

Sukrit Ranjan

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Education

Harvard University **PhD, Astronomy & Astrophysics** **May 2017**
NSF Graduate Research Fellow. Certificate in Origin of Life studies. Thesis: “The UV Environment For Prebiotic Chemistry”. PhD advisor: Professor Dimitar Sasselov.

M.I.T. **SB, Physics** **June 2010**
Major in Physics, minors in History and Astronomy. Elected to ΦBK and ΣΠΣ. GPA 4.93/5.00.

Professional Appointments

M.I.T. **SCOL Postdoctoral Fellow** **09/2017-Present**
SCOL prize postdoctoral fellow under guidance of Professor Sara Seager. Leading research program focused on understanding the origin of life on Earth and on other worlds, rocky planet atmospheric evolution, and remotely detectable biosignatures.

Indian Institute of Astrophysics **Postdoctoral Researcher** **06-08/2017**
Visiting postdoctoral fellow with Professor Sujana Sengupta; worked on atmospheric escape, exoplanet polarization signatures, and use of ASTROSAT for M-dwarf UV field characterization. CoI on successful ASTROSAT proposal.

NASA Ames Research Center **Research Associate** **06-08/2010**
Selected to the NASA Academy, NASA’s premier junior leadership training program. Associate Project Manager for team project to build a sensor to detect redox-metabolizing microbes. Mars analog work with Dr. Nathalie Cabrol.

Awards and Honors

- **AAS Rodger Doxsey Prize**, 2017.
 - **Simons Collaboration on the Origin of Life Postdoctoral Fellowship**, 2016.
 - **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.
 - **Joel Matthew Orloff Award for Outstanding Service in Physics**, 2010.
 - **NASA Ambassador for International Year of Astronomy**, 2009.
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Refereed Publications

14. **Ranjan, S.**, Z. Todd, P. Rimmer, D. Sasselov, A. Babbin, 2018. Nitrogen Oxide Concentrations in Natural Waters on Early Earth. *Submitted*.
13. Sousa-Silva, C., S. Seager, J. J. Petkowski, **S. Ranjan**, Z. Zhan, R. Hu, W. Bains, 2018. On Phosphine as a Biosignature Gas in Exoplanet Atmospheres. *Astrobiology*, *in review*.
12. 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.
11. **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.
10. 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.
9. **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.

8. **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.
 7. **Ranjan, S.** and D. Sasselov, 2017. Constraints on the Early Terrestrial Surface UV Environment Relevant to Prebiotic Chemistry. *Astrobiology*, 17, 169.
 6. **Ranjan, S.** and D. Sasselov, 2016. Influence of UV Radiation on the Synthesis of Prebiotic Molecules. *Astrobiology*, 16, 68.
 5. **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.
 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.
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Talks and Seminars

- Lorenz Center Workshop: “A Roadmap for Universal Life”. Leiden, The Netherlands. 10/2018. **Invited.**
- UC Riverside Astronomy Seminar. Riverside, CA 10/2018. **Invited.**
- UMass Lowell Space Physics Seminar. Lowell, MA. 02/2018. **Invited.**
- “Nitrogen Oxide Concentrations in Natural Waters on Early Earth”. SCOL Meeting. New York, NY. 10/2018.
- Goldschmidt Conference. Boston, MA. 08/2018. **Invited.**
- COSPAR Meeting. Pasadena, CA. 07/2018.
- “Science of Early Life” Conference. Hamilton, Canada. 06/2018.
- NASA GSFC SEEC “Seeds of Biomolecules” Conference. Greenbelt, MD. 04/2018. **Invited.**
- 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.
- MIT PICS Seminar. Cambridge, MA. 11/2017. **Invited.**
- IIA Astrophysics Seminar. Bangalore, India. 06/2017.
- CfA Atomic and Molecular Physics Seminar. Cambridge, MA. 05/2017. **Invited.**
- Harvard Origins of Life Initiative Chalk Talk. Cambridge, MA. 02/2017. **Invited.**
- 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.
- ELSI-Harvard Joint Workshop: The Chemical Origins of Life on Early Earth and Other Planetary Bodies. Cambridge, MA. 02/2015. **Invited.**
- 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 Experience

- **Undergraduate Thesis Supervisor, Harvard University (2013-2015).** Co-supervisor for undergraduate student completing junior and senior theses. Lead to a peer-reviewed publication in ChemComm.
- **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.
- **Mentor, SciPro, Spring 2007.** Guided local high-school students through science project with objective to teach scientific methods, documentation, and presentation of results, as well as encourage them to pursue STEM fields.

Service

- **Peer reviewer** for *Astrobiology*, *Life*, and *The Astrophysical Journal*.
 - **Peer mentor (2012-present).** (1) Mentor for MIT freshman via MAP program (2018-present). (2) Peer mentor for junior postdocs in MIT EAPS department (2018-present). (3) Peer mentor for interns & junior graduate students in Harvard Astronomy department (2012-2015).
 - **MIT Interviewer (2011-present).** Interviewing candidates for MIT undergraduate admission.
 - **Representative, Faculty Search Committee (2013-14).** Elected representative to Harvard Astronomy department committee to select new professor.
 - **Representative, Graduate Student Council (2011-13).** Elected representative to Harvard GSC.
 - **Representative, Committee on the Undergraduate Program.** Student representative to the MIT CUP.
 - **Representative, Committee on Curricula.** Student representative to the MIT CoC.
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Outreach

- **Invited Speaker, *Contemporary Science Issues and Innovations* (2018).** Invited speaker and interviewee for Science for the Public's *Contemporary Science Issues and Innovations* TV program, on the topic Odd Couple: UV Radiation and the Origin of Life.
- **Invited Author, *Imagine* (2014).** Wrote invited article "Strange New Worlds" for *Imagine* magazine's Space Exploration issue.
- **Organizing Committee, ComSciCon (2012, 2013).** Co-founder and organizer for summer science communication workshop ComSciCon.
- **Author, *Astrobites* (2011-2013).** Author for astronomy outreach blog *Astrobites*
- **Speaker, *Science in the News* (2012).** Gave public talk "Astrobiology: The Search for Extraterrestrial Life" as part of *Science in the News* lecture series.