

Sarah E. Moran

Director's Postdoctoral Fellow, Lunar and Planetary Laboratory, University of Arizona

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Education

Johns Hopkins University, Baltimore, MD

PhD, Planetary Sciences

August 2016 – June 2021

Dissertation: *In Search of Clearer Skies?*

Linking Planetary Aerosols from the Laboratory to Models

Advisor: Prof. Sarah M. Hörst

Master of Arts, Planetary Sciences

August 2016 – May 2018

Barnard College, Columbia University, New York, NY

August 2011 – May 2015

Bachelor of Arts, Astrophysics; *cum laude*

Science & Public Policy minor

Research Experience

Director's Postdoctoral Fellow

January 2022 – present

University of Arizona, Lunar and Planetary Laboratory, Tucson, AZ

Modeling of planetary, exoplanetary, and brown dwarf atmospheres

Advisor: Prof. Mark S. Marley

Postdoctoral Research Scientist

Sept 2021 – Dec 2021

NASA Ames Research Center/Bay Area Environmental Research Institute, Mountain View, CA

Aerosol/microphysical modeling for transiting planetary atmospheric observations

Supervisor: Dr. Natasha E. Batalha

Visiting Scientist

Postdoctoral Fellow

Sept 2021 – Aug 2022

July 2021 – Aug 2021

Graduate Research Assistant/NASA Earth and Space Science Fellow

Jan 2017 – June 2021

Johns Hopkins University, Earth & Planetary Sciences, Baltimore, MD

Analogue aerosol laboratory production and FTIR, Hörst PHAZER Laboratory

Advisor: Prof. Sarah M. Hörst

Graduate Research Assistant

June 2017 – June 2021

Space Telescope Science Institute, Baltimore, MD

Exoplanet atmospheric modeling, STARGATE collaboration

Advisor: Prof. Nikole K. Lewis (Cornell University, Dept. of Astronomy and Carl Sagan Institute)

Visiting Researcher

Jan 2017 – Sept 2018

Institut de Planétologie et d'Astrophysique de Grenoble, Université Grenoble Alpes, Grenoble, France

High resolution mass spectrometry of atmospheric haze analogues

Supervisor: Dr. Véronique Vuitton

NSF REU Researcher

Summer 2014

Georgetown University, Materials Physics, Washington, D.C

Computational study of 2-D materials for electronics/solar cells with Quantum Espresso

Advisor: Prof. Amy Liu

NSF REU Researcher

Summer 2013

University of Utah, Physics and Astronomy, Salt Lake City, UT

Data analysis of SDSS BOSS BAL quasar spectroscopy and photometry with IDL

Advisor: Prof. Kyle S. Dawson

Policy Experience

Lloyd V. Berkner Space Policy Intern Fall 2019
Space Studies Board, National Academies of Sciences, Engineering, and Medicine, Washington, DC
Projects: *Solar and Space Physics Midterm Report; Astro2020; Committee on Solar and Space Physics Rideshare Opportunity Short Report; Committee on Astrobiology and Planetary Science Decadal Survey planning*

Additional Training

ComSciCon-SciWri, Penn State University, State College, PA October 2019
Cloud Academy, Les Houches School of Physics, Les Houches, France September 2018
Johns Hopkins University SafeZone training, Baltimore, MD August 2017
Software Carpentry Coding Bootcamp, JHU EPS, Baltimore, MD August 2016

