

Dr. Alexandria V. Johnson

Assistant Professor of Practice and Research – Purdue University

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Education

Ph.D. Atmospheric Science, “The Formation of Ice in Maritime Cumuli: Insights from New Observations and Modeling”, Advisor: S. Lasher-Trapp
2014 - Purdue University

B.S. Physics with Mathematical Sciences Minor (Cum Laude)
2009 - Michigan Technological University

Professional Appointments

Purdue University

2019 – Present Assistant Professor of Practice & Research

Brown University

2018 – 2019 Assistant Professor of Research
2018 – 2019 Institute at Brown for Environment and Society Visiting Fellow
2015 – 2018 Adjunct Assistant Professor of Research

Massachusetts Institute of Technology

2018 – 2019 Visiting Researcher
2015 – 2018 Postdoctoral Fellow – Clouds in exoplanet atmospheres – Are They Blocking our View of Life Below?, Supervisor: D. Cziczo
2014 – 2015 Postdoctoral Associate – Nucleation and spectral properties of cloud particles in exoplanet atmospheres, Supervisors: D. Cziczo and S. Seager

Purdue University

2010 - 2014 Graduate Research Assistant – Early ice formation and proliferation in maritime cumulus clouds, Advisor: S. Lasher-Trapp
2010 Graduate Research Assistant – Applications of airborne and balloon-borne GPS radio occultation systems for the remote sensing of water vapor in the atmosphere, Advisor: J. Haase

University of Illinois Urbana-Champaign

2009 - 2010 Graduate Research Assistant – Nucleation properties of aged aerosols in the atmosphere, Advisor: N. Riemer

Michigan Technological University

2008 - 2009 Undergraduate Research Assistant – Variation in the latent heat release of water below 0°C, Advisor: W. Cantrell

2007 - 2008 Undergraduate Research Assistant – Ice nucleation under the influence of long chain organic compounds, Advisor: W. Cantrell

NASA Ames Research Center

2008 Undergraduate Research Intern – Formation and growth of water vapor ice clouds under Martian conditions on JSC Mars-1 regolith simulant, Advisor: L. Iraci

Publications

In preparation

Johnson, A. V., T.M. Schneiderman, A. J. R. Bauer, S. Seager, D. Charbonneau, D. Latham, and D. J. Cziczo: Phase Transitions of Ammonium Nitrate as a function of Temperature as Observed through Scattered Light. *Draft for submission to J. Phys. Chem.*

Johnson, A. V., S. Lance, **D. Tersegno, T. M. Schneiderman**, J. Harrington, M. Hanson, and D. J. Cziczo: Development of a High Temperature Vapor Diffusion Chamber for Planetary Studies. *Draft for submission to Atmo. Meas. Tech.*

Grey, L, A.V. Johnson, et al.: Post-Monsoon Provides Clear Views of Mt. Everest. *Draft for submission to Weather.*

Published

Fortney et al., 2019: The Need for Laboratory Measurements and Ab Initio Studies to Aid Understanding of Exoplanetary Atmospheres. Astro2020 Science White Paper.

Lasher-Trapp, S., D. Leon, P. DeMott, C. Villanueva-Birrel, **A. Johnson**, D. Moser, C. Tulley, and W. Wu, 2016: Multi-Senor Investigation of Rime-Splintering in Tropical Maritime Cumuli. *J. Atmos. Sci.*, **73**, 2547-2564.

Johnson, A., S. Lasher-Trapp, A. Bansemer, Z. Ulanowski, and A. Heymsfield, 2014: Difficulties in Early Ice Detection with the Small Ice Detector 2 HIAPER (SID-2H). *J. Atmos. Oceanic Technol.*, **31**, 1263–75.

Haase, J. S., J. Maldonado-Vargas, F. Rabier, P. Cocquerez, M. Minois, V. Guidard, P. Wyss, and **A. V. Johnson**, 2012: A Proof-of-concept Balloon-borne Global Positioning System Radio Occultation Profiling Instrument for Polar Studies. *Geophys. Res. Lett.*, **39**.

