

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.
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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
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Successful Proposals

Funding

- **NASA ICAR**, “Probing Origin Of Life Possibilities, Atmospheric Redox, & Terrestrial Environment Evolution (POOL-PARTEE)”, Co-I, 2025, \$541k (\$4M total).
- **NASA Exobiology**, “Improved Constraints on Atmogenic NO_x^- in Natural Waters on Prebiotic Earth”, PI, 2025, \$288k (\$540k total).
- **JPL SURP**, “Revitalizing the MEAC Photochemical Model in Preparation for Public Release”, I-PI, 2024, \$144k (\$180k total).

- **NSF Astronomy & Astrophysics Grants**, “GLOW: Constraining the Atmospheric Signatures of Magmatic Volcanism on Terrestrial Exoplanets”, PI, 2024, \$422k (\$496k total).
- **JWST Guest Observer Program**, “Using stellar contamination proxy TRAPPIST-1 b to search for an atmosphere on TRAPPIST-1 e”, Co-I, 2024, \$5k(\$200k total).
- **SciAlog Signatures of Life in the Universe**, “Constraining the Abiotic Sulfur Cycle on Temperate Terrestrial Planets”, Co-PI, 2023, \$55k (\$220k total).
- **UA Provost’s Independent Fund**, “ Construction of Venusian Atmospheric Models in Preparation for the Decade of Venus ”, PI, 2023, \$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**, “Chromospheric 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**, “Chromospheric 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

16. **Ranjan, S.**, M. Schlecker, N. Wogan, M. Wong, 2026. Testing Origin-of-Life Theories with the Habitable Worlds Observatory (HWO). Publications of the Astronomical Society of the Pacific, *in press*. arXiv:2507.00164. Press.
15. **Ranjan, S.**, D. Adams, M. Wong, M. Schlecker, N. Wogan, J. M. Weber, 2026. Prebiosignatures with the Habitable Worlds Observatory (HWO). Publications of the Astronomical Society of the Pacific, *in press*. arXiv:2507.00165.
14. **Ranjan, S.**, N. Wogan, A. Glidden, J. Wang*, K. Stevenson, N. Lewis, T. Koskinen, S. Seager, H. R. Wakeford, R. P. van der Marel, 2025. The Photochemical Plausibility of Warm Exo-Titans Orbiting M-dwarf Stars. *Astrophysical Journal Letters*, 993, L39. *UA Press Release, NPR*
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); UA Press Release*.
12. **Ranjan, S.**, E. Schwieterman, M. Leung, C. Harman, R. Hu, 2023. A Re-Appraisal of CO/O₂ 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 H₂O 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; MIT Press Release*.
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. *MIT Press Release*.
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. *Harvard Press Release*.
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

42. Bari, R., A. Levi, **S. Ranjan**, 2026. The Solubility of N₂ in High Pressure Ice and its Consequent Outgassing Limitations in Water Worlds. *The Astrophysical Journal*, *in press*.
41. Arora, R.* , **S. Ranjan**, P. Moitra, A. Mallik, 2025. Thin H₂-dominated Atmospheres as Signposts of Magmatic Outgassing on Tidally-Heated Terrestrial Exoplanets. *Planetary Science Journal*, *in press*. arXiv:2510.07378.
40. Glidden, A.* , **S. Ranjan**, S. Seager, et al., 2025. JWST-TST DREAMS: Secondary Atmosphere Constraints for the Habitable Zone Planet TRAPPIST-1 e. *The Astrophysical Journal Letters*, 990, L53. Press: NYT, SciAm, CBS, ABC, estimated reach: 1.7 billion.
39. Espinoza, N., N. Allen, A. Glidden, et al. *including S. Ranjan*, 2025. JWST-TST DREAMS: NIRSpec/PRISM Transmission Spectroscopy of the Habitable Zone Planet TRAPPIST-1 e. *The Astrophysical Journal Letters*, 990, L52.
38. Krissansen-Totton, J., A. G. Ulysses, M. Frissell, et al. *including S. Ranjan*, 2025. Wavelength Requirements for Life Detection via Reflected Light Spectroscopy of Rocky Exoplanets. *Astrobiology*, *in review*. arXiv:2507.14771
37. Segura, A., R. Osten, E. Schwieterman, et al. *including S. Ranjan*, 2025. Setting the stage: the earliest solar system and Sun history. *Astrobiology*, *in revisions*. **Invited Review**.
36. Schlecker, M., D. Apai, A. Affholder, **S. Ranjan**, et al., 2025. Bioverse: Potentially Observable Exoplanet Biosignature Patterns Under the UV Threshold Hypothesis for the Origin of Life. *The Astrophysical Journal*, 980, 198.
35. Broussard, W., E. Schwieterman, C. Sousa-Silva, G. Sanger-Johnson, **S. Ranjan**, O. Venot, 2025. The Impact of Extended CO₂ Cross Sections on Temperate Anoxic Planet Atmospheres. *The Astrophysical Journal*, 980, 198.
34. Jiang, H. J., T. C. Underwood, J. G. Bell, et al. *including S. Ranjan*, 2024. Mimicking Lightning-Induced Electrochemistry on the Primitive Earth. *PNAS*, 121, e2400819121.
33. de Wit, J., R. Doyon, B. V. Rackham, et al. *including S. Ranjan*, 2024. A roadmap to the efficient and robust characterization of temperate terrestrial planet atmospheres with JWST. *Nature Astronomy*, 8, 810.
32. Broussard, W., E. Schwieterman, **S. Ranjan**, C. Sousa-Silva, A. Fateev, C. Reinhard, 2024. The Impact of Extended H₂O Cross-Sections on Temperate Anoxic Planet Atmospheres: Implications for Spectral Characterization of Habitable Worlds. *Astrophysical Journal*, 967, 114. *Featured in AAS Nova*.
31. Todd, Zoe R., G. Lozano, C. Kufner, **S. Ranjan**, D. Catling, D. Sasselov, 2024. UV Transmission in Prebiotic Environments on Early Earth. *Astrobiology*, 24, 559.
30. Petkowski, J., S. Seager, W. Bains, **S. Ranjan**, P. Rimmer, W. Buchanan, R. Agrawal, R. Mogul, C. Carr, 2024. Venus's Atmosphere Anomalies as Motivation for Astrobiology Missions. *Astrobiology*, 24, 343.
29. Bari, R., A. Levi, **S. Ranjan**, 2024. Stability of Nitrogen Filled Ice in Water Worlds. *The Astrophysical Journal*, *in rev*.
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 Silicon 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-Archaeon 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. Harman, C.E., **S. Ranjan**, and E. Schwieterman. The Need for Intra-Model Comparisons and Data in Assessing Habitable Environments and Interpreting Potential Biosignatures. *White Paper submitted to NASA SMD RFI regarding development of NASA-DARES 2025*
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. *White paper*. arXiv:1804.05110

