Rena Aerey Lee

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Education

2023 - Present **Ph.D. in Astronomy**, *University of Hawai'i at Mānoa*, Honolulu, HI

2020 – 2022 **M.S. in Earth and Planetary Sciences**, *University of Hawai'i at Mānoa*, Honolulu, HI

2016 – 2020 **B.A. in Astronomy (Honors)**, *Vassar College*, Poughkeepsie, NY

B.A. in Cognitive Science, *Vassar College*, Poughkeepsie, NY

Research Experience

Interests Low Mass Stars, Stellar Activity, Planet Formation and Evolution, Planetary Atmospheres

Jan 2023 - Sep 2023 **Dr. Michael Connelley**, *699-1 Project: Measuring the magnetic fields of the coolest pre-main sequence stars using iSHELL*, Honolulu, HI

- Deriving stellar properties in conjuction with average magnetic field measurements of pre-main sequence M stars in the Beta Pictoris Moving Group using a MCMC framework, utilizing high resolution K-band spectra obtained with iSHELL at IRTF.

Aug 2020 - Dec 2022 **Dr. Eric Gaidos**, *Master's Thesis: Relating Multiplicity and Rotational Evolution among Young M Dwarf Stars in the Beta Pictoris Moving Group*, Honolulu, HI

- Obtaining, reducing, and analyzing IR data from Maunakea Observatories and other sources to study the rotation and activity of young M dwarf stars and the implications for the evolution of their planets; observational campaign to detect and measure the stellar masses of companions in binary systems.

Aug 2020 - July 2022 **Dr. Peter Plavchan**, *TOI Follow-Up Program*, Fairfax, VA

- Collaborator and observer for IR spectroscopic follow-up of TESS Objects of Interest, detecting and characterizing exoplanets around M Dwarf stars by radial velocity analysis.

Aug 2021 - July 2022 **Dr. Sonal Jain**, *MAVEN IUVS Science Team*, Boulder, CO

- Research Affiliate of the Mars Atmosphere and Volatile EvolutioN (MAVEN) Imagning UltraViolet Spectrograph (IUVS) Science Team at the Laboratory for Atmospheric and Space Physics; analyzed data from previous laboratory work with Dr. Joseph Ajello and prepared manuscripts for publication.

Aug 2019 - Aug 2020 **Dr. Joseph Ajello**, *Laboratory Study of Planetary UV Emissions*, Boulder, CO

- Analyzed laboratory UV emission spectra for application in planetary aeronomical modeling; laboratory operation; prepared manuscript for publication; data reduction, analysis, and quality assurance.

May 2019 - Aug 2019 **Dr. Joseph Ajello & Dr. Charles Malone**, *NSF Research Experience for Undergraduates*, Boulder, CO

- Operated and optimized laboratory vacuum chamber equipment, electron gun, and flight spare spectrographs (MAVEN IUVS, GOLD) to obtain electron impact-induced fluorescence spectra from common planetary gases; developed data reduction and visualization routines.

Teaching Experience

Undergraduate

Academic Intern (distinguished TA), Astronomy Department *Aug 2019 – May 2020*

- *ASTR 101: Solar System Science*
- *ASTR 105: Stars, Galaxies, and Cosmology*
- *ASTR 220: Stellar Astrophysics*
- *ASTR 230: Planetary and Space Science*
- *ASTR 240: Observational Astronomy*
- *ASTR 322: Galaxies*

Academic Intern (distinguished TA), Cognitive Science Department *Jan 2020 – May 2020*

- *COGS 219: Research Methods in Cognitive Science*

Laboratory Teaching Assistant, Chemistry Department *Aug 2018 – Dec 2019*

- *CHEM 108: General Chemistry I Lab*
- *CHEM 109: General Chemistry II Lab*
- *CHEM 244: Organic Chemistry I Lab*