Evans et al., 2012: The PRE-Depression Investigation of Cloud-systems in the Tropics (PREDICT) Field Campaign: Perspectives of Early Career Scientists. *Bull. Amer. Meteor. Soc.*, **93**, 173-87.

Phebus, B. D., **A. V. Johnson**, B. Mar, B. M. Stone, A. Colaprete, and L. T. Iraci, 2011: Water ice nucleation characteristics of JSC Mars-1 regolith simulant under simulated Martian atmospheric conditions. *J. Geophys. Res.*, **116**.

Cantrell, W., A. Kostinski, A. Szedlak, and **A. Johnson**, 2011: Heat of Freezing for Supercooled Water: Measurements at Atmospheric Pressure. *J. Phys. Chem. A*, **115**, 5729-34.

Talks

Invited

The Study of Extraterrestrial Clouds by Earth Means. *Boston University Center for Space Physics Seminar*. Virtual (2021) – Rescheduled due to COVID-19

Exploring Exoplanet Clouds at Home and Abroad. *Laboratory Astrophysics Division Invited Speaker – 234th American Astronomical Society Meeting*. St. Louis, MO. (2019)

From Earth to Exoplanets: Learning about Distant Atmospheres in the Lab. *RI Space Grant Annual Symposium Keynote Speaker*. Bristol, RI. (2019)

The Study of Extraterrestrial Clouds by Earth Means. *University of Wisconsin – Madison Department of Atmospheric and Oceanic Sciences Colloquium*. Madison, WI. (2019)

The Study of Extraterrestrial Clouds by Earth Means. *Brown University Department of Earth, Environmental and Planetary Sciences Colloquium*. Providence, RI. (2019)

From Earth to Exoplanets: Learning about Distant Atmospheres in the Lab. *University of Washington Atmospheric Sciences Colloquium*. Seattle, WA. (2018)

Bringing Exoplanet Clouds Down to Earth. *Brown University BASS*, Providence, RI. (2016)

Bringing Exoplanet Clouds Down to Earth. *University of Urbana-Champaign Atmospheric Sciences Seminar*. Urbana, IL. (2016)

Bringing Exoplanet Clouds Down to Earth. *Michigan Technological University Remote Sensing Seminar*. Houghton, MI. (2016)

Toward Laboratory Studies of Exoplanet Cloud particles. *Templeton Foundation Opportunity Meeting*, Cambridge, MA. (2016)

Bringing Exoplanet Clouds Down to Earth. *Harvard Center for Astrophysics Small Scale Seminar*, Cambridge, MA. (2016)

A Better Understanding of Exoplanet Clouds through Laboratory Studies. *Massachusetts Institute of Technology Planetary Lunch Colloquium Series*, Cambridge, MA. (2015)

Ice Nucleation Under Terrestrial and Martian Atmospheric Conditions. *Massachusetts Institute of Technology*. Cambridge, MA. (2013)

Analyzing and Correcting SID-2H Data from the ICE-T Field Campaign. *NCAR RAF*, Broomfield, CO. (2012)

Oral Conference Presentations

Johnson, A., D. T. Altoaimi, K. Hernandez, D. Tersegno, 2019: Laboratory Studies of Extraterrestrial Clouds through Terrestrial Means. *American Geophysical Union Annual Meeting*, San Francisco, CA.

Johnson, A., M. Zawadowicz, S. Lance, and D. Cziczo, 2018: Scattering Matrices of Single Levitated Particles. *10th International Aerosol Conference*, St. Louis, Missouri.

Johnson, A., T. M. Safran, A. J. R. Bauer, and D. Cziczo, 2017: A Study of Exoplanet Aerosols by Earth Means. *AAAR National Meeting*, Raleigh, NC.

Johnson, A., S. Lance, D. J. Cziczo, S. Seager, D. Charbonneau, and A. Bauer, 2016: Exploring the Microphysical Properties of Exoplanet Clouds. *16th ICCP*, Manchester, UK.