Grants, Fellowships, and Selected Competitive Observing Programs

Co-I, Exoplanet Research Program 2021 (PI Julie Moses) 2022 – 2024
The Chemistry of Sulfur and Phosphorus Species in Exoplanet Atmospheres
Co-I, Hubble Space Telescope Cycle 29 Program (PI Zafar Rustamkulov), 23 orbits 2021 – 2024
GO Program 16695, *Cloudy Mornings and Clear Afternoons: Mapping Atmospheric Dynamics at the Limbs of an Exceptional Hot Saturn*
Co-I, 4 JWST Cycle 1 Programs – 108.8 total hours 2021 – 2024
GO Program 1981 (PI Kevin Stevenson & Jacob Lustig-Yaeger), 75.6 hours
Tell Me How I'm Supposed to Breathe with No Air: Measuring the Prevalence and Diversity of M-Dwarf Planet Atmospheres
GO Program 2288 (PI Joshua Lothringer & Jeff Valenti), 7.4 hours
Formation and Impact of Silicate Clouds on L Dwarfs
GO Program 2594 (PI Jessica Spake & Zafar Rustamkulov), 16.6 hours
The Twin Paradox: Assessing Planetary Radius Evolution with a CH₄ Thermometer
GO Program 2667 (PI Hannah Wakeford), 9.2 hours
Good Vibrations: Directly Measuring Exoplanet Aerosol Compositions with MIRI Spectroscopy
Co-I, NASA Exoplanet Research Program 2018 2 (PI Chao He) 2020 – 2022
Laboratory Exploration of Hazes in Atmospheres of Rocky Planets around M-dwarfs
Co-I, Hubble Space Telescope Cycle 27 Program (PI Jessica Spake), 16 orbits 2019 – 2022
GO Program 15838, *How Hot Is the Inside of a Young Planet?*
Fellow, NASA Earth and Space Science Fellowship, Astrophysics 2018 – 2021
The Role of Hazes in the Atmospheres of Temperate Planets in M-Dwarf Systems

Service and Leadership

Reviewer; *Nature Astronomy, Icarus* Spring 2021 – present
NASA Review Panel Executive Secretary Spring 2021
JHU EPS Buddy System, Co-Founder and Inaugural Head Buddy June 2020 – August 2021
JHU EPS Bromery Speaker Seminar Organizational Committee July 2020 – October 2021
Science team, exoplanet working group, Odyssey mission to Neptune concept study February 2020 – August 2020
JHU EPS Equity, Diversity, and Inclusion committee Fall 2019 – December 2021
EPS Course Guide Curator Fall 2019 – Fall 2020
EPS Graduate Student President Fall 2018 – Fall 2019
Graduate Council Department Representative, Johns Hopkins University Fall 2017 – Fall 2018

Outreach

Delaware Teen Science Café Featured Scientist, Delaware Museum of Natural History	February 2021
AAS Congressional Visits Day 2020	September 2020
Presentation, Johns Hopkins Center for Talented Youth, (35 MS/HS students)	June 2019
Skype a Scientist, (~20 MS students)	January 2019
Volunteer, 2018 USA Science & Engineering Festival, AAAS, Washington, D.C.	April 2018
Catalyzing Advocacy for Scientists and Engineers Workshop, AAAS, Washington, D.C.	March 2018
St. Teresa's Academy eMentor, STEM careers	Spring 2017 – present

Honors, and Awards

AAS Rodger Doxsey Travel Prize	January 2021
J. Brien Key Fund Travel Award, Johns Hopkins University	December 2018
Women in Astronomy IV Conference Travel Grant, NRAO	June 2017
EPS Summer Field Research Grant, Johns Hopkins University	June 2017
<i>Cum Laude</i> , Barnard College	May 2015
Dean's List, Barnard College	Fall 2011 – Spring 2015

