

Dr. Alexandria V. Johnson
Assistant Professor of Practice – 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
2019 – Present Assistant Professor of 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 through the Simons Foundation Collaboration on the Origins of Life “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

Underlined names represent those of advised students

In Review

Weller, M. B., A. J. Evans, D. E. Ibarra, and **A. V. Johnson**: The Ancient Venus Atmosphere: Atmospheric N₂ Explained by Early Plate Tectonics. *In review at Nature Astronomy*.

Corlies, P., A. Hayes, A. Soto, J. M. Lora, J. M. Soderblom, M. Adamkovics, E. Turtle, S. Rodriguez, J. L. Mitchell, **A. V. Johnson**, J. K. Steckloff, and M. Battalio, 2022: Reoccurring cloud outbursts at Titan's northern mid-latitudes. *In review at The Planetary Science Journal*.

Corlies, P., A. Hayes, G. Rodriguez, M. Adamkovics, J. Kelland, E. P. Turtle; J. M. Lora, J. Mitchell, A. Soto, J. Soderblom, **A.V. Johnson**, J. Steckloff, S. Le Mouelic, and P. Rannou, 2021: A complete analysis of clouds in the Cassini VIMS dataset. *In review