Sukrit Ranjan

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Professional Appointments

University of Arizona **Assistant Professor** **09/2022-Present**
Assistant Professor in Department of Planetary Sciences/Lunar and Planetary Laboratory at University of Arizona.

Northwestern University **CIERA Postdoctoral Fellow** **09/2020-09/2022**
Center for Interdisciplinary Exploration and Research in Astrophysics prize fellow in NU Physics & Astronomy.

M.I.T. **SCOL Postdoctoral Fellow** **09/2017-08/2020**
Simons Collaboration on the Origin of Life prize fellow in MIT Earth, Atmospheric & Planetary Sciences.

Education

Harvard University **PhD, Astronomy & Astrophysics** **May 2017**
PhD Thesis: "The UV Environment For Prebiotic Chemistry". Research Exam (MA Thesis): "Characterization of 5 Hot Jupiter Atmospheres with WFC3 On HST". Certificate in Origin of Life studies.

M.I.T. **SB, Physics** **June 2010**
Major in Physics, minors in History & Astronomy, ΦBK, ΣΠΣ, Burchard Scholar, Orloff Award, Mazlish Prize.

Other Appointments

- **Blue Marble Space Institute of Science**, Affiliate Research Scientist. 06/20-present
- **National Institute of Science Education and Research**, Visiting Faculty. 10/21-12/21
- **Indian Institute of Astrophysics**, Postdoctoral Researcher (PI: S. Sengupta). 06-08/2017.
- **NASA Ames Research Center**, Research Associate/NASA Academy (PI: N. Cabrol). 06-08/2010.

Selected Awards and Honors

- **SciAlog: Signatures of Life in the Universe Fellow**, 2023
- **CIERA Postdoctoral Fellowship**, 2020
- **NAI Early Career Scholarship**, 2018.
- **SCOL Postdoctoral Fellowship**, 2017
- **AAS Rodger Doxsey Prize**, 2017.
- **Harvard Astronomy Department Outstanding Mentor Certificate**, 2014 & 2015.
- **AGU Fall Meeting Outstanding Student Paper Award**, 2013.
- **Harvard University Certificate of Distinction in Teaching**, 2012.
- **NSF Graduate Research Fellowship**, 2010

Successful Proposals

Funding

- **JWST Guest Observer Program**, "Using stellar contamination proxy TRAPPIST-1 b to search for an atmosphere on TRAPPIST-1 e", Co-I, 2024, $TBD($TBD total).
- **SciAlog Signatures of Life in the Universe**, "Constraining the Abiotic Sulfur Cycle on Temperate Terrestrial Planets", Co-PI, 2023-2024, $50k ($200k total).
- **UA Provost's Independent Fund**, " Construction of Venusian Atmospheric Models in Preparation for the Decade of Venus ", PI, 2023-2025, $159k ($194k total).

- **NASA Exoplanets Research Program**, "Experimental Constraints for Improving Terrestrial Exoplanet Photochemical Models (ExCITE-PM)", Science PI, 2021, $132k ($677k total).
- **HST Guest Observer Program**, "Chromosopheric and Coronal Activity in the Lowest-Mass Stars", Co-I, 2020, $23k ($224k total).

Observing Time

- **JWST Guest Observer Program**, "Using stellar contamination proxy TRAPPIST-1 b to search for an atmosphere on TRAPPIST-1 e", Co-I, 2024, 128.8 hours.
- **LCO Director's Discretionary Time**, "Photometric Monitoring of TRAPPIST-1 To Enable Precision Spectroscopy of TRAPPIST-1e", Co-I, 2023, 8 hours.
- **TESS Guest Observer Program**, "Planets And Stellar Activity Through Time: Understanding The Evolution, Diversity And Habitability Of Planetary Systems", Co-I, 2023.
- **HST Guest Observer Program**, "Chromosopheric and Coronal Activity in the Lowest-Mass Stars", Co-I, 2020, 33 orbits.
- **AstroSat Cycle T01**, "M-dwarfs as Exoplanet Hosts: Coordinated Observations with HST and Astrosat in X-rays through UV", Co-I, 2017, 15000.0 seconds.

