

RACHEL B. FERNANDES | CV

- » **Status:** Ph.D. Candidate at the Lunar & Planetary Laboratory, The University of Arizona
- » **Advisors:** Dr. Ilaria Pascucci; Dr. Gijs D. Mulders
- » **Interests:** Exoplanet Demographics; Exoplanet Detection via Transits; Young Planets; Planet Formation; Stellar Characterization
- » **Website:** www.rachelfernandes.com



»»» SUMMARY

I am a Ph.D. candidate at the Lunar & Planetary Laboratory & the Department of Planetary Sciences at The University of Arizona where I work with Dr. Ilaria Pascucci and Dr. Gijs Mulders on the detection, characterization and demographics of exoplanetary systems using data from both ground- and space-based telescopes.

My current research focuses on the detection and characterization of close-in, transiting young exoplanets with the Transiting Exoplanet Sky Satellite (TESS) with an end goal of understanding their demographics.

»»» EDUCATION

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|--------------|--|--------------------------|
| 2017-present | Doctor of Philosophy in Planetary Sciences | University of Arizona |
| | » Thesis Advisors: Drs. Ilaria Pascucci, Gijs D. Mulders | |
| | » Expected graduation: May 2023 | |
| 2017-2019 | Master of Science in Planetary Sciences | University of Arizona |
| | » Thesis Advisor: Dr. Ilaria Pascucci | |
| | » Thesis: Turnover at the Snowline in the Radial Velocity Giant Planet Occurrence Rate | |
| 2013-2017 | Bachelor of Science in Astrophysics & Physics | University of Cincinnati |
| | » Thesis Advisor: Dr. Michael L. Sitko | |
| | » Thesis: Variability of Dust Emission in Pre-main Sequence and Related Stars: Investigating the Structural Changes in the Inner Disk Regions of MWC 480 | |

»»» EMPLOYMENT & RESEARCH EXPERIENCE

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|-----------|--|
| 2020 | California Institute of Technology/IPAC Visiting Graduate Fellow |
| 2014-2017 | Undergraduate Research Assistant, University of Cincinnati |
| 2015 | Women In Science and Engineering Summer REU, University of Cincinnati |

»»» PROFESSIONAL AFFILIATIONS & HONORS

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|--------------|--|
| 2021-present | NASA's Nexus for Exoplanet System Science (NExSS) Alien Earths Team Member |
| 2021 | Exoplanet Explorer, ExoPAG Executive Committee and the NASA's Exoplanet Exploration Program |
| 2020-present | TESS Working Group member |
| 2019-present | Exoplanet Program Analysis Group (ExoPAG) Science Interest Group 2 (SIG2) member |
| 2017-2021 | NASA's Nexus for Exoplanet System Science (NExSS) Earths in Other Solar Systems (EOS) Team Member |
| 2017-present | Member of Lunar & Planetary Laboratory PLANETS (PLANetary Agender, Non-binary, womEn and Trans Scientists and Staff), The University of Arizona |
| 2016-present | American Astronomical Society, Junior Member |

2016-2018 **Sigma Pi Sigma (Physics Honors Society), University of Cincinnati Chapter Member**
 2015 - 2017 **President, Society of Physics Students, University of Cincinnati Chapter**

»»» DIVERSITY, EQUITY, INCLUSION and ACCESSIBILITY (DEIA) LEADERSHIP

2022-present **Tucson Initiative for Minoritized student Engagement in Science (TIMESTEP) Graduate Student Coordinator**
 2021-present **Project-Based Learning Opportunities and Exploration of Mentorship for Students with Visual Impairments in STEM (POEM), The University of Arizona**
 2021-present **NASA's Universe of Learning's Subject Matter Expert**
 2019-present **Lunar & Planetary Laboratory Department Life Committee, The University of Arizona**
 2019 **College of Science Outreach Coordinator, The University of Arizona**
 2014-2017 **University of Cincinnati Department of Physics Annual Outreach Program at the Cincinnati Observatory Center - ScopeOut**

»»» SCHOLARSHIPS & AWARDS

2018,2019,2022 **Galileo Circle Scholar Fellowship, The University of Arizona**
 2019 **Curson Travel Award, The University of Arizona**
 2016 **Sarah Blank Greenholz Scholarship, University of Cincinnati**
 2015-2016 **Physics Scholarship, Department of Physics, University of Cincinnati**
 2015 **Women In Science and Engineering (WISE) Grant, University of Cincinnati**
 2013-2017 **International Outreach Scholarship, University of Cincinnati**

