

# Rae J. Holcomb

ASTRONOMY GRADUATE STUDENT · EXOPLANETS & STELLAR ASTROPHYSICS

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## Research Interests

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- M Dwarf** Characterizing and interpreting stellar variability in M dwarfs
- Stellar Rotation** Techniques for identifying stellar rotation periods in TESS light curves
- Exoplanets** High-precision radial velocity planet search and characterization

## Education & Research Positions

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### University of California, Irvine

PH.D. IN PHYSICS AND ASTRONOMY

Irvine, CA

Aug 2019 - Spring 2025 (expected)

- Advisor: Dr. Paul Robertson
- Chancellor Fellowship
- Dissertation Project: “Flicker” and “Jitter”: Connecting Photometric Variability and Radial Velocity Jitter in M Dwarfs

### NASA Goddard Space Flight Center

PANDORA SCIENCE TEAM INTERN

Greenbelt, MD

Oct 2023 - Oct 2024

- Advisor: Dr. Christina Hedges
- Project: Spectroscopic Data Reduction Pipeline Development

### Center for Computational Astrophysics @ The Flatiron Institute

PRE-DOCTORAL FELLOWSHIP

New York City, NY

Aug 2022 - July 2023

- Advisor: Dr. Ruth Angus
- Fellowship Project: The TESS Rotation Collaboration

### Rice University

B.S. IN ASTROPHYSICS

Houston, TX

Aug 2015 - June 2019

- Advisor: Dr. Patrick Hartigan
- Graduated with Distinction in Research and Creative Works
- Senior Thesis: Identifying Young Fast-Rotators from TESS Light Curves

## Talks & Posters

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\* denotes invited talks

### SEMINARS

- Oct 2023 **Seminar**, JPL Exoplanet Group Seminars Remote
- Dec 2022 **Seminar**, NRAO Professional Development Seminars Remote
- Dec 2022 \* **Seminar**, American Museum of Natural History Seminars New York City, NY
- Nov 2022 \* **Seminar**, Caltech/IPAC Departmental Seminar Pasadena, CA
- Sep 2022 \* **Seminar**, Columbia University Lunch Talks New York City, NY

### CONFERENCES

- Jul 2023 **Poster**, Towards other Earths III Porto, Portugal
- Mar 2023 **Poster**, Extreme Precision Radial Velocities V Santa Barbara, CA
- Mar 2023 **Poster**, Extreme Precision Radial Velocity V Santa Barbara, CA
- Mar 2022 **Talk**, 50 Years of Skumanich Relations Conference Boulder, CO
- Jan 2020 **Poster**, American Astronomical Society 235th Meeting Honolulu, HI

## Teaching & Work Experience

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### Code/Astro Teaching Assistant & Metnor

Evanston, IL

CODE/ASTRO SOFTWARE DEVELOPMENT WORKSHOP

July 2023

- Code/Astro is a week-long astronomy software development workshop that aims to teach fundamental software engineering skills and best practices for sustainable open-source packages for astronomy applications.
- Assist with teaching curriculum covering git control, software structure, code documentation, package publishing, and more.
- Mentor students in small groups, facilitating an interactive and hands on learning environment.

### **Instructor of Record, Phys 20A**

UC IRVINE

- Sole instructor for Phys 20A - Introduction to Astronomy summer session classes
- Managed course materials, grading, registration, etc

Irvine, CA

July 2021

### **Teaching Assistant, Various**

UC IRVINE

- Teaching assistant for various physics and astronomy classes, including lecture and lab style classes
- Duties include leading discussion sections, teaching labs, grading papers, and offering personalized tutoring

Irvine, CA

Sept 2019 - Present

### **Teaching Assistant, ASTR 202**

RICE UNIVERSITY

- Teaching assistant for introductory level astronomy class
- Hosted office hours, graded, and offered personalized help to 50 students

Houston, TX

Jan 2019 - May 2019

### **Technical Writing Mentor, ENGI 120**

RICE UNIVERSITY

- Tutored freshmen engineering students in the engineering design process as they planned and prototyped innovative solutions for real world clients
- Individually mentored students to hone their technical writing skills, offering criticism and feedback on 15-30 essays per student team each semester