Peer-Reviewed Publications (Published or Submitted)

* = *mentored or co-mentored student*

First-Author Publications

13. **Ranjan, S.**, K. Abdelazim, G. Lozano, S. Mandal, C. Y. Zhou, C. Kufner, Z. Todd, N. Sahai, D. Sasselov, 2023. °Geochemical and Photochemical Constraints on S[IV] Concentrations in Natural Waters on Prebiotic Earth. AGU Advances, 4, e2023AV000926. *Editor's Highlight (awarded to $< 2\%$ of papers).*
12. **Ranjan, S.**, E. Schwieterman, M. Leung, C. Harman, R. Hu, 2023. A Re-Appraisal of CO/O_2 Runaway on Habitable Planets Orbiting Low-Mass Stars. The Astrophysical Journal Letters, 958, L15.
11. **Ranjan, S.**, P. Nayak, J. S. Pineda, M. Narang, 2023. UV Spectral Characterization of Low-Mass Stars With AstroSat UVIT for Exoplanet Applications: The Case Study of HIP 23309. The Astronomical Journal, 166, 70.
10. **Ranjan, S.**, S. Seager, Z. Zhan, D. Koll, W. Bains, J. Petkowski, J. Huang, Z. Lin, 2022. Photochemical Runaway in Exoplanet Atmospheres: Implications for Biosignatures. The Astrophysical Journal, 930, 131.
9. **Ranjan, S.**, C. Kufner, G. Lozano, Z. Todd, A. Haseki*, D. Sasselov, 2022. UV Transmission in Natural Waters on Prebiotic Earth. Astrobiology, 22, 242.
8. **Ranjan, S.**, E. Schwieterman, C. Harman, A. Fateev, C. Sousa-Silva, S. Seager, R. Hu, 2020. Photochemistry of Anoxic Abiotic Habitable Planet Atmospheres: Impact of New H_2O Cross-Sections. The Astrophysical Journal, 896, 2.
7. **Ranjan, S.**, Z. Todd, P. Rimmer, D. Sasselov, A. Babbin, 2019. Nitrogen Oxide Concentrations in Natural Waters on Early Earth. Geochemistry, Geophysics, Geosystems, 20, 2021. *Top 10 Downloaded Article.*
6. **Ranjan, S.**, Z. Todd, J. Sutherland, and D. Sasselov, 2018. Sulfidic Anion Concentrations on Early Earth for Surficial Origins-of-Life Chemistry. Astrobiology, 18, 1023.
5. **Ranjan, S.**, R. Wordsworth, and D. Sasselov, 2017b. The Surface UV Environment on Planets Orbiting M-Dwarfs: Implications for Prebiotic Chemistry & Need for Experimental Follow-Up. The Astrophysical Journal, 843, 110.
4. **Ranjan, S.**, R. Wordsworth, and D. Sasselov, 2017a. Atmospheric Constraints on the Surface UV Environment of Mars at 3.9 Ga Relevant to Prebiotic Chemistry. Astrobiology, 17, 687.
3. **Ranjan, S.** and D. Sasselov, 2017. Constraints on the Early Terrestrial Surface UV Environment Relevant to Prebiotic Chemistry. Astrobiology, 17, 169.
2. **Ranjan, S.** and D. Sasselov, 2016. Influence of UV Radiation on the Synthesis of Prebiotic Molecules. Astrobiology, 16, 68.
1. **Ranjan, S.**, D. Charbonneau, J.-M. Désert, N. Madhusudhan, L. D. Deming, A. N. Wilkins, and A. M. Mandell, 2014. Atmospheric Characterization of 5 Hot Jupiters with the Wide Field Camera 3 on the Hubble Space Telescope. The Astrophysical Journal, 785, 148.