»»» PROGRAMMING & SOFTWARE EXPERIENCE

- Python, SQL, IDL, R, C++, Mathematica, LaTeX, UNIX/LINUX

»»» OBSERVATIONAL EXPERIENCE

- 1 night using NIRSPEC at W. M. Keck Observatory (PI: E. Petigura)
- 11 nights using SpeX at NASA's Infrared Telescope Facility (PIs: M. Sitko; V. Reddy; K. Hardegree-Ullman)
- 5 nights using PHARO (200") at Palomar Observatory (PI: D. Ciardi)
- 2 nights using Goodman Spectrograph on SOAR, Chile (PI: K. Hardegree-Ullman)
- Experience photometrically observing exoplanet transits using 14" Meade LX200 (University of Cincinnati) and RAPTORS (University of Arizona)

»»» MENTORSHIP EXPERIENCE

2022 **Abhinav Vatsa, The University of Arizona**
 2016-2020 **Dakotah B. Tyler, University of Cincinnati**
 2016-2019 **Ammar Bayyari, University of Cincinnati**
 2016-2017 **David Luria, University of Cincinnati**
 2015-2018 **Monika Pikhartova, University of Cincinnati**

»»» TEACHING ASSISTANTSHIP





Fall 2019 **Earth – Evolution of a Habitable World (PTYS 170A1)**
 Spring 2019 **The Physics of the Solar System (PTYS 403)**
 Fall 2018 **Our Golden Age of Planetary Exploration (PTYS 206)**
 Spring 2018 **Earth – Evolution of a Habitable World (PTYS 170A1)**
 Fall 2017 **Planet Earth: Evolution of a Habitable World (PTYS 170A1)**

»»» REFEREED PUBLICATIONS











Citations: 247; H-index: 7

 Exoplanets  Protoplanetary Disks  Small Bodies





Lead Author

17. **Fernandes, R. B.** & Hardegree-Ullman, K. K. et al. 2022, AJ, to be submitted September 2022:
A Photometry-based Uniform Catalog of Stellar Parameters for ~11,000 Stars in 32 Young Clusters and Associations within 200 pc 
16. **Fernandes, R. B.**, Mulders, G. D., Pascucci, I. et al. 2022, AJ, 164, 78:
pterodactyls: A Tool to Uniformly Search and Vet for Young Transiting Planets in TESS Primary Mission Photometry 
15. **Fernandes, R. B.**, Mulders, G. D., Pascucci, I. et al. 2019, ApJ, 874, 81:
Hints of a Turnover at the Snowline in the Giant Planet Occurrence Rate 
14. **Fernandes, R. B.**, Long, Z. C. et al. 2018, ApJ, 856, 103F:
Variability of Dust Emission in Pre-main Sequence and Related Stars. IV. Investigating the Structural Changes in the Inner Disk Regions of MWC 480 

Major Contributions

13. Vanderburg, A.,..., **Fernandes, R. B.** et al. 2022, to be submitted September 2022:
A Temperate Jupiter-sized Planet Transiting a 17 Million Year Old Star Misaligned with a Resolved Debris Disk 
12. Bergsten, G. J., Pascucci, I., Mulders, G. D., **Fernandes, R. B.** & Koskinen, T. T. 2022, AJ, in review:
The Demographics of Kepler's Earths and super-Earths into the Habitable Zone 
11. Koskinen, T. T., Lavvas, P., Huang, C., Bergsten, G., **Fernandes, R. B.** & Young, M. E. 2022, ApJ, 929, 52K:
Mass loss by atmospheric mass from extremely close-in planets 
10. Bennett, David P., Ranc, Clément & **Fernandes, R. B.** 2021, AJ, 162, 243:
No Sub-Saturn Mass Planet Desert in the CORALIE/HARPS Radial Velocity Sample 
9. Mulders, G. D., Pascucci, I., Ciesla, F. J. & **Fernandes, R. B.** 2021, ApJ, 920, 66:
The Mass Budgets and Spatial Scales of Exoplanets and Protoplanetary Disks  
8. Pikhartova, M., Long, Z. C., Assani, K. D., **Fernandes, R. B.** et al. 2021, ApJ, 919, 64:
Variability of Disk Emission in Pre-Main Sequence and related Stars. V. Occultation Events from the innermost disk region of the Herbig Ae Star HD 163296 
7. Reddy, V.,, **Fernandes, R. B.** et al. 2019, Icarus, 326, 133-150:
Near-Earth asteroid 2012 TC4 campaign: Results from global planetary defense exercise 
6. Long, Z. C., Akiyama, E., **Fernandes, R. B.** et al. 2018, ApJ, 858, 112L:
Differences in the gas and dust distribution in the pre-transitional disk of a sun-like young star PDS 70 
5. Long, Z. C., **Fernandes, R. B.**, Sitko, M.L., Wagner, K. et al. 2017, ApJ, 838, 62:
The Shadow Knows: Using Shadows to Investigate the Structure of the Pretransitional Disk of HD 100453 

