Michaela Leung

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Education

University of California, Riverside — Riverside, CA

Doctor of Philosophy in Earth and Planetary Sciences — *Sept. 2020 – Present*

Advanced to Candidacy January 2023. Expected Graduation: Spring 2025

- Including courses on Planetary Habitability, Planetary Atmospheres, Diversity, Equity, Inclusion and Justice in the Geosciences. GPA: 4.0
- University Teaching Certificate (March 2024) Includes Advanced University Pedagogy Courses, teaching observations, and creation of teaching portfolio

University of Washington — Seattle, WA

Bachelor of Science in Earth and Space Sciences — *Sept. 2016 – June 2020*

- Cum Laude with Departmental and Interdisciplinary Honors.
- Early entrance at age 15 through UW Academy for Young Scholars program

Research Experience

Graduate Research Assistant — July 2020 – Present

Department of Earth and Planetary Sciences, University of California, Riverside — *Riverside, CA*

Advisor: Dr. Edward Schwieterman

- Substantial updates and revisions to the atmos 1-dimensional coupled climate photochemistry model including addition of new gaseous species.
- Interdisciplinary and vertically integrated approaches for evaluating novel process driven biosignatures
- Climate, photochemical, and spectral simulations of terrestrial exoplanets.

Undergraduate Research Assistant — October 2017 – September 2020

Virtual Planetary Laboratory, University of Washington — *Seattle, WA*

Advisor: Dr. Victoria Meadows

- Used SMART radiative transfer model to analyze oxygen false positives
- Developed python scripts and modified existing FORTRAN code. Wrote first-author paper and gave poster presentations.

Publications

Submitted

- *Barnes, R., Do Amaral, L., Birky, J., et al., [and 41 others including **Leung, M** and Ngo, C]. History and Habitability of the LP 890-9 Planetary System. In Review*
- *Schwieterman, E., Fauchez, T., Haqq-Misra, J., et al., [and 5 others including **Leung, M**]. Artifical Greenhouse Gases as Technosignatures. In Review*
- Villanueva, G., Fauchez, T., Kofman, V., et al., [and 15 others including **Leung, M**]. Modelling Atmospheric Lines By the Exoplanet Community (MALBEC) version 1.0. A CUISINES radiative transfer intercomparison project. In Press
- Angerhausen, D., Pidhorodetska, D., **Leung, M.** et al., (2024) Large Interferometer For Exoplanets: XII. The Detectability of Capstone Biosignatures in the Mid-Infrared - Sniffing Exoplanetary Laughing Gas and Methylated Halogens. The Astronomical Journal, 167, 128 doi.org/10.3847/1538-3881/ad1f4b
- Ranjan, S., Schwieterman, E., **Leung, M**., Harman C.E., Hu, R. A Re-Appraisal of CO/O2 Runaway on Habitable Planets Orbiting Low-Mass Stars. The Astrophysical Journal Letters, 958, L15 doi.org/10.3847/2041-8213/ad037c
- **Leung, M.**, Schwieterman, E. W., Parenteau, M. N., & Fauchez, T. J. (2022). Alternative Methylated Biosignatures. I. Methyl Bromide, a Capstone Biosignature. The Astrophysical Journal, 938(1), 6. https://doi.org/10.3847/1538-4357/ac8799
- Peacock, S., Barman, T. S., Schneider, A. C., **Leung, M.**, Schwieterman, E. W., Shkolnik, E. L., & Parke Loyd, R. O. (2022). Accurate Modeling of Lyα Profiles and Their Impact on Photolysis of Terrestrial Planet Atmospheres. The Astrophysical Journal, 933(2), 235. https://doi.org/10.3847/1538-4357/ac77f2
- **Leung, M.**, Meadows, V., & Lustig-Yaeger, J. (2020). High-resolution Spectral Discriminants of Ocean Loss for M-Dwarf Terrestrial Exoplanets, 160(1). https://doi.org/10.3847/1538-3881/ab9012

Invited Talks

- **Leung, M.**, (2024) Exoplanet Biosignature : NASA Hyperwall talk at AAS 243, New Orleans, January 2024
- **Leung, M.**, Schwieterman, E. W., Parenteau, N., & Fauchez, T. J., (2023) Novel Methylated Biosignatures: Mid-Infrared Signs of Life with Low False Positive Potential : seminar talk at the Universidad Nacional Autónoma de México, Mexico City/virtual, May 17, 2023