Co-Author Publications

33. Jiang, H. J., T. C. Underwood, J. G. Bell, et. al. *including* **S. Ranjan**, 2024. Mimicking Lighting-Induced Electrochemistry on the Primitive Earth. PNAS, *in rev.*

32. Bari, R., A. Levi, **S. Ranjan**, 2023. Stability of Nitrogen Filled Ice in Water Worlds. The Astrophysical Journal, *submitted.*

31. Broussard, W., E. Schwieterman, **S. Ranjan**, C. Sousa-Silva, A. Fateev, C. Reinhard, 2024. The Impact of Extended H_2O Cross-Sections on Temperate Anoxic Planet Atmospheres: Implications for Spectral Characterization of Habitable Worlds. Astrophysical Journal, *accepted.*

30. Todd, Zoe R., G. Lozano, C. Kufner, **S. Ranjan**, D. Catling, D. Sasselov, 2023. UV Transmission in Prebiotic Environments on Early Earth. Astrobiology, *accepted.*

29. Petkowski, J., S. Seager, W. Bains, **S. Ranjan**, P. Rimmer, W. Buchanan, R. Agrawal, R. Mogul, C. Carr, 2023. Venus's Atmosphere Anomalies as Motivation for Astrobiology Missions. Astrobiology, *in press.*

28. Grant, D., N. Lewis, H. Wakeford, et. al. *including* **S. Ranjan**, 2023. JWST-TST DREAMS: Quartz Clouds in the Atmosphere of WASP-17b. The Astrophysical Journal Letters, 956, L29.

27. Bains, W., M. Pasek, **S. Ranjan**, J. Petkowski, A. Omran, S. Seager, Z. Zhan, 2023. Large Uncertainties in the Thermodynamics of Phosphorus (III) Oxide (P_4O_6) Have Significant Implications for Planetary Atmospheric Chemistry. ACS Earth & Space Chemistry, 7, 1219.

26. Huang, J., S. Seager, J. Petkowski, Z. Zhan, **S. Ranjan**, 2022. Methanol – A Poor Biosignature Gas in Exoplanet Atmospheres. Astrophysical Journal, 933, 6.

25. Greaves, J., P. Rimmer, A. Richards, J. Petkowski, W. Bains, **S. Ranjan**, S. Seager, D. Clements, C. Sousa-Silva, H. Fraser, 2022. Low Levels of Sulphur Dioxide Contamination of Phosphine Spectra from Venus' Atmosphere. Monthly Notices of the Royal Astronomical Society, 514, 2994.

24. Zhan, Z..*, J. Huang, S. Seager, J. Petkowski, **S. Ranjan**, 2022. Organic Carbonyls are Poor Biosignature Gases in Exoplanet Atmospheres but May Generate Significant CO. Astrophysical Journal, 930, 133.

23. Glidden, A., S. Seager, J. Huang.*, J. Petkowski, **S. Ranjan** 2022. Can Carbon Fractionation Provide Evidence for Aerial Biospheres in the Atmospheres of Temperate Sub-Neptunes? Astrophysical Journal, 930, 62.

22. Bains, W., O. Shorttle, **S. Ranjan**, P. Rimmer, J. Petkowski, J. Greaves, S. Seager, 2022. Only Extraordinary Volcanism Can Explain the Presence of Parts Per Billion Phosphine on Venus. Proceedings of the National Academy of Sciences, 119, e2121702119.

21. Bains, W., O. Shorttle, **S. Ranjan**, P. Rimmer, J. Petkowski, S. Seager, 2022. Constraints on the production of phosphine by Venusian volcanoes. Universe, 8, 54.

20. Lin, Z., S. Seager, **S. Ranjan**, T. Kozakis, L. Kaltenegger, 2022. H_2-dominated Atmosphere as an Indicator of Second-Generation Rocky White Dwarf Exoplanets. Astrophysical Journal Letters, 925, L10.