Houston, TX

Aug 2016 - Dec 2018

### **Course Designer and Instructor, COLL 131**

RICE UNIVERSITY

- Designed and taught a unique college course "COLL 131 — Narratives in Interactive Media" at Rice University, for which students received college credit
- Facilitated literacy in video games and coached students to engage with games critically as an artistic medium
- Emphasized critical analysis of design and storytelling techniques in video games

Houston, TX

Aug 2017 - May 2018

### **Software Development Intern**

SPICEWORKS

- Spiceworks is a leading company that develops web tools and market research for the IT industry
- Implemented features for Cloud Helpdesk web application, including front end, back end, web styling, and databases
- Experience coding in Ruby on Rails, JavaScript, and some SQL

Houston, TX

May 2016 - Aug 2016

## **Outreach & Leadership**

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### **Astrobiology Book Club**

FOUNDER

- Organize and run weekly meetings to read and discuss key papers in astrobiology-related fields
- Facilitate research discussions among graduate students across multiple universities

Remote

Aug 2022 - Present

### **Underrepresented Genders in Physics and Astronomy (UNITY)**

MENTOR

- Individually mentor undergraduate physics students from underrepresented demographics
- Help students find research opportunities, develop professional skills, and build confidence
- Organize and lead informational events and panels on topics including applying to graduate schools and finding REU opportunities
- Volunteer at UNITY events, including the APS Conference for Undergraduate Women in Science (2020)

UC Irvine

Sep 2019 - PRESENT

### **McMurtry Academic Fellows**

PHYSICS FELLOW

- Head physics tutor for freshman and sophomore students in entry level physics classes at McMurtry College
- Organize study and review sessions

Rice University

Aug 2017 - May 2019

### **Rice Players Astronomy Outreach**

DRAMATURG

- Served as the "astronomy consultant" for a university production of *Silent Sky*, a play about the history of women in astronomy
- Hosted Q&A sessions after each performance to answer audience questions and share knowledge about the science behind the play
- Worked with actors and production members to support accurate depictions of scientific equipment and concepts
- Gave astronomy outreach talks to local high schools who were also putting on performances of the same play

Rice University

Jan 2019 - April 2019

## **Honors & Awards**

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2022	<b>Flatiron Institute Predoctoral Fellowship,</b>	New York City, NY
2020	<b>UC Grad Slam,</b> Semifinalist	Irvine, CA
2019	<b>Chancellor's Fellowship,</b> UC Irvine	Irvine, CA
2019	<b>Distinction in Research and Creative Works,</b> Rice University	Houston, TX
2019	<b>Dessler Award for Undergraduate Achievement in Astronomy,</b> Rice University	Houston, TX
2019	<b>Catalyst Science Communication Symposium,</b> 3rd place	Houston, TX
2017	<b>Dessler Scholarship for Summer Undergraduate Research,</b>	Houston, TX
2016	<b>Best Interdisciplinary Team Award,</b> Rice Engineering Design Showcase	Houston, TX