Publications

- [12] Garcia, L.J., **Moran, S.E.**, Rackham, B.V., Wakeford, H.R., Gillon, M., de Wit, J., Lewis, N.K. *HST/WFC3 transmission spectroscopy of the cold rocky planet TRAPPIST-1h*, A&A, in revision
- [11] **Moran, S.E.**, Hörst, S. M., He, C., Radke, M.J., Izenberg, N.R., Sebree, J. A., Vuitton, V., Flandinet, L., Orthous-Daunay, F.-R., Wolters, C. *Triton Haze Analogues: the Role of Carbon Monoxide in Haze Formation*, Journal of Geophysical Research – Planets, accepted December 2021
- [10] Pidhorodetska, D., **Moran, S.E.**, Schwieterman, E.W., Fauchez, T.J., Barclay, T.F., Quintana, E.V., Domagal-Goldman, S.D., Lewis, N.K., Villanueva, G.L., Schlieder, J.E., Gilbert, E.A., Kostov, V.B. *L 98-59: a Benchmark System of Small Planets for Future Atmospheric Characterization*, Astrophysical Journal, 162 (4), [169]. DOI: 10.3847/1538-3881/ac1171. 2021.
- [9] Yu, X., Zhang, X., Hörst, S.M., He, C., Dymont, A. H., McGuiggan, P., Lewis, N.K., Moses, J.I., Fortney, J.J., Gao, P., Kempton, E.M.-R., **Moran, S.E.**, Morley, C.V., Powell, D., Valenti, J.A., Vuitton, V. *Haze Evolution in Temperate Exoplanet Atmospheres through Surface Energy Measurements*, Nature Astronomy. DOI: 10.1038/s41550-021-01375-3. 2021
- [8] Rymer, A., Runyon, K., Clyde, B., and 69 coauthors, including **Moran, S.E.** *Neptune Odyssey: A Flagship Concept for the Exploration of the Neptune-Triton System*, Planetary Science Journal, 2, 5 (184) (**Special Issue – “Planetary Decadal Mission Concept Studies”**), DOI: 10.3847/PSJ/abf654. 2021
- [7] Gao, P., Wakeford, H.R., **Moran, S.E.**, Parmentier, V. *Aerosols in Exoplanet Atmospheres*, Journal of Geophysical Research – Planets, 126 (**Invited Review for Special Issue, “Exoplanets: The Nexus of Astronomy and Geoscience”**), DOI: 10.1029/2020JE006655. 2021.
- [6] Vuitton, V., **Moran, S.E.**, He, C., Wolters, C., Flandinet, L., Orthous-Daunay, F.-R., Moses, J. I., Valenti, J.A., Lewis, N.K., Hörst, S.M. *H₂SO₄ and Organosulfur Compounds in Laboratory Analogue Aerosols of Warm High Metallicity Exoplanet Atmospheres*, Planetary Science Journal, 2 (2). DOI: 10.3847/PSJ/abc558. 2021.

[5] **Moran, S.E.**, Hörst, S.M., Vuitton, V., He, C., Lewis, N.K., Flandinet, L., Moses, J.I., North, N., Orthous-Daunay, F.-R., Sebree, J., Wolters, C., M.-R. Kempton, E., Marley, M.S., Morley, C.V., Valenti, J.A. *Chemistry of Temperate Super-Earth and Mini-Neptune Atmospheric Hazes from Laboratory Experiments*, Planetary Science Journal, 1, (17). DOI: 10.3847/PSJ/ab8eae. 2020.

[4] He, C., Hörst, S.M., Lewis, N.K., Yu, X., Moses, J.I., McGuiggan, P., Marley, M.S., Kempton, E. M.-R., **Moran, S.E.**, Morley, C.V., Vuitton, V. *Sulfur-driven Haze Formation in Warm CO₂-rich Exoplanet Atmospheres*, Nature Astronomy, 4, [986-993]. DOI: 10.1038/s41550-020-1072-9. 2020.

[3] Wakeford, H.R., Lewis, N.K., Fowler, J., Bruno, G., Wilson, T.J., **Moran, S.E.**, Valenti, J., Batalha, N.E., Filippazzo, J., Bourrier, V., Hörst, S.M., Lederer, S.M., de Wit, J. *Disentangling the planet from the star in late type M dwarfs: A case study of TRAPPIST-1g*, Astronomical Journal, 157 (1), [11]. DOI: 10.3847/1538-3881/aaf04d. 2018.