19. Huang, J.*, S. Seager, J. Petkowski, **S. Ranjan**, Z. Zhan, 2022. Assessment of Ammonia as a Biosignature Gas in Exoplanet Atmospheres. Astrobiology, 22, 171.

18. Rimmer, P., **S. Ranjan**, S. Rugheimer, 2021. Life?s Origins and the Search for Life on Rocky Exoplanets. Elements, 17, 265. *Invited Review.*

17. Bains, W., J. Petkowski, S. Seager, **S. Ranjan**, C. Sousa-Silva, P. Rimmer, Z. Zhan, J. Greaves, A. Richards, 2022. Venusian phosphine: a 'wow!' signal in chemistry? Phosphorus, Sulfur, and Silocon and the Related Elements, 1-6.

16. Zhan, Z.*, S. Seager, J. Petkowski, C. Sousa-Silva, **S. Ranjan**, et. al., 2021. Assessment of Isoprene as a Possible Biosignature Gas in Exoplanets with Anoxic Atmospheres. Astrobiology, 21, 765.

15. An, S., **S. Ranjan**, K. Yuan, X. Yang, R. Skodje, 2021. The Role of the Three Body Photodissociation Channel of Water in the Evolution of Dioxygen in Astrophysical Applications. Physical Chemistry Chemical Physics, 23, 9235.

14. Bains, W., J. Petkowski, S. Seager, **S. Ranjan**, et al., 2021. Phosphine on Venus Cannot be Explained by Conventional Processes. Astrobiology, 21, 1277.

13. Greaves, J., A. Richards, W. Bains, P. Rimmer, D. Clements, S. Seager, J. Petkowski, C. Sousa-Silva, **S. Ranjan**, et al., 2021. Reply to: Phosphine Gas in the Cloud Decks of Venus. Nature Astronomy, 5, 636.

12. Greaves, J., A. Richards, W. Bains, P. Rimmer, H. Sagawa, D. Clements, S. Seager, J. Petkowski, C. Sousa-Silva, **S. Ranjan**, et al., 2021. Addendum: Phosphine Gas in the Cloud Decks of Venus. Nature Astronomy, 5, 726.

11. Greaves, J., A. Richards, W. Bains, P. Rimmer, H. Sagawa, D. Clements, S. Seager, J. Petkowski, C. Sousa-Silva, **S. Ranjan**, et al., 2020. Phosphine Gas in the Cloud Decks of Venus. Nature Astronomy, 5, 655.

