

# MICHELLE L HILL

## CURRICULUM VITAE

### UCR PhD Student

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### Research Interests

My research interests include detection and characterization of exoplanets and exomoons in the habitable zone of their stars, with particular interest in low-mass exoplanets in the habitable zone. My main thesis project explores how small a planet can be and still maintain liquid surface water long term.

### Education

University of California, Riverside <i>Adviser:</i> Stephen Kane	Earth and Planetary Science Ph.D. <i>Expected:</i> April 2025	
University of Southern Queensland	Physics	B.S. Honors <i>Summa Cum Laude</i> , 2018
University of New England	Physics	B.S. <i>Summa Cum Laude</i> , 2017
San Francisco State University <i>1 year exchange.</i>	Astrophysics	B.S. <i>Cum Laude</i> , 2016

### Positions Held

Research Assistant, University of California, Riverside <i>Adviser:</i> Stephen Kane	2018–
Science Instructor, Science From Scientists	2016-2018
Research Assistant, San Francisco State University <i>Adviser:</i> Stephen Kane	2015-2016

### First Author Publications

- Hill, M.L.** et al., “*STEHM: Smaller Than Earth Habitability Model. Exploring the Lower Planet Size Boundary of Planetary Habitability*”, 2024, in Prep
- Hill, M.L.** et al., “*Detection and Confirmation of Third Planets Around the Subgiant Stars HD1605 and HD163607*”, 2024, in Prep
- Hill, M.L.** et al., “*The TESS-Keck Survey. XIX. A Warm Transiting Sub-Saturn Mass Planet and a non-Transiting Saturn Mass Planet Orbiting a Solar Analog*”, 2024, *The Astronomical Journal*, 167, 151
- Hill, M.L.** et al., “*A Catalog of Habitable Zone Exoplanets*”, 2023, *The Astronomical Journal*, 165, 34
- Hill, M.L.** et al., “*Asteroseismology of iota Draconis and Discovery of an Additional Long-Period Companion*”, 2021, *The Astronomical Journal*, 162, 211
- Hill, M.L.**, Kane, S.R., Mocnik, T. “*Orbital Refinement and Stellar Properties for the HD 9446, HD 43691, and HD 179079 Planetary Systems*”, 2020, *The Astronomical Journal*, 159, 5
- Hill, M.L.**, Kane, S.R., Duarte, E. Seperuelo, Kopparapu, R.K., Gelino, D.A., & Wittenmyer, R.A. “*Exploring Kepler Giant Planets in the Habitable Zone*”, 2018, *The Astrophysical Journal*, 860, 1

## Other Publications

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1. Murphy, J. et al. (# additional co-authors including **Hill, M.L.**), “*The TESS-Keck Survey. XVI. Mass Measurements for 12 Planets in Eight Systems*”, 2023, The Astronomical Journal,
2. Weiss, L. et al. (20 additional co-authors including **Hill, M.L.**), “*The Kepler Giant Planet Search. I: A Decade of Kepler Planet Host Radial Velocities from W. M. Keck Observatory*”, 2023, The Astronomical Journal,
3. MacDougall, M. et al. (# additional co-authors including **Hill, M.L.**), “*The TESS-Keck Survey. XV. Precise Properties of 108 TESS Planets and Their Host Stars*” The Astronomical Journal
4. Kane, S.R. et al. (# additional co-authors including **Hill, M.L.**), “*Revised Properties and Dynamical History for the HD 17156 System*”, 2023, The Astronomical Journal
5. Campante, T.L. et al. (# additional co-authors including **Hill, M.L.**), “*Revisiting the Red-giant Branch Hosts KOI-3886 and  $\iota$  Draconis. Detailed Asteroseismic Modeling and Consolidated Stellar Parameters*”, 2023, The Astronomical Journal
6. Colby Ostberg et al. (# additional co-authors including **Hill, M.L.**), “*The Demographics of Terrestrial Planets in the Venus Zone*”, 2023, The Astronomical Journal
7. Van Zandt, J. et al. (# additional co-authors including **Hill, M.L.**), “*TESS-Keck Survey XIV: Two giant exoplanets from the Distant Giants Survey*” 2023, The Astronomical Journal
8. Fei Dai et al. (# additional co-authors including **Hill, M.L.**), “*TOI-1136 is a Young, Coplanar, Aligned Planetary System in a Pristine Resonant Chain*”, 2023, The Astronomical Journal
9. El Mufti, M. et al. (# additional co-authors including **Hill, M.L.**), “*TOI 560 : Two Transiting Planets Orbiting a K Dwarf Validated with *iSHELL*, *PFS* and *HIRES* RVs*”, 2023, The Astronomical Journal
10. Ian Crossfield et al. (# additional co-authors including **Hill, M.L.**), “*GJ1252b: A Hot Terrestrial Super-Earth With No Atmosphere*”, 2023, The Astrophysical Journal Letters
11. Turtelboom, E.V. et al (# additional co-authors including **Hill, M.L.**), “*The TESS-Keck Survey. XI. Mass Measurements for Four Transiting sub-Neptunes orbiting K dwarf TOI-1246*”, 2022, The Astronomical Journal
12. Chontos, A. et al (# additional co-authors including **Hill, M.L.**), “*The TESS-Keck Survey: Science Goals and Target Selection*”, 2022, The Astronomical Journal, 163, 297
13. Johnson, M.C. et al (# additional co-authors including **Hill, M.L.**), “*An Aligned Orbit for the Young Planet V1298 Tau b*”, 2022, The Astronomical Journal, 163, 247
14. Dalba, P.A. et al (# additional co-authors including **Hill, M.L.**), “*The TESS-Keck Survey. VIII. Confirmation of a Transiting Giant Planet on an Eccentric 261 Day Orbit with the Automated Planet Finder Telescope*, 2022, The Astronomical Journal, 163, 2
15. Heidari, N. et al (93 additional co-authors including **Hill, M.L.**), “*HD 207897 b: A dense sub-Neptune transiting a nearby and bright K-type star*”, 2022, *Astronomy & Astrophysics*, Volume 658, id.A176