Contributed Talks and Posters

Undergraduate Mentee

- **Leung, M.**, Schwieterman, E. W., & Parenteau, N. (2024) Methylated Biosignatures: Mid-Infrared Signs of Life with Low False Positive Potential : oral presentation at AAS 243, January 2024
- **Leung, M.**, Schwieterman, E. W., Parenteau, N., & Fauchez, T. J., (2023) Novel Methylated Biosignatures: Mid-Infrared Signs of Life with Low False Positive Potential : oral presentation at the Astrobiology Graduate Conference, May 2023
- **Leung, M.**, Schwieterman, E. W., Parenteau, N., & Fauchez, T. J., (2023) Methylated Biosignatures: Mid-Infrared Signs of Life with Low False Positive Potential : oral presentation at Cloud Academy 3, March 2023
- **Leung, M.**, Schwieterman, E., Parenteau, N., & Fauchez, T. (2023) CH_3Br: a Novel Biosignature Candidate : oral presentation at AAS 241, January 2023
- *Ngo, C.,* **Leung, M.**, & Schwieterman, E. (2023). Exploring Additional Methylated Biosignatures: $CHBR_3$. oral presentation at AAS 241, January 2023
- **Leung, M.**, Schwieterman, E. W., Parenteau, N., & Fauchez, T. J., (2022) CH_3Br: A Novel Methylated Biosignature for Exoplanets : poster presentation at AGU Annual Meeting, December 2022
- **Leung, M.**, Schwieterman, E. W., Parenteau, N., & Fauchez, T. J., (2022) CH_3Br: A Novel Methylated Biosignature for Exoplanets : oral presentation at Exoplanets in Our Backyard 2, November 2022
- **Leung, M.**, Schwieterman, E. W., Parenteau, N., & Fauchez, T. J., (2022) CH_3Br: A New Capstone Biosignature for Exoplanets : oral presentation at AAS 240, June 2022
- **Leung, M.**, Schwieterman, E. W., & Parenteau, N. (2022) Novel Methylated Biosignatures: Outcomes of a General Metabolic Process as a New Class of Biosignatures : oral presentation at ExoPAG 26, June 2022
- **Leung, M.**, Schwieterman, E. W., & Parenteau, N., (2022) CH_3Br: A New Capstone Biosignature for Exoplanets : The Astrobiology Science Conference, May 2022
- Wolf, E. T., Schwieterman E. W., Haqq-Misra, J., **Leung, M.**, ... (2022) Exploring Habitable Atmospheres of TRAPPIST-1e Using a Modeling Hierarchy and Sparse Griding Techniques : The Astrobiology Science Conference, May 2022
- **Leung, M.**, Schwieterman, E. W.& Parenteau, N., (2022) CH_3Br: A New Capstone Biosignature for Exoplanets : oral presentation at CHAMPS-hosted Early Career Highlight seminar, virtual, January 2022
- **Leung, M.**, Schwieterman, E. W.& Parenteau, N., (2022) CH_3Br: A New Capstone Biosignature for Exoplanets : oral presentation at AAS 239, Salt Lake City, UT, January 2022 *** Cancelled due to COVID-19
- Peacock, S., ... **Leung, M.** ... (2022) High Radial Velocities Expose More Than Just Lyman-Alpha Line Cores : oral presentation at AAS 239, Salt Lake City, UT, January 2022 *** Cancelled due to COVID-19
- **Leung, M.** & Meadows V., (2021) Impact of Photochemistry in Terrestrial P type Circumbinary Exoplanetary Atmospheres: poster presented at Habitable Worlds 2021, February 23
- **Leung, M.**, Meadows V. & Lustig-Yeager, J. (2021), High Resolution Spectral Discriminants of Ocean Loss for M Dwarf Terrestrial Exoplanets: oral presentation at AAS 237, Virtual Meeting, January 15
- **Leung, M.**, Meadows V., & Lincowski, A. (2020) Effects of Atmospheric Photochemistry in Circumbinary Planets: poster presented at the 52nd Annual Meeting of the Division of Planetary Sciences AAS, Virtual Meeting, October 26.
- **Leung, M.**, Meadows V., & Lincowski, A. (2020) Effects of Atmospheric Photochemistry in Circumbinary Planets: presented at Exoplanets in Southern California, Virtual Meeting, September 15.