[2] **Moran, S.E.**, Hörst, S.M., Batalha, N.E., Lewis, N.K., Wakeford, H.R. *Limits on Clouds and Hazes for the TRAPPIST-1 Planets*, Astronomical Journal, 156 (6), [252]. DOI: 10.3847/1538-3881/aae83a (**Research Highlight in Nature Astronomy; Research Highlight in AAS Nova**). 2018.

[1] Harris, D. W., Jensen, T. W., Suzuki, N., Bautista, J. E., Dawson, K. S., Vivek, M., Brownstein, J. R., Ge, J., Hamann, F., Herbst, H., Jiang, L., **Moran, S. E.**, Myers, A. D., Olmstead, M. D., Schneider, D. P. *The Composite Spectrum of Boss Quasars Selected for Studies of the Ly α Forest.*, Astronomical Journal, 151 (6), [155]. DOI: 10.3847/0004-6256/151/6/155. 2016.

Invited Seminars and Colloquia

University of Utah, High Energy and Astrophysics Seminar	September 2021
University of Kansas, Astronomy and Space Physics Seminar	September 2021
Johns Hopkins University/Space Telescope Science Institute Summer Talks Series	June 2021
Geological Society of Washington, Exoplanets and Super-Earths Themed Meeting	May 2021
Massachusetts Institute of Technology, Astronomy Brown Bag Lunch Seminar	April 2021
NASA Goddard Space Flight Center, Exoplanet Series Seminar	December 2020
University of California, Santa Cruz, Planetary Lunch Seminar	November 2020
University of Maryland, College Park, Planetary and Exoplanetary Astronomy Seminar	October 2020
Caltech, Planetary Science Seminar	May 2020

Teaching Experience

The Johns Hopkins University

Teaching Assistant, AS.270.114 Guided Tour: The Planets	Spring 2021
1 guest lecture: <i>Titan</i>	
Guest Lecturer (2 lectures), AS.270.423 Planetary Atmospheres	Spring 2020, Fall 2021
<i>Atmospheric Chemistry</i>	
<i>Exoplanet Atmospheres</i>	
Guest Lecturer (1 lecture), AS.270.328 Planetary Exploration: Techniques and Data Analysis	Fall 2018
<i>Exoplanet Detection Techniques</i>	

Skills

<i>Programming languages:</i>	Python, IDL, Fortran, MATLAB
<i>Software:</i>	LaTeX/Overleaf, HTML, CHIMERA, <i>virga</i> , <i>picaso</i> , <i>pandexo</i> , MS Office suite, Keynote
<i>Operating systems:</i>	Macintosh, Unix/Linux, Windows
<i>Laboratory Instrumentation:</i>	ESI-Orbitrap MS, FTIR, cryostat operation
<i>Laboratory Skills:</i>	vacuum techniques, machine shop; technical theatre production
<i>Languages:</i>	elementary proficiency in Latin, Italian; beginning proficiency in French
<i>Communication:</i>	excellent creative/professional writing, organizational, and communication skills

Technical Non-refereed Publications

- [4] *Neptune and Triton: A Flagship for Everyone*, Rymer, A., Runyon, K. and 40 coauthors, including **Moran, S.E.** White Paper for the Planetary Science and Astrobiology Decadal Survey 2023-2032. 2020.
- [3] *Neptune Odyssey: Mission to the Neptune-Triton System*, Rymer, A., Clyde, B., Runyon, K., and 70 coauthors, including **Moran, S.E.** NASA Planetary Mission Concept Study for the Astrobiology and Planetary Science Decadal Survey 2023-2032. 2020.
- [2] *Enabling Effective Exoplanet / Planetary Collaborative Science*, Marley, M.S., Harman, C. Hammel, H.B., Bryne, P.K., Fortney, J.J., Accomazzi, A., **Moran, S.E.**, Way, M.J., Christiansen, J.L., Izenberg, N.R. Holt, T., Vahidinia, S., Kohler, E., Brugman, K.K. White Paper for the Planetary Science and Astrobiology Decadal Survey 2023-2032. 2020.
- [1] *The Importance of Prioritizing Exoplanet Experimental Facilities*, Kohler, E., He, C., **Moran, S.E.**, Dan Shim, S.-H., Brugman, K.K., Johnson, A.C., Vergeli, P.C., Thompson, M.A., Graham, H. White Paper for the Planetary Science and Astrobiology Decadal Survey 2023-2032. 2020.