Presentations

‡ = *Remote*

Invited

- AOGS, Fukuoka, Japan. 08/2026.
- Molecular Origins of Life, Munich, Germany. 07/2026.
- AbSciCon 2026, Madison, WI. 05/2026.
- NOIRLab FLASH, 12/2025.
- Harvard University Origins Forum, Cambridge, MA. 04/2025.
- NOIRLab FLASH, 04/2025.
- NISER School of Earth & Planetary Sciences Seminar, 03/2025.
- IIA Sujana Sengupta Superannuation Celebration[‡]. 08/2024.
- HWO Living Worlds Biosignature Interpretation Team Meeting[‡]. 07/2024.
- HWO Living Worlds Seminar[‡]. 06/2024.
- 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.
- PCE₃ 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.
- Exoclimates 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

- AAS 247, Phoenix, AZ. 01/2026.
- BEACON, Reykjavik, Iceland. 07/2025
- ExoClimes VII, Montreal, Canada. 07/2025
- 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.
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Teaching

- **Instructor**, UA PTYS/ASTR/GEOS 214 “Life in the Cosmos”. Tucson, AZ. Fall 2024.
 - **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 program.
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Mentorship

Research

- **Advisor, Graduate Research**. Primary advisor for 2 PhD students.
- **Advisor, Undergraduate Research**. (3) Mentoring 2 UA undergraduates in astrobiology research (2025-present). (2) Mentored two NISER 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.
- **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).

Non-Research

- **Mentor, Undergraduates.** (3) Volunteer faculty fellow for UA ASEMS program, targeted at recruiting underrepresented UA undergraduates to STEM. (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).
 - **Mentor, High-School Students.** Guided local high-school students from underrepresented backgrounds through hands-on science project via MIT SciPro program (2007).
 - **Mentor, Peers.** (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).
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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).
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Service & Leadership

- **Peer reviewer** for numerous journals including *Science*, *Nature Astronomy*, *Nature Communications*, *The Astrophysical Journal*, *AGU Advances*, *Icarus*, *Astrobiology*, *Life* and numerous proposal calls including NASA, NSF, ERC, Leverhulme, Sloan.
 - **Member, NASA Habitable Worlds Observatory Living Worlds Steering Committee**, 2024-2025.
 - **Advisor for PTYS Astrobiology Minor** (5 students, 2022-present).
 - **Member/Chair, Graduate Admissions and Advising Committee**, (2022-present).
 - **Founder & Organizer, LPL Planetary Atmospheres Discussion Group** (2022-present).
 - **Organizer, UA Theoretical Astrophysics Program Colloquium** (2024-present).
 - **Member, Graduate Student Colloquium Committee**, (2023-2024).
 - **Organizer, LPL Department Colloquium** (Spring 2023).
 - **Speaker, LPL Evening Lecture Series** (11/2023).
 - **Member, CIERA Astrophysics Seminar Committee** (2020-2021).
 - **Member, Department Retreat Organizing Committee** (2014).
 - **Student Representative, Faculty Search Committee** (2013-14).
 - **Representative, Graduate Student Council** (2011-13).
 - **Interviewer, MIT Undergraduate Admissions** (2011-2021).
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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