10. Seager, S., J. Petkowski, P. Gao, W. Bains, N. Bryan, **S. Ranjan**, J. Greaves, 2020. The Venusian Lower Atmosphere as a Depot for Desiccated Microbial Life: A Proposed Life Cycle for Persistence of the Venusian Aerial Biosphere. Astrobiology, http://doi.org/10.1089/ast.2020.2244.
9. Todd, Z, A. Fahrenbach, **S. Ranjan**, C. Magnani, J. Szostak, D. Sasselov, 2020. UV-driven deamination of cytidine ribonucleotides under planetary conditions. Astrobiology, 20, 878-888.
8. Guenther, M., Z. Zhan, S. Seager, P. Rimmer, **S. Ranjan**, et. al., 2020. Stellar Flares from the First TESS Data Release: Exploring a New Sample of M Dwarfs. The Astronomical Journal, 159, 2.
7. Sousa-Silva, C., S. Seager, **S. Ranjan**, J. J. Petkowski, Z. Zhan, R. Hu, W. Bains, 2020. On Phosphine as a Biosignature Gas in Exoplanet Atmospheres. Astrobiology, 20, 235.
6. Xu, J., D. Ritson, **S. Ranjan**, Z. Todd, D. Sasselov, J. Sutherland, 2018. Photochemical reductive homologation of hydrogen cyanide using sulfite and ferrocyanide. Chemical Communications, 54, 5566.
5. Todd, Z.*, A. Fahrenbach, C. Magnani*, **S. Ranjan**, A. Bjorkborn, J. Szostak, D. Sasselov, 2018. Solvated-electron production using cyanocuprates is compatible with the UV-environment on a Hadean-Archaean Earth. Chemical Communications, 54, 1121.
4. Wilkins, A. N., L. D. Deming, N. Madhusudhan, A. Burrows, H. A. Knutson, P. McCullough, and **S. Ranjan**, 2014. The Emergent 1.1-1.7 μm Spectrum of the Exoplanet CoRoT-2b as measured using the Hubble Space Telescope. The Astrophysical Journal, 783, 113.
3. Deming, L. D., A. Wilkins, P. McCullough, A. Burrows, J. J. Fortney, E. Agol, I. Dobbs-Dixon, N. Madhusudhan, N. Crouzet, J. Désert, R. L. Gilliland, K. Haynes, H. A. Knutson, M. Line, Z. Magic, A. M. Mandell, **S. Ranjan**, D. Charbonneau, M. Clampin, S. Seager, and A. P. Showman, 2013. Infrared Transmission Spectroscopy of the Exoplanets HD 209458b and XO-1b using the Wide Field Camera-3 On the Hubble Space Telescope. The Astrophysical Journal, 774, 95.
2. Cosgrove, R., M. Nicolls, H. Dahlgren, **S. Ranjan**, and R. Doe, 2010. Radar Detection of a Localized 1.4 Hz Pulsation in Auroral Plasma, Simultaneous with Pulsating Optical Emissions, During a Substorm. Annales Geophysicae, 28, 1961.
1. Nicolls, M. J., C. J. Heinselman, E.A. Hope, **S. Ranjan**, and M.C. Kelly, 2007. Imaging of Polar Mesosphere Summer Echoes with the 450 MHz Poker Flat Advanced Molecular Incoherent Scatter Radar. Geophysical Research Letters, 34, L20102.

Other Scholarship

2. de Wit, J., R. Doyon, B. V. Rackham, et. al. *including* **S. Ranjan**, 2023. A roadmap to the efficient and robust characterization of temperate terrestrial planet atmospheres with JWST. arXiv:2310.15895
1. Henning W. G., J. P. Renaud, P. Saxena, et. al. *including* **S. Ranjan**, 2018. Highly volcanic exoplanets, lava worlds, and magma ocean worlds: An emerging class of dynamic exoplanets of significant scientific priority. arXiv:1804.05110

Talks and Seminars

‡ = *Remote*

Invited

- Harvard University Origins Forum, Cambridge, MA. 11/2024.
- International Conference on Planets, Exoplanets and Habitability, Ahmedabad, India. 02/2024. **Keynote**.
- NASA Lab Astro PI Program Review, Washington, DC. 11/2023.
- NAU Astronomy & Planetary Science Colloquium, Flagstaff, AZ. 10/2023.
- Penn State Astrobiology Hour, State College, PA. 09/2023.
- MIT PLS Seminar, Cambridge, MA. 09/2023
- NSF Workshop "Life in the Universe", Cambridge, MA. 09/2023
- BMSIS Seminar, Seattle, WA‡. 07/2023
- StSci "Planetary Systems and the Origins of Life in the Era of JWST". Baltimore, MD. 05/2023.