16. Kane, S.R., et al (8 additional co-authors including **Hill, M.L.**), “*Orbital Dynamics and the Evolution of Planetary Habitability in the AU Mic System*”, 2022, The Astronomical Journal, Volume 163, Issue 1
17. Llop-Sayson, J., et al (41 additional co-authors including **Hill, M.L.**), “*Constraining the Orbit and Mass of epsilon Eridani b with Radial Velocities, Hipparcos IAD-Gaia DR2 Astrometry, and Multi-epoch Vortex Coronagraphy Upper Limits*”, 2021, The Astronomical Journal, Volume 162, 5
18. Kosiarek, M.R., et al (41 additional co-authors including **Hill, M.L.**), “*Physical Parameters of the Multi-Planet Systems HD 106315 and GJ 9827*”, 2021, The Astronomical Journal, 161, 1
19. Weiss, L., et al. (55 additional co-authors including **Hill, M.L.**), “*The TESS-Keck Survey II: An Ultra-Short Period Rocky Planet and its Siblings Transiting the Galactic Thick-Disk Star TOI-561*”, 2021, The Astronomical Journal, accepted for publication
20. Dai, F., et al. (45 co-authors including **Hill, M.L.**), “*TKS III: A Stellar Obliquity Measurement of TOI-1726 c*”, 2020, The Astronomical Journal, 160, 4
21. Kane, S.R., Roettenbacher, R.M., Unterborn, C., Foley, B.J., **Hill, M.L.**, “*A Volatile-poor Formation of LHS 3844b Based on Its Lack of Significant Atmosphere*”, 2020, The Planetary Science Journal, 1, 2
22. Mann, A.W., et.al. (52 additional co-authors including **Hill, M.L.**), “*TESS Hunt for Young and Maturing Exoplanets (THYME) III: a two-planet system in the 400 Myr Ursa Major Group*”, 2020, The Astronomical Journal, 160, 4
23. Badenas-Agusti, M., et al. (40 additional co-authors including **Hill, M.L.**), “*HD 191939: Three Sub-Neptunes Transiting a Sun-like Star Only 54 pc Away*”, 2020, The Astronomical Journal, 160, 3
24. Cloutier, R., et al. (87 additional co-authors including **Hill, M.L.**), “*TOI-1235 b: A Keystone Super-Earth for Testing Radius Valley Emergence Models around Early M Dwarfs*”, 2020, The Astronomical Journal, 160, 1
25. Dalba, P.A., et al. (65 additional co-authors including **Hill, M.L.**), “*The TESS-Keck Survey. I. A Warm Sub-Saturn-mass Planet and a Caution about Stray Light in TESS Cameras*”, 2020, The Astronomical Journal, 159, 5
26. Kane, S.R., Fetherolf, T., **Hill, M.L.**, “*The Dark Planets of the WASP-47 Planetary System*”, 2020, The Astronomical Journal, 159, 4
27. Bouma, L.G., et.al. (22 additional co-authors including **Hill, M.L.**), “*WASP-4b Arrived Early for the TESS Mission*”, 2019, The Astronomical Journal, 157, 6, 217
28. Kane, S.R., **Hill, M.L.**, Kasting, J.F., Kopparapu, R.K., Quintana, E.V., Barclay, T., Batalha, N.M., Borucki, W.J., Ciardi, D.R., Haghhighipour, N., Hinkel, N.R., Kaltenegger, L., Selsis, F and Torres, G., “*A Catalog of Kepler Habitable Zone Exoplanet Candidates*”, 2016, The Astrophysical Journal, 830, 1