Laboratory Teaching Assistant, Physics Department *Aug 2018 – May 2019*

- *PHYS 113: Fundamentals of Physics I*
- *PHYS 114: Fundamentals of Physics II*

Awards, Scholarships, and Fellowships

Graduate

Institute for Astronomy Outreach Service Award *Jan 2023*

Graduate Division Achievement Scholarship, UH Mānoa ($3K) *Aug 2022*

NASA Exoplanet Science Institute Sagan Summer Workshop Travel Award *Jul 2022*

	National Science Foundation Graduate Research Fellowship ($125K)	*Apr 2022 - Present*
	Fred Mason Bullard Fellowship ($12K), UH Mānoa	*Aug 2020*
Undergraduate	Austin Endowed Student Travel Grant, American Geophysical Union	*Dec 2019*
	Internship Grant Fund, Vassar College	*Nov 2019*
	Grace Hopper Celebration Research Scholarship, Computing Research Association	*Oct 2019*
	QuestBridge National College Match Finalist	*Nov 2015*

Volunteering and Outreach

Graduate	Volunteer, Institute for Astronomy Outreach	
	- Hawai'i Geek Meet	*Sep 2022*
	- Welina Mānoa: First Day of School Kick-Off Event	*Aug 2022*
	- Girl Scouts of Hawai'i STEM Camp	*Jun 2022*
	- IfA Open House	*Apr 2022*
	- Radio Telescope Demonstration	*Feb 2022*
	- Makahiki Games & Stargazing Event	*Dec 2021*
	Mentor, Mauna Kea Scholars	*May 2022 - Present*
	Mentor, HI-STAR (Hawai'i Student/Teacher Astronomy Research) Summer Camp	*May 2021 - Present*
	Mentor and Volunteer, Honua Scholars	*Oct 2021 - Present*
	Alumna and Volunteer, QuestBridge Organization	*Aug 2016 - Present*
Undergraduate	Organizer, Night at the Observatory Events, Vassar College	*Aug 2019 - Feb 2020*
	Research and Coding Intern, Vassar Brothers Medical Center: The Heart Center	*Aug 2018 - May 2019*
	Middle School and College Prep Tutor, Vassar College Urban Education Initiative	*Aug 2016 - May 2018*

Academic Service

Graduate Outreach Representative, Institute for Astronomy	*Aug 2022 - Present*
Earth & Planetary Sciences Representative, Graduate Student Organization	*May 2022 - Present*
Graduate Student Representative, Justice, Equity, Diversity, and Inclusion Committee	*Aug 2021 - Jul 2022*

Programming Skills

Proficient	Python | LaTeX | Bash
Novice	IDL | MATLAB | R | C

Conferences and Presentations

Talks	Earth and Planetary Sciences Department Colloquium Talk	*Nov 2021*
	- Bullard Talk: Hidden Binary Stars in a Young Stellar Association	
	American Geophysical Union Fall Meeting	*Dec 2019*
	- Laboratory Aeronomy by Electron Impact of CO and CO_2 for Analysis of UV Observations of the Martian Upper Atmosphere	
Posters	NExScI Sagan Summer Workshop	*Jul 2022*
	- Census & Age of the Beta Pictoris Moving Group with Gaia DR3	
	American Geophysical Union Fall Meeting	*Dec 2021*
	- Mars and Venus Dayglow Studies Based Upon Laboratory Aeronomy from Electron Impact of CO_2 for analysis of UV Observations by MAVEN, EMM, MEx, and VEx	
	NExScI Sagan Summer Workshop	*Jul 2021*
	- Hidden Binaries in the Beta Pictoris Moving Group	
Contributor	Europlanet Science Congress (Talk)	*Sep 2022*
	- The CO Cameron bands in the Mars dayglow and aurora: consequences of revised cross sections	
	American Geophysical Union Fall Meeting (Poster)	*Dec 2019*
	- Comparison of Titan and Earth UV Dayglow: Cascade UV Spectrum of the LBH Band System of N_2 by Electron Impact	

Refereed Publications

3 First Author **Lee, R. A.** + 4 authors. "Revisiting the Membership, Multiplicity, and Age of the Beta Pictoris Moving Group in the *Gaia* Era" 2023, MNRAS. *Submitted Feb 2023.*

Lee, R. A. + 11 authors. "Laboratory Study of the Cameron Bands and UV Doublet in the Middle Ultraviolet 180–300 nm by Electron Impact upon CO_2 with Application to Mars" 2022, Astrophysical Journal, 938, 99.