- CU Boulder Physical Chemistry/Chemical Physics Colloquium. Boulder, CO. 04/2023.
- Alien Earths Origins Seminar. Tucson, AZ. 04/2023.
- JHU/StSci Joint Astrobiology Seminar. Baltimore, MD. 03/2023.
- ETH Zurich Exoplanets & Habitability Seminar. Zurich, Switzerland‡. 12/2022.
- Simons Society of Fellows Symposium. New York, NY. 09/2022.
- Lorenz Center Workshop: "Tracing Sulfur From Molecular Clouds To The Origin of Life". Leiden, The Netherlands. 09/2022.
- AbSciCon, Atlanta, GA. 05/2022. **Plenary, keynote**.
- UCR Astrobiology Seminar, Riverside, CA. 03/2022.
- Purdue University Colloquium, West Lafayette, IN. 02/2022.
- University of Wisconsin Center for Origins Research Colloquium, Madison, WI. 02/2022.
- ELSI Symposium, Tokyo, JP‡. 01/2022.
- UA LPL Colloquium, Tucson, AZ. 12/2021.
- ASU SPD Journal Club, Tempe, AZ‡. 10/2022.
- First Annual Conference of the Polish Astrobiological Society: Life & Space 2021, Poland‡. 09/2021.
- Twinkle & The Next Generation of Exoplanet Scientists, UK‡. 09/2021.
- BMSIS Seminar, Seattle, WA‡. 09/2021.
- PCE_3 Seminar, Prebiotic Chemistry and Early Earth Environments Consortium (NASA RCN), USA‡. 09/2021.
- TIFR Seminar, Mumbai, India‡. 05/2021.
- JPL Seminar, Pasadena, CA‡. 03/2021.
- MIT Planetary Lunch Seminar, Cambridge, MA‡. 11/2020.
- University of Pennsylvania Astronomy Journal Club. Philadelphia, PA‡. 10/2020.
- National Institute of Science Education and Research School of Earth and Planetary Sciences Colloquium. Bhubaneswar, India‡. 10/2020.
- Harvard-Smithsonian Center for Astrophysics Exoplanet Lunch. Cambridge, MA‡. 04/2020.
- UC Davis Origins Group Seminar. Davis, CA. 11/2019.
- Exoclimes 2019. Oxford, UK. 08/2019. **Keynote**.
- Northwestern University CIERA Theory Group Seminar. Evanston, IL. 04/2019.
- ELSI Seminar. Tokyo, Japan. 04/2019.
- XVth Rencontres du Vietnam: "Life3E'2019: Search for Life, From Early Earth to Exoplanets". Quy Nhon, Vietnam. 03/2019. **Keynote**.
- Lorenz Center Workshop: "A Roadmap for Universal Life". Leiden, The Netherlands. 10/2018.
- UC Riverside Astronomy Seminar. Riverside, CA. 10/2018.
- Goldschmidt Conference. Boston, MA. 08/2018.
- NASA GSFC SEEC "Seeds of Biomolecules" Conference. Greenbelt, MD. 04/2018.
- UMass Lowell Space Physics Seminar. Lowell, MA. 02/2018.
- MIT PICS Seminar. Cambridge, MA. 11/2017.
- Harvard-Smithsonian Center for Astrophysics Atomic and Molecular Physics Seminar. Cambridge, MA. 05/2017.
- Harvard Origins of Life Initiative Chalk Talk. Cambridge, MA. 02/2017.
- ELSI-Harvard Joint Workshop: The Chemical Origins of Life on Early Earth and Other Planetary Bodies. Cambridge, MA. 02/2015.