### Other Publications in Preparation

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1. **Hill, M.L.**, Kane, S.R. “*Exploring Giant Planets and their Potential Moons in the Habitable Zone*”, Honors Thesis, USQ

## Honors and Awards

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NASA FINESST Fellow	2021 - 2025
Seec Symposium Student Travel Grant	2024
Sagan Summer workshop Travel Grant	2019
Kepler & K2 Science Conference V Student Travel Grant	2019
University of Southern Queensland First Class Honours	2018
AGU Student Travel Grant	2017
University of New England Vice Chancellor Honour Roll	2016
University of New England Vice Chancellor Honour Roll	2015
San Francisco State University Dean's List	2015-2016

## Talks

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1. *May 2022 Contributed Talk*, “Extraordinary Outliers of the Habitable Zone Catalog”, AbSciCon, Atlanta, GA, USA
2. *October 2019 Invited Talk*, “Exploring Giant Planets and their Potential Moons in the Habitable Zone”, IPAC Seminar, Pasadena, CA, USA
3. *March 2019 Contributed Talk*, “Exploring Giant Planets and their Potential Moons in the Habitable Zone”, Kepler & K2 Science Conference V, Glendale, CA, USA
4. *January 2019 Contributed Talk*, “Exploring Giant Planets and their Potential Moons in the Habitable Zone”, 233rd Meeting of the AAS, Seattle, WA, USA
5. *June 2018 Thesis Defense*, “Exploring Giant Planets and their Potential Moons in the Habitable Zone”, University of New England, NSW, Australia
6. *December 2017 Contributed Talk*, “Exploring Kepler Giant Planets in the Habitable Zone”, AGU Fall Meeting, New Orleans, LA, USA
7. *April 2017 Contributed Talk*, “A Catalog of Kepler Habitable Zone Exoplanet Candidates”, AbSciCon, Mesa, AZ, USA

## Posters

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1. *May 2024, Hill, M.L.* et al., “Exploring the Lower Planet Size Boundary of Planetary Habitability”, AbSciCon, Providence, RI, USA **Poster**
2. *April 2024, Hill, M.L.* et al., “Exploring the Lower Planet Size Boundary of Planetary Habitability”, SEEC, Baltimore, MD, USA **Poster**
3. *April 2024, Hill, M.L.* et al., “Exploring the Lower Planet Size Boundary of Planetary Habitability”, CIDER Workshop, Berkeley, CA, USA **Poster**
4. *Feb 2022, Hill, M.L.* et al., “Exploring the Lower Planet Size Boundary of Planetary Habitability”, Exoplanets in Our Backyard, Albuquerque, NM, USA **Poster**
5. *August 2019, Hill, M.L.* et al., “Exploring Giant Planets and their Potential Moons in the Habitable Zone”, Extreme Solar Systems IV, Reykjavik, Iceland **Poster**
6. *July 2019, Hill, M.L.* et al., “Exploring Giant Planets and their Potential Moons in the Habitable Zone”, Sagan Summer Workshop, Pasadena, CA, USA **Poster**
7. *October 2017, Kane, S.R., Hill, M.L., twelve others*, “Exploring Kepler Giant Planets in the Habitable Zone”, Know Thy Planet, Know Thy Star, Pasadena, CA, USA **Poster**

## Computer Skills

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Proficient in Python, Matlab

Intermediate in Fortran

Extensive experience modeling radial velocity data with RadVel & RVSearch

Experience modeling joint astrometry and radial velocity data with Orvara

Experience modeling joint transit and radial velocity data with Exoplanet

Experience modeling with ROCKE-3D (attended workshop 2019)

Experience modeling with VPlanet (attended workshop 2019, 2023)

Experience modeling with cGENIE (10 week course taken 2019)

### Telescope Training

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Keck HIRES, 2019, HI, USA

Lick Observatory, 2019, CA, USA

### In The Media

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1. **Press release** from UCR describing the paper “Exploring Kepler Giant Planets in the Habitable Zone”: <https://phys.org/news/2018-06-giant-planets-habitable-moons.html>
2. **Interview** BBC interview by Mary Halton “Exomoons: On the hunt for distant worlds”: <https://www.bbc.com/news/science-environment-44605761>
3. **Radio Interview** with BBC Radio 4 about the paper “Exploring Kepler Giant Planets in the Habitable Zone”: <https://www.bbc.co.uk/programmes/b0b4817n>
4. **Interview** CBC interview by Nicole Mortillaro “In the search for life beyond Earth, moons may be the best candidates”: <https://testtube.com/dnews/could-the-death-star-really-destroy-a-planet>
5. **Interview** Particle interview by Karl Gruber “Searching for alien life on other moons”, <https://phys.org/news/2018-07-alien-life-moons.html>
6. **Interview** on Physics World to discuss the potential exomoon discovery by Teachey et al. (2018), <https://physicsworld.com/a/does-a-giant-moon-the-size-of-neptune-orbit-a-distant-exo/>