

Sarah M. Hörst

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Adjunct Astronomer, Space Telescope Science Institute	she/her/hers

Dr. Hörst studies the chemistry of planetary atmospheres, particularly the atmosphere of Titan, focusing on complex organic chemistry leading to the formation of haze using laboratory experiments and photochemical modeling. Dr. Hörst is an expert in laboratory characterization of particles using a variety of measurement techniques that interrogate size, density, composition, and optical properties.

Education

The University of Arizona, Tucson, AZ	2011
PhD in Planetary Sciences	
Dissertation: Post-Cassini Investigations of Titan Atmospheric Chemistry	
California Institute of Technology, Pasadena, CA	2004
BS in Planetary Science with honors	
BS in Literature with honors	

Positions Held

Associate Professor, Johns Hopkins University	2021-Present
Department of Earth and Planetary Sciences	
Hopkins Extreme Materials Institute Fellow	
Adjunct Astronomer, Space Telescope Science Institute	2018-Present
Assistant Professor, Johns Hopkins University	2014-2020
NSF Astronomy and Astrophysics Postdoctoral Fellow, University of Colorado	2011-2014
Supervisor: Margaret A. Tolbert	
Experimental investigation of the effect of oxygen bearing molecules on the formation and composition of planetary atmospheric aerosols (HR-ToF-AMS, SMPS, PIT-MS)	
Graduate Research Assistant, The University of Arizona	2005-2011
Advisor: Roger V. Yelle	
Titan photochemical modeling	
Titan aerosol analogues (“tholins”)	
Visiting Student, Laboratoire de Planétologie de Grenoble	2008-2011
Collaborators: Roland Thissen, Véronique Vuitton, Odile Dutuit, Didier Voisin	
Titan tholin high resolution mass spectrometry (ESI-Orbitrap)	
Contractor, NASA Jet Propulsion Laboratory	2004-2005
Supervisor: Ashwin R. Vasavada	
Investigations of Saturn’s southern hemisphere winds and vortices (Cassini ISS data)	
Undergraduate Research Assistant, California Institute of Technology	2001-2003
Advisor: Michael E. Brown	
Iterative blind deconvolution (IDAC) of Galilean satellite images	
Investigation of magnesium around Io and Europa (analysis of HST-FOS data)	
Ground-based observations of clouds on Titan	

Honors and Awards

Scialog Fellow – Search for Life in the Universe	2022
Johns Hopkins University President’s Frontier Award (includes 250k)	2022
American Geophysical Union Fellow	2020

James B. Macelwane Medal from the American Geophysical Union	2020
Laboratory Astrophysics Division of the American Astronomical Society Early Career Award	2020
Johns Hopkins University Catalyst Award (includes \$75k)	2017
National Academy of Sciences Kavli Fellow	2012, 2014, 2016, 2019
Named to “Highly Qualified” Group for NASA’s 2013 Astronaut Candidate Selection	2012
University of Arizona Gerard P. Kuiper Memorial Award	2011
University of Arizona Departmental Excellence in Scholarship Award	2010
Peter B. Wagner Memorial Award for Women in Atmospheric Sciences	2009
University of Arizona Departmental Outstanding Mentor/Teaching Assistant Award	2008
University of Arizona Spring PTYS Outstanding Teaching Assistant Award	2008
University of Arizona Galileo Circle Scholarship	2006
California Institute of Technology Summer Undergraduate Research Fellowship Richter Scholar	2002

Professional Affiliations

American Astronomical Society
 Laboratory Astrophysics Division of the American Astronomical Society
 Division for Planetary Sciences of the American Astronomical Society
 American Geophysical Union

Representative Publications

- He, C., **Hörst, S.M.**, and 11 coauthors. “Sulfur Promotes Haze Formation in Warm Exoplanet Atmospheres.” *Nature Astronomy*, doi:10.1038/s41550-020-1072-9, 2020
- He, C., **Hörst, S.M.**, and 7 coauthors. “Gas Phase Chemistry of Cool Exoplanet Atmospheres: Insight from laboratory simulations.” *ACS Earth and Space Chemistry*, 3, 39-50, 2019.
- He, C., **Hörst, S.M.**, and 9 coauthors. “Photochemical Haze Formation in the Atmospheres of super-Earths and mini-Neptunes.” *Astronomical Journal*, 156, 38, 2018.
- He, C., **Hörst, S.M.**, and 8 coauthors. “Laboratory Simulations of Haze Formation in Cool Exoplanet Atmospheres: Particle Color and Size Distribution.” *Astrophysical Journal Letters*, 856:L3, 2018.
- Hörst, S.M.**, and 8 coauthors. “Haze Production Rates in super-Earth and mini-Neptune Atmosphere Experiments.” *Nature Astronomy*, 2, 303-306, 2018.
- Hörst, S.M.**, and 5 coauthors. “Laboratory Investigations of Titan Haze Formation: In Situ Measurement of Gas and Particle Composition.” *Icarus*, 301, 136-151, 2018.
- Hörst, S.M.** “Titan’s atmosphere and climate.” *JGR Planets*, 122, 3, 432-482, doi:10.1002/2016JE005240, 2017.
- Cable, M.L., **Hörst, S.M.**, and 6 coauthors. “Identification of Primary Amines in Titan Tholins using Nonaqueous Microchip Capillary Electrophoresis.” *EPSSL*, 403, 99-107, 2014.
- Yoon, Y.H., **Hörst, S.M.**, Hicks, R.K., Li, R., deGouw, J.A., and M.A. Tolbert. “The Role of Benzene Photolysis in Titan Haze Formation.” *Icarus*, 233, 233-241, 2014.
- Hörst, S.M.** and M.A. Tolbert “The Effect of Carbon Monoxide on Planetary Haze Formation.” *ApJ* 781 53, 2014.
- Hörst, S.M.** and M.A. Tolbert. “In Situ Measurements of Size and Density of Titan Aerosol Analogues.” *Astrophysical Journal Letters*, 770, L10, doi:10.1088/2041-8205/770/1/L10, 2013.
- Hörst, S.M.** and M.E. Brown. “A Search for Magnesium in Europa's Atmosphere.” *ApJL*, 764, L28, 2013.
- Hörst, S.M.** et al. “Formation of Amino Acids and Nucleotide Bases in a Titan Atmosphere Simulation Experiment.” *Astrobiology*, 12, 9, doi:10.1089/ast.2011.0623, 2012.
- Cable, M.L., **Hörst, S.M.**, and 4 coauthors. “Titan Tholins: Simulating Titan Organic Chemistry in the Post Cassini-Huygens Era.” 112, (3), 1882-1909, *Chemical Reviews*, 2012.