Contributed

- AbSciCon 2024, Providence, RI. 05/2024
- Arizona Astrobiology Symposium, Tempe, AZ. 03/2024
- Steward Observatory Internal Symposium, Tucson, AZ. 09/2023
- LPL Science Conference, Tucson, AZ. 08/2023
- Origins 2023, Quito, Ecuador. 07/2023
- Oxygen in Planetary Biospheres, Green Bank, WV. 05/2023
- Alien Earths Team Meeting, Tucson, AZ. 02/2023
- COSPAR, Athens, Greece. 07/2022
- Exoplanets IV, Las Vegas, NV. 05/2022
- AbSciCon, Atlanta, GA. 05/2022
- Stars and Planets in the Ultraviolet: A Cross-Community Symposium‡. 05/2021.
- STScI 2021 Spring Symposium "Towards the Comprehensive Characterization of Exoplanets"‡. 04/2021.
- Northwestern University Lunch Seminar. Evanston, IL‡. 02/2021.
- SCOL Meeting. New York, NY‡. 11/2020.
- DPS 52‡. Virtual Meeting‡. 10/2020.
- Exoplanets III. Virtual Meeting‡. 07/2020.
- 236th American Astronomical Society Meeting. Virtual Meeting‡. 06/2020.
- Boston Area Exoplanet Science Meeting. Boston, MA‡. 04/2020.
- Gordon Research Conference on the Origin of Life. Galveston, TX. 01/2020.
- 235th American Astronomical Society Meeting. Honolulu, HI. 01/2020.
- Habitability: Producing Conditions Conducive to Life. Bozeman, MT. 09/2019.
- SCOL Meeting. New York, NY. 04/2019.
- CU Boulder CASA/JILA Seminar. Boulder, CO. 02/2019.
- FFAME Workshop: "Origins of Life". Atlanta, GA. 10/2018.
- SCOL Meeting. New York, NY. 10/2018.
- COSPAR Meeting. Pasadena, CA. 07/2018.
- "Science of Early Life" Conference. Hamilton, Canada. 06/2018.
- Gordon Research Seminar. Galveston, TX. 01/2018.
- Boston Area Exoplanets Meeting. Cambridge, MA. 12/2017.
- Habitable Worlds: A System Science Workshop. 11/2017.
- SCOL Meeting. New York, NY. 11/2017.
- IIA Astrophysics Seminar. Bangalore, India. 06/2017.
- 5th ELSI International Symposium. Tokyo, Japan. 01/2017.
- American Astronomical Society Meeting. Grapevine, TX. 01/2017.
- Caltech Geoclub Seminar. Pasadena, CA. 12/2016.
- DTM Astronomy Seminar. Washington, DC. 11/2016.
- Columbia Astronomy Seminar. New York, NY. 11/2016.
- UChicago Exoplanets Group Seminar. Chicago, IL. 11/2016.
- MIT Kavli Institute Brown Bag Lunch. Cambridge, MA. 10/2016.
- NASA GISS Seminar. New York, NY. 10/2016.
- NASA GSFC Exoplanet Seminar. Greenbelt, MD. 09/2016.
- NASA Ames Space Science & Astrobiology Division Seminar. Moffett Field, CA. 09/2016
- MRC LMB Seminar. Cambridge, UK. 08/2016.
- University of St. Andrews Earth Science Seminar. St. Andrews, UK. 08/2016.

- Cornell Planetary Lunch. Ithaca, NY. 05/2016.
- Astrobiology Science Conference. Chicago, IL. 06/2015.
- AGU Fall Meeting. San Francisco, CA. 12/2013.
- AbGradCon. Montreal, Canada. 06/2013.
- XXVIIIth IAU General Assembly. Beijing, China. 08/2012.
- Extreme Solar Systems II. Jackson Hole, WY. 09/2011.

Teaching

- **Instructor**, UA PTYS/ASTR 475/575 "Planetary Astrobiology". Tucson, AZ. Spring 2024.
- **Guest Lecturer (11/2019)**, MIT Course: "Astrobiology, Origins and Early Evolution of Life". Cambridge, MA. 11/2019.
- **Teaching Fellow, Harvard University**. Taught (a) Celestial Navigation (2011). (b) How to Build a Habitable Planet (2012).
- **Teaching Assistant, MIT**. Taught (a) Physics 1 (Fall 2007) (b) Hands-On Astronomy: Observing Stars and Planets (Spring 2009) (c) Observational Techniques of Optical Astronomy (Fall 2009).
- **Teacher & Organizer, Observational Astronomy for High-School Students, Fall 2008, 2009.** Developed and taught evening class in observational astronomy for local high-school students. Included classroom and laboratory components and field trips.
- **Teaching Assistant, Programa Joves i Ciencia, Summer 2008, 2009.** Taught astrophysics and observational astronomy to high school students in Spain. Included classroom and laboratory components; developed own progam.