Johnson, A., D. J. Cziczo, A. J. R. Bauer, and S. Seager, 2015: Light Scattered by Ammonium Nitrate as a Function of Crystalline Phase. *ACS National Meeting*, Boston MA.

Johnson, A. and S. Lasher-Trapp, 2014: Modeling of Early Ice Formation in Maritime Cumulus Clouds. *AMS Cloud Physics Meeting*, Boston, MA.

Johnson, A., S. Lasher-Trapp, and A. Bansemer, 2013: Ice detection with SID-2H during the ICE-T field campaign. *Davos Atmosphere and Cryosphere Assembly*, Davos, Switzerland.

Grants & Fellowships

Submitted in past year

Title: Cloud with a Chance of Exploding Rain: Cloud Microphysics and Rain Production on Titan
Status: Not Selected
Role: PI
Source: NASA Cassini Data Analysis Program (CDAP)
Amount: \$686k total
Duration: 2021-2024

Completed

Title: Clouds in exoplanet atmospheres – Are They Blocking our View of Life Below?
Role: PI
Source: Simons Foundation Collaborations on the Origins of Life
Amount: \$260,127 (awarded to MIT)
Duration: 2015-2018

Title: Advanced EDB for the Study of Exoplanet Clouds
Role: Co-I
Source: Simons Foundation Collaborations on the Origins of Life
Amount: \$60,500 (awarded to MIT)
Duration: 2016-2018

Service

University

2020 – present	EAPS Code of Conduct Task Force
2019 – present	Purdue EAPS Alumni and Corporate Relations Committee
2019 – present	Purdue EAPS Seminar Committee, Faculty Chair
2018 – 2019	Brown Planetary Climate Task Force, Chair
2014 – 2015	MIT EAPS Postdoctoral Meetings, Organizer
2013	Purdue EAPS Women in Science Program Retreat, Organizer
2011 – 2013	Purdue – University of Illinois Urbana-Champaign Biannual Midwest Cloud and Aerosol Forum, Co-founder and Organizer

Professional

Reviewer for: Nature Astronomy, Nature Reviews Earth and Environment, The Astrophysical Journal, Journal of Atmospheric Science, Atmospheric Measurement and Technology, Atmospheric Chemistry and Physics, and Journal of Oceanic and Atmospheric Technology

NSF external and panel grant reviewer (~ yearly)

NASA panel grant reviewer (~ yearly)

2021 DPS LOC Committee for Providence, RI meeting

2019 AGU Annual Meeting Session Co-Convener

2017 AAAR Special Symposium Co-Convener (Inaugural Session) – Extraterrestrial Aerosols: From Mars to Titan and Beyond, Co-chair

Past Committee Member

Mengxi Wu – Ph.D. student at Brown University, Dept. Earth, Environmental and Planetary Sci.

Laura Lark – Ph.D. student at Brown University, Dept. Earth, Environmental and Planetary Sci.

Awards and Honors

Simons Foundation Collaboration on the Origins of Life Instrument Grant (2016)

MIT Postdocs Share their Science – 2nd Place (MIT, 2016)

Simons Foundation Collaboration on the Origins of Life Prize Postdoctoral Fellowship (2015)

Outstanding Graduate Student Award (Purdue University, 2013)

Henry Silver Graduate Student Scholarship (Purdue University, 2012)

Ted Rozsa Endowed Scholarship (Michigan Technological University, 2007)

Teaching and Advising

Courses

2021 (Spring)	Planetary Atmospheres (Purdue University) Seminar in Earth Sciences (Purdue University)
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2020 (Fall) Atmospheric Thermodynamics (Purdue University)
Seminar in Earth Sciences (Purdue University)

2020 (Spring) Physics of Climate (Purdue University)
Seminar in Earth Sciences (Purdue University)

2019 (Fall) Atmospheric Thermodynamics (Purdue University)
Seminar in Earth Sciences (Purdue University)

2019 (Spring) Exoplanets Seminar (Brown University)

