviors

SKILLS

Mastery

Programming: Python, Perl Data Language, shell script, Matplotlib, and LaTeX

Software: Mercury6 and REBOUND (n-body integrators)

Supercomputing with Cherry Creek, UNLV and QUEST, Northwestern

Familiarity: C/C++, MESA (stellar evolution), IDL, Perl, HTML, and ArcGIS