## Selected Publications

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### References

- [1] Rae J. Holcomb, Paul Robertson, Patrick Hartigan, Ryan J. Oelkers, and Caleb Robinson. SpinSpotter : An Automated Algorithm for Identifying Stellar Rotation Periods with Autocorrelation Analysis. , 936(2):138, September 2022.
- [2] Jack Lubin, Judah Van Zandt, Rae Holcomb, Lauren M. Weiss, Erik A. Petigura, Paul Robertson, Joseph M. Akana Murphy, Nicholas Scarsdale, Konstantin Batygin, Alex S. Polanski, Natalie M. Batalha, Ian J. M. Crossfield, Courtney Dressing, Benjamin Fulton, Andrew W. Howard, Daniel Huber, Howard Isaacson, Stephen R. Kane, Arpita Roy, Corey Beard, Sarah Blunt, Ashley Chontos, Fei Dai, Paul A. Dalba, Kaz Gary, Steven Giacalone, Michelle L. Hill, Andrew Mayo, Teo Močnik, Molly R. Kosiarek, Malena Rice, Ryan A. Rubenzahl, David W. Latham, S. Seager, Joshua N. Winn, and Kaz Gary. TESS-Keck Survey. IX. Masses of Three Sub-Neptunes Orbiting HD 191939 and the Discovery of a Warm Jovian plus a Distant Substellar Companion. , 163(2):101, February 2022.
- [3] P. Hartigan, R. Holcomb, and A. Frank. Proper Motions and Shock Wave Dynamics in the HH 7-11 Stellar Jet. , 876(2):147, May 2019.
- [4] Marc Hon, Daniel Huber, Nicholas Z. Rui, Jim Fuller, Dimitri Veras, James S. Kuszlewicz, Oleg Kochukhov, Amalie Stokholm, Jakob Lysgaard Rørsted, Mutlu Yıldız, Zeynep Çelik Orhan, Sibel Örtel, Chen Jiang, Daniel R. Hey, Howard Isaacson, Jingwen Zhang, Mathieu Vrad, Keivan G. Stassun, Benjamin J. Shappee, Jamie Tayar, Zachary R. Clayton, Corey Beard, Timothy R. Bedding, Casey Brinkman, Tiago L. Campante, William J. Chaplin, Ashley Chontos, Steven Giacalone, Rae Holcomb, Andrew W. Howard, Jack Lubin, Mason MacDougall, Benjamin T. Montet, Joseph M. A. Murphy, Joel Ong, Daria Pidhorodetska, Alex S. Polanski, Malena Rice, Dennis Stello, Dakotah Tyler, Judah Van Zandt, and Lauren M. Weiss. A close-in giant planet escapes engulfment by its star. , 618(7967):917–920, June 2023.
- [5] Gudmundur Stefansson, Suvrath Mahadevan, Yamila Miguel, Paul Robertson, Megan Delamer, Shubham Kanodia, Caleb Cañas, Joshua Winn, Joe Ninan, Ryan Terrien, Rae Holcomb, Eric Ford, Brianna Zawadzki, Brendan P. Bowler, Chad Bender, William Cochran, Scott Diddams, Michael Endl, Connor Fredrick, Samuel Halverson, Fred Hearty, Gary J. Hill, Andrea Lin, Andrew Metcalf, Andrew Monson, Lawrence Ramsey, Arpita Roy, Christian Schwab, Jason Wright, and Gregory Zeimann. An extreme test case for planet formation: a close-in Neptune orbiting an ultracool star. *arXiv e-prints*, page arXiv:2303.13321, March 2023.
- [6] Michael Endl, Paul Robertson, William D. Cochran, Phillip J. MacQueen, Brendan P. Bowler, Kyle E. Franson, Rae Holcomb, Corey Beard, Howard Isaacson, Andrew W. Howard, and Jack Lubin. A Jupiter Analog Orbiting The Nearby M Dwarf GJ 463. , 164(6):238, December 2022.
- [7] Corey Beard, Paul Robertson, Shubham Kanodia, Jack Lubin, Caleb I. Cañas, Arvind F. Gupta, Rae Holcomb, Sinclair Jones, Jessica E. Libby-Roberts, Andrea S. J. Lin, Suvrath Mahadevan, Gudmundur Stefánsson, Chad F. Bender, Cullen H. Blake, William D. Cochran, Michael Endl, Mark Everett, Eric B. Ford, Connor Fredrick, Samuel Halverson, Leslie Hebb, Dan Li, Sarah E. Logsdon, Jacob Luhn, Michael W. McElwain, Andrew J. Metcalf, Joe P. Ninan, Jayadev Rajagopal, Arpita Roy, Maria Schutte, Christian Schwab, Ryan C. Terrien, John Wisniewski, and Jason T. Wright. GJ 3929: High-precision Photometric and Doppler Characterization of an Exo-Venus and Its Hot, Mini-Neptune-mass Companion. , 936(1):55, September 2022.