- **Leung, M.** & Meadows V. (2020) Effects of Atmospheric Photochemistry in Circumbinary Planets: poster presented at the Undergraduate Research Symposium
- **Leung, M.**, Meadows V. & Lustig-Yeager, J. (2019), How to Discriminate Signs of Life from Ocean Loss on Earth-like Exoplanets Using High Resolution Ground Based Spectroscopy: poster presented at the Undergraduate Research Symposium

Professional Service

Execeutive Secretary, NASA Review Panel, 2023

Diversity, Equity, and Inclusion (DEI) Experience

Graduate Student Association DEI Representative June 2022 – Present

Department of Earth and Planetary Science

- Elected to student leadership position focused on liaising with faculty and campus DEI groups.
- In progress projects include: creation of gender neutral bathroom, workshop series for graduate students

Programming Committee Member and Chair

The Women+ of Color Project

Programming Committee Member: April 2021 – October 2023 | Programming Committee Chair: April 2022 – October 2023

- Planning fall conference to support graduate applicants from marginalized communities through creating workshops and organizing the event program.

Committee Member November 2020 – November 2022

Professional Culture and Climate Subcommittee *Division of Planetary Sciences, AAS*

- Work on analyzing results from DPS meeting survey, and proposed ideas to improve culture and climate in DPS.

Undergraduate Representative May 2019 – June 2020

Earth and Space Sciences Curriculum Committee, University of Washington *Seattle, WA*

- Represented undergraduate students in discussions and decisions about curriculum updates and overhauls.
- Led discussions about equity and initiated review of teaching goals in required courses

Teaching Experience

Graduate Teaching Assistant 3 Quarters including Fall 2023

GEO 013

- Taught 100+ students over three sections per term. Created interactive presentations, in class activities and group work structures to support students on graded activities.

Instructor of Record June 2022 – July 2022

GEO 013

- Converted class to flipped classroom. Piloted use of 'University of Mars' video game. Adapted course assignments with a focus on accessibility.

Undergraduate Peer Tutor and Mentor

Odegaard Writing and Research Center, University of Washington *Seattle, WA*

Peer Tutor: September 2018 – June 2020 | Peer Mentor: August 2019 – June 2020

- Worked with graduate and undergraduate student writers on various writing projects through question based, non-directive strategies.
- Developed mentorship and organization skills through supporting and training staff as well as planing events and programming.
- Supported transition to remote in April 2020. Led initiative to connect staff through COVID-19 induced isolation.

Outreach

GEOP Committee Member December 2022 – Present

Geoscience Education and Outreach Program *Department of Earth and Planetary Sciences, UCR*

- Developed new planetary science activity
- Coordinated with other departments for cross disciplinary outreach program development
- Supported and facilitated outreach events reaching 200+ community members

Astrobiology Guest Speaker / Skype a Scientist October 2020 – Present

- Conducting multiple virtual presentations with 300+ students in elementary and middle school science classes.
- 2023. "From Ammonia to Oxygen: A Review of Remotely Detectable (Potential) Signs of Life Battle Point Astronomical Association, August 12, 2023 via Zoom.
- 2021. "The Search for Life Beyond the Solar System" Battle Point Astronomical Association, June 12, 2021 via Zoom.

Undergraduate Research Leader September 2019 – June 2020

Undergraduate Research Program, University of Washington *Seattle, WA*

- Communicated about research opportunities at outreach events to first year and transfer students.

Relevant Work Experience

Technical Editor May–July 2020

Math for Programmers

- Edited manuscript for technical accuracy and clarity. Created high quality figures and confirmed Python code functionality.

Interpretive Science Educator February 2015 – June 2018

Pacific Science Center *Seattle, WA*

- Facilitated informal science education. Examples include presenting interactive activities about remote sensing and transit detection of exoplanets.
- Learned strategies for science communication across age groups and utilized these skills to work primarily with families with young children
- Developed hands-on activities and planned event celebrating 2017 total solar eclipse using multimedia strategies including themed music and crafts
- Wrote successful grant application for $165k to fund solar panel array. Worked with contractors and assessed bids. Developed educational signage and hands-on science communication activities.

Honors and Awards

- UC President's Dissertation Year Fellowship AY 2024-2025 (full funding)
- NASA ExoExplorer 2024 Cohort, January 2024-June 2024
- Honorable Mention, National Science Foundation Graduate Research Fellowship Program, March 2021
- Provost's Research Fellowship, University of California, Riverside (2020-2025, full funding 2020-2021)
- Undergraduate Student Speaker, Earth and Space Sciences Graduation, 2020
- Husky 100, 2020
- Mary Gates Research Scholarship, Spring 2020
- University of Washington Dean's List: 9 quarters
- Husky Leadership Certificate, University of Washington