1st Author Conference and Workshop Presentations

- [19] *Triton Haze Analogues and the Role of Carbon Monoxide in Haze Formation (from the Laboratory)*, **Moran, S.E.**, Hörst, S. M., He, C., Radke, M.J., Izenberg, N.R., Sebree, J. A., Vuitton, V., Flandinet, L., Orthous-Daunay, F.-R., Wolters, C., AGU Fall Meeting, P52B.04. New Orleans, LA. December 2021. Oral Presentation.
- [18] *Clouds in the Lab*, **Moran, S.E.**, CloudNineCon (**Invited Keynote Speaker**). Virtual Meeting. August 2021.
- [17] *The Complexity of Oxygenated Planetary Hazes Near and Far*, **Moran, S.E.**, et al., Emerging Researchers in Exoplanet Science 2021. Virtual Meeting. May 2021. Plenary Oral Presentation.
- [16] *In Search of Clearer Skies? Linking Exoplanet Clouds and Hazes from the Laboratory to Atmospheric Models*, **Moran, S.E.**, Hörst, S.M., Lewis, N.K. AAS 237, 413.05 D. Virtual Meeting. January 2021. Oral Presentation (Dissertation Talk).
- [15] *Triton's Haze Properties as Characterized in the Lab*, **Moran, S.E.**, Hörst, S.M., He, C., Radke, M.J., Sebree, J., Izenberg, N.R., Vuitton, V., Flandinet, L., Orthous-Daunay, F.-R., Wolters, C. AGU Fall Meeting, P066-0016. Virtual Meeting. December 2020. Poster.
- [14] *Chemical Composition and Behavior of Super-Earth and Mini-Neptune Exoplanet Hazes*, **Moran, S.E.**, Hörst, S. M., Vuitton, V., He, C., Lewis, N.K., Bishop, N., Flandinet, L., Moses, J., Orthous-Daunay, F.-R., Sebree, J., Wolters, C. DPS 52, 213.02. Virtual Meeting. October 2020. Oral Presentation.
- [13] ****Chemistry of Exoplanet Hazes from the Lab**, **Moran, S.E.**, Hörst, S. M., Vuitton, V., He, C., Lewis, N.K., Bishop, N., Flandinet, L., Moses, J., Orthous-Daunay, F.-R., Sebree, J., Wolters, C. Cloud Academy II, Les Houches School of Physics, Les Houches, France. March 2020. Oral Presentation.
** postponed to March 2022 due to COVID-19 outbreak
- [12] *Chemistry of Laboratory Exoplanet Hazes*, **Moran, S.E.**, Hörst, S. M., Vuitton, V., He, C., Lewis, N.K., Bishop, N., Flandinet, L., Moses, J., Orthous-Daunay, F.-R., Sebree, J., Wolters, C. Exoplanets in Our Backyard, Planetary Atmospheres Thick and Thin #3030, Lunar and Planetary Institute, Houston, TX. February 2020. Oral Presentation.
- [11] *Chemistry of Temperate Exoplanet Hazes from the Laboratory*, **Moran, S.E.**, Hörst, S. M., Vuitton, V., He, C., Lewis, N.K., Flandinet, L., Moses, J., Orthous-Daunay, F.-R., Sebree, J., Wolters, C. AAS 235, 248.04, Honolulu, HI. January 2020. Oral Presentation.
- [10] *Chemistry of Exoplanet Haze Analogues from the Laboratory*, **Moran, S.E.**, Hörst, S. M., Vuitton, V., He, C., Lewis, N.K., Bishop, N., Flandinet, L., Moses, J., Orthous-Daunay, F.-R., Sebree, J., Wolters, C. Chesapeake Bay Area Exoplanet Meeting, University of Delaware, Newark, DE. September 2019. Oral Presentation.
- [9] *Chemistry of Exoplanet Haze Analogues from the Lab*, **Moran, S.E.**, Hörst, S. M., Vuitton, V., He, C., Lewis, N.K., Bishop, N., Flandinet, L., Moses, J., Orthous-Daunay, F.-R., Sebree, J., Wolters, C. Exoclimates V, Oxford, UK. August 2019. Poster.