2017, 2018 (Spring) Planetary Atmospheres (MIT), Development and Co-instructor

2010 (Spring) Earth Sciences for Elementary Teachers (Purdue University), Graduate
Teaching Assistant

2009 (Summer, Fall) Introduction to Meteorology and General Physical Meteorology
(University of Illinois Urbana-Champaign), Graduate Teaching Assistant

2005, 2007-2009 General and specialty Physics labs for Engineers and Physics Labs for
Physics Majors (Michigan Technological University), Undergraduate
Teaching Assistant

Current Students

Matt Weller – Postdoctoral Associate at Brown University (co-advised with Alexander Evans).
2019 – Present.

Kevin Walker – Undergraduate Astrobiology major at Purdue University. Graduated May 2020.
Pursing Master’s in Planetary Atmospheres. Advised 2019 – Present.

Colin Hamill – Pursing a Ph.D. in Planetary Atmospheres. Advised 2020-Present.

Jasmine Singh – Undergraduate Planetary Atmospheres major at Purdue University. Advised
2020 – Present.

Julianna Hepinstall – Undergraduate Planetary Atmospheres major at Purdue University.
Advised 2020 – Present.

Valeria Garcia – Undergraduate Planetary Atmospheres major at Purdue University. Advised
2020 – Present.

Logan Grey – Undergraduate Physics major at Purdue University. Advised 2020 – Present.

Past Students

Natalie Grober – Undergraduate Planetary Science major with English Minor at Purdue
University. Summer researcher as part of the Summer Stay program, 2020.

Robert Washington – Undergraduate Planetary Science major at Purdue University. Graduated
May 2020, advised 2019-2020.

David Tersegno – Ph.D. student at Brown University, Dept. of Earth, Environmental and
Planetary Sci. Entered program 9/2018, advised 2018-2019.

Dana Altoaimi – Undergraduate Geophysics major at Brown University. Summer researcher as part of the Kaust Gifted Student Program, 2019.

Kimberly Hernandez – Undergraduate Physics major at Wellesely College. Summer researcher as part of the Brown University Leadership Alliance Program, 2019.

Field Campaigns

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| 2011 | Ice in Clouds Experiment – Tropical (ICE-T)
In-field researcher, ground based quality control, weather forecasting, and outreach |
| 2010 | Pre-Depression Investigation of Cloud-Systems in the Tropics (PREDICT)
Operation, maintenance, and quality control of GPS radio occultation system onboard the NSF/NCAR Gulfstream-V |

Laboratory Experience

Grant budget tracking
Lab equipment purchases (large [$>$ \$5k] and small)
Instrument development, building, testing, and maintenance
Undergraduate, Graduate, and high-school student mentoring
Laboratory management
Environmental, Health, and Safety lab representative
Chemical inventory maintenance and compliance

Professional Memberships

American Geophysical Union
American Chemical Society
American Meteorological Society
American Association for Aerosol Research
American Astronomical Society - Division of Planetary Sciences
American Astronomical Society - Laboratory Astrophysics Division
Out in Science, Technology, Engineering, and Mathematics

In the News and Media

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| 2020 | ‘How do you teach when everything changes world-wide at once? EAPS professors share how they managed teaching during a pandemic’ EAPS Department News |
| 2019 | Scientific photographer for ‘Rare metallic asteroids might have erupted molten iron’ press release and related coverage Purdue Newsroom |
| 2019 | ‘How do Clouds Form?’ Ask EAPS on MIT Open Learning |
| 2019 | Commentary on ‘How Manganese Played a Pivotal Role in Photosynthesis and Oxidation Protection’ Astrobiology at NASA |

- 2017 'Probing Exoplanet Atmospheres' [WGBH Science for the Public](#)
- 2016 'Exoplanet Clouds on Earth' [MIT EAPS Scope 2016-2017 Issue](#)
- 2016 'Clouds Might Ruin Our Chance to Spot Extraterrestrial Life' [The Atlantic](#)