Mentorship

Research

- **Advisor, Graduate Research**. Advisor for 2 PhD student.
- **Co-Mentor, Graduate Research**. (2) Co-mentored two graduate students in photochemistry research, resulting in first-author publications for the students (2018-2021). (1) Mentored graduate student in origins-of-life research, resulting in first-author publication for the student (2016-2018).
- **Mentor, Undergraduate Research**. (2) As visiting faculty at NISER, mentoring two undergraduates in planetary science research (2021-2022). (1) Co-supervisor & project designer for undergraduate junior and senior theses. Student co-author on peer-reviewed publication (2013-2015).
- **Mentor, High School Research**. (2) Mentored high school student in capstone project in AP Research class (2020-21). (1) Mentored high school student via Research Science Institute (RSI) program (2019). Guided student through research project; student co-author on peer-reviewed paper incorporating her work. Won "Top 5 Presentation" honor at RSI. News coverage.

Non-Research

- **Mentor, Underrepresented Undergraduates**. (2) Professional mentor for MIT sophomore-senior undergraduates from underrepresented backgrounds via E-Mentor Advocate Partnership Program (EMAP; 2021-2022) (1) Mentor for MIT freshmen from underrepresented backgrounds via Mentor Advocate Program (MAP; 2018-2020).
- **Peer Mentor**. (3) Peer mentor for junior postdocs in MIT EAPS department (2018-2020). (2) Mentor for graduate student in MIT EAPS department (2019-2020). (1) Peer mentor for interns & junior graduate students in Harvard Astronomy department (2012-2015).
- **Mentor, Underrepresented High-School Students** Guided local high-school students from underrepresented backgrounds through hands-on science project via MIT SciPro program (2007).

Training in Pedagogy, Mentorship & Leadership

- **"First-Year Faculty Academy"** (2023). Formal training in best practices for college teaching from the Center for the Integration of Research, Teaching, and Learning (CIRTL).
- **"Leadership Coaching Program"** (2021). Formal coaching in leadership at Northwestern.
- **"Mentoring Up + Down"** (2021). Formal training in mentorship at Northwestern.
- **"Inclusive Classrooms: How to Leverage Identity to Improve your Teaching Practice"** (2020). Formal training in inclusive teaching for postdocs at MIT.
- **"Scientists Teaching Science"** (2017). Graduate course in STEM science pedagogy at Harvard (audit, full participation).

Service

- **Peer reviewer** for *Science*, *Nature Astronomy*, *Nature Communications*, *The Astrophysical Journal*, *AGU Advances*, *Icarus*, *Astrobiology*, *Life*.
- **Advisor for PTYS Astrobiology Minor (5 students, 2022-present)**
- **Organizer, LPL Department Colloquium (Spring 2023)**
- **Member, Graduate Admissions and Advising Committee, (2022-present)**
- **Speaker, LPL Evening Lecture Series (11/2023)**
- **Member, CIERA Astrophysics Seminar Committee (2020-2021)**
- **Member, Department Retreat Organizing Committe (2014).**
- **Student Representative, Faculty Search Committee (2013-14).**
- **Representative, Graduate Student Council (2011-13).**
- **Interviewer, MIT Undergraduate Admissions (2011-2021).**

References

- **Professor Dimitar Sasselov**, Harvard University, dsasselov@cfa.harvard.edu.
- **Professor Sara Seager**, Massachusetts Institute of Technology, seager@mit.edu
- **Professor James Kasting**, Pennsylvania State University, jfk4@psu.edu
- **Professor Vicky Kalogera**, Northwestern University, vicky@northwestern.edu
- **Professor Andrew Babbin**, Massachusetts Institute of Technology, babbin@mit.edu