- [8] *Exoplanet Hazes in the Laboratory and Atmospheric Models*, **Moran, S.E.**, et al., Emerging Researchers in Exoplanet Science 2019, Cornell University, Ithaca, NY. June 2019. Oral Presentation.
- [7] *Atmospheric Hazes of M-Dwarf Temperate Planets*, **Moran, S.E.**, Hörst, S.M., Lewis, N.K. NESSF Special Session, AAS 233, 215.14, Seattle, Washington. January 2019. Oral Presentation.
- [6] *Limits on Clouds and Hazes for the TRAPPIST-1 Planets: Insight from the laboratory and models*, **Moran, S.E.**, Hörst, S.M., Batalha, N.E., Lewis, N.K., Wakeford, H.R. AAS 233, 103.04, Seattle, Washington. January 2019. Oral Presentation.
- [5] *Insights into the atmospheres of the TRAPPIST-1 planets from the laboratory and models*, **Moran, S.E.**, Hörst, S.M., Batalha, N.E., Lewis, N.K., Wakeford, H.R. AGU, P44B-06, Washington, D.C. December 2018. Oral Presentation.
- [4] *Limits on Clouds and Hazes for the TRAPPIST-1 Planets*, **Moran, S.E.**, Hörst, S.M., Batalha, N.E., Lewis, N.K., Wakeford, H.R. Cloud Academy, Les Houches School of Physics, Les Houches, France. September 2018. Poster.
- [3] *Super-Earth and mini-Neptune laboratory haze analogues and their effects on exoplanetary atmospheric modeling*, **Moran, S. E.**, et al. Exoplanets II, Cambridge, UK. July 2018. Oral Presentation.
- [2] *Modeling Exoplanetary Haze and Cloud Effects for Transmission Spectroscopy of the TRAPPIST-1 System*, **Moran, S.E.**, Hörst, S.M., Lewis, N.K., Batalha, N.E., de Wit, J. AAS 231, 148.39, Washington, DC. January 2018. Poster.
- [1] *Laboratory Studies of Planetary Hazes: composition of cool exoplanet atmospheric aerosols with very high resolution mass spectrometry*, **Moran, S.E.**, Hörst, S.M., Lewis, N.K., He, C., Flandinet, L., Moses, J.I., Orthous-Daunay, F.-R., Vuitton, V., Wolters, C. DPS 49, 416.25, Provo, UT. October 2017. Poster.