Minor Contributions

4. Osborn, H.,, **Fernandes, R. B.** et al. 2022, in prep:
Two Warm Neptunes transiting HD 12572 revealed by TESS & Cheops 
3. Noonan, J. W.,, **Fernandes, R. B.** et al. 2019, AJ, 158, 313:
Search for the H chondrite parent body among the Three Largest S-type Asteroids: (3) Juno, (7) Iris and (25) Phocaea 
2. Pascucci, I., Mulders, G. D., Gould, A. & **Fernandes, R. B.** 2018, ApJ, 856L, 28P:
A Universal Break in the Planet-to-Star Mass-Ration Function of Kepler MKG stars 
1. Cheng, A. F., ..., Sitko, M. L., **Fernandes, R. B.**, et al. 2017, Icarus, 281, 404-416:
Stratospheric balloon observations of comets C/2013 A1 (Siding Spring), C/2014 E2 (Jacques), and Ceres 

»»» **SELECTED TALK CONTRIBUTIONS**

**Invited Talks*

Aug 2022	Understanding the Impact of Stripped sub-Neptune cores on EtaEarth using TESS, Caltech/IPAC Lunch Seminar, Pasadena, California
July 2022	Preliminary Estimates of the Occurrence of Close-in (sub)Neptunes in Young Clusters, Harvard University Center for Astrophysics, Cambridge, Massachusetts
July 2022	Unearthing the Earths: Using TESS and Kepler to Reveal the Primordial Population of Short-Period Planets, TESS Science Talk, Massachusetts Institute of Technology, Cambridge, Massachusetts*
July 2022	pterodactyls: A Uniform Search for Young Transiting Planets in TESS Primary Mission FFIs, Boston University, Boston, Massachusetts
Jan 2022	pterodactyls: A Uniform Search for Young Transiting Planets in TESS Primary Mission FFIs, NASA's NExSS Alien Earths All Hands Team Meeting
Jan 2022	pterodactyls: A Uniform Search for Young Transiting Planets in TESS Primary Mission FFIs, NASA ExoPAG 25 Virtual Meeting
Nov 2021	Exoplanet Demographics Beyond Kepler: Giant Planets with Radial Velocity & Young Planets with TESS, Carnegie Institution for Science*
Oct 2021	pterodactyls: A Uniform Search for Young Transiting Planets in TESS Primary Mission FFIs, Jet Propulsion Laboratory, Pasadena, California*
May 2021	Exoplanet Demographics Beyond Kepler: Giant Planets with Radial Velocity & Young Planets with TESS, Exoplanet Explorers (ExoExplorers) Science Series*
Dec 2020	Understanding the Impact of Stripped sub-Neptune cores on EtaEarth using TESS, Quantitative Habitability Science Workshop, Tucson, Arizona
Nov 2020	Unearthing the Earths: Using TESS and Kepler to Reveal the Primordial Population of Short-Period Planets, Exoplanet Demographics Conference, Pasadena, California
Aug 2020	Understanding the Impact of Stripped sub-Neptune cores on EtaEarth using TESS, Lunar & Planetary Laboratory Conference, Tucson, Arizona
Jul 2020	The Frequency of Habitable Zone Earth-size Planets, Exoplanets III, Heidelberg, Germany
Jul 2020	The Impact of Stellar Multiplicity on the Detection of Young Transiting Planets, Caltech/IPAC Visiting Graduate Fellowship Lunch Seminar, Pasadena, California
May 2019	Hints of a Turnover at the Snowline in the Giant Planet Distribution, 3rd Advanced School for Exoplanetary Science: Demographics of Exoplanetary Systems, Vietri sul Mare, Salerno, Italy*
Apr 2019	Hints of a Turnover at the Snowline in the Giant Planet Distribution, Jet Propulsion Laboratory, Pasadena, California