Lee, R. A. + 9 authors. "Laboratory Study of the Cameron Bands, the Fourth Positive Bands, and the First Negative Bands in the Middle Ultraviolet 180-300 nm by Electron Impact on CO" 2021, Journal of Geophysical Research: Planets, 126, 2020JE006602.

7 Contributing

Gaidos, E., **Lee, R. A.**, + X authors. "Rotation and Multiplicity in the Beta Pictoris Moving Group" 2023, Monthly Notices of the Royal Astronomical Society. *in prep*.

Gaidos, E., Hirano, T., **Lee, R. A.**, + 7 authors. "Planet(esimal)s Around Stars with TESS (PAST) III: A Search for Triplet He I in the Atmospheres of Two 200 Myr-old Planets" 2022, Monthly Notices of the Royal Astronomical Society. *Accepted Oct 2022*. on arXiv.

El Mufti, M., + 95 authors, including **Lee, R. A.** "TOI 560 - Two Transiting planets Orbiting a K dwarf Validated with iSHELL, PFS and HIRES RVs" 2021, AAS Journals. *Accepted Oct 2022*. on arXiv.

Cale, B. + 54 authors, including **Lee, R. A.** "Diving Beneath the Sea of Stellar Activity: Chromatic Radial Velocities of the Young AU Mic Planetary System" 2021, Astronomical Journal, 162, 295.

Gaidos, E. + 23 authors, including **Lee, R. A.** "Zodiacal Exoplanets in Time (ZEIT) XII: A Directly-Imaged Planetary-Mass Companion to a Young Taurus M Dwarf Star" 2021, Monthly Notices of the Royal Astronomical Society, 512, 10.1093/mnras/stab3069.

Ajello, J. M. + 10 authors, including **Lee, R. A.** "The UV spectrum of the Lyman-Birge-Hopfield band system of N2 induced by cascading from electron impact" 2020, Journal of Geophysical Research: Space Physics, 125, 2019JA027546.

de Leeuw, J. + 18 authors, including **Lee, R. A.** "Similar event-related potentials to structural violations in music and language: A replication of Patel, Gibson, Ratner, Besson, & Holcomb (1998)" 2019, Metapsychology, 3, MP.2018.1481.

Awarded Proposals

Funding

Co-I TESS Guest Investigator Program Cycle 4 *2021*

Rotation and Multiplicity of Hyades M Dwarf Stars (PI Eric Gaidos)

Observing

PI Hidden Binaries in the Beta Pictoris Moving Group, NASA IRTF | 39 hrs *2021B-2022A*

Hidden Binaries in the Beta Pictoris Moving Group, NAOJ Subaru Telescope | 12 hrs *2021B*

Co-I Running Out of Gas near the End of Planet Formation, NASA IRTF | 6.25 hrs *2022B*

Transit Spectroscopy of a Nearby Young Exo-Neptune, NASA IRTF | 6.5 hrs *2022A*

Transit Spectroscopy of a Nearby Super-Earth, Subaru Telescope | 6.5 hrs *2022A*

Sleuthing the magnetic field, rotation, and age of a nearby M dwarf star, NASA IRTF | 10.75 hrs *2022A*

Transit Spectroscopy of a Planet around a Nearby Bright Young Star, NASA IRTF | 7.5 hrs *2021B*

Hidden Binaries in the Beta Pictoris Moving Group, NASA IRTF | 21 hrs *2021A*

Contributing Observer

Spectroscopy of Dipper Stars to reveal Inner Disk Dynamics, NASA IRTF | 7.5 hrs *2022A*

Transit Spectroscopy of TOIs in the Neptune Desert, Subaru Telescope | 9 hrs *2022A*

Rotation and Multiplicity of Hyades M Dwarf Stars, W.M. Keck Observatories | 24 hrs *2021B*

TOI follow-up program, Plavchan Group, NASA IRTF | ∼30+ hrs *2020B-2021A*

References available upon request.