Co-Author Conference and Workshop Presentations

- [12] *L 98-59: a Benchmark System of Small Planets for Future Atmospheric Characterization*, D. Pidhorodetska, **Moran, S.E.**, Fauchez, T., Schwieterman, E., Barclay, T., Quintana, E., Domagal-Goldman, S., Lewis, N.K., Villanueva, G., Schlieder, J. AAS 237, 437.05. Virtual Meeting. January 2021.
- [11] *Hazes and Exoplanetary Atmospheres in the Lab*, Hörst, S.M., He, C., Lewis, N.K., Moses, J.I., Yu, X., Vuitton, V., McGuiggan, P., Marley, M., Kempton, E.M.-R., Valenti, J.A., Morley, C.V., Sebree, J., **Moran, S.E.** AGU, INV14. Virtual Meeting. December 2020.
- [10] *Laboratory Investigation of Haze Formation in Exoplanet Atmospheres: Implication for Habitability and Biosignatures*, He, C., Hörst, S.M., Lewis, N.K., **Moran, S.E.**, Yu, X., Moses, J.I. AGU, P018-03. Virtual Meeting. December 2020.
- [9] *Sulfur Promotes Haze Formation in Warm CO₂-Rich Exoplanet Atmospheres*, He, C., Hörst, S.M., Lewis, N.K., Yu, X., Moses, J.I., McGuiggan, P., Marley, M.S., Kempton, E. M.-R., **Moran, S.E.**, Morley, C.V., Vuitton, V. DPS 52, 403.04. Virtual Meeting. October 2020.
- [8] *L 98-59: A Benchmark System of Terrestrial Planets for Future Atmospheric Characterization*, Pidhorodetska, D., **Moran, S. E.**, Fauchez, T., Kopparapu, R. K., Colon, K., Quintana, E., Villanueva, G., Domagal-Goldman, S. Exoplanets in Our Backyard, Lunar and Planetary Institute, Houston, TX. February 2020.
- [7] *Orbitrap mass spectrometry of synthetic exoplanetary particles*, Wolters, C, Vuitton, V., Flandinet, L., **Moran, S.E.**, He, C., Orthous-Daunay, F.-R., Hörst, S.M. EPSC-DPS Meeting 2019- L2.122. Geneva, Switzerland. September 2019.
- [6] *Orbitrap mass spectrometry of synthetic (exo-)planetary organic haze*, Vuitton, V., Flandinet, L., **Moran, S.E.**, He, C., Orthous-Daunay, F.-R., Wolters, C., Hörst, S.M. EPSC-DPS Joint Meeting 2019-38. Geneva, Switzerland. September 2019.
- [5] *Comparison of Molecular Complexity Between Chondrites, Martian Meteorite and Lunar Soils*, Orthous-Daunay, F.-R., Wolters, C., Flandinet, L., Vuitton, V., Beck, P., Bonal, L., Isa, J., Moynier, F., Voisin, D., **Moran, S.E.**, Hörst, S.M., Danger, G., Vinogradoff, V., Piani, L., Bekaert, D., Tissandier, L., Isono, Y., Tachibana, S., Naraoka, H., Thissen, R. MetSoc2019, Sapporo, Japan. July 2019.

[4] *Liquid Chromatography Orbitrap Mass Spectrometry Study of Synthetic and Chondritic Organic Mixtures*, Wolters, C., Vuitton, V., Orthous-Daunay, F.-R., Flandinet, L., He, C., **Moran, S.E.**, Hörst, S.M., Bekaert, D., Tissandier, L., Marty, B., Piani L. MetSoc2019, Sapporo, Japan. July 2019.

[3] *Laboratory Investigation of the Molecular Composition of (Exo-)Planetary Organic Aerosols*, Vuitton, V., Flandinet, L., Orthous-Daunay, F.-R., Wolters, C., Ayoub, H., Hörst, S.M., He, C., and **Moran, S.E.** AbSciCon2019, Bellevue, Washington. June 2019.

[2] *Disentangling the Planet from the Star in Late-type M Dwarfs: A Case Study of TRAPPIST-1g*, Wakeford, H.R., Lewis, N.K., Fowler, J., Bruno, G., Wilson, T.J., **Moran, S.E.**, Valenti, J., Batalha, N.E., Filippazzo, J., Bourrier, V., Hörst, S.M., Lederer, S.M., de Wit, J. AAS 233, 103.05, Seattle, Washington. January 2019. Oral Presentation.

[1] *Titan's Oxygen Chemistry and its Impact on Haze Formation*, Vuitton, V., He, C., **Moran, S.E.**, Wolters, C., Flandinet, L., Orthous-Daunay, F.-R., Thissen, R., Hörst, S.M. AAS 232, 123.02, Denver, CO. June 2018. iPoster.

Professional Affiliations

Division for Planetary Sciences – American Astronomical Society
Laboratory Astrophysics Division – American Astronomical Society
American Geophysical Union
American Association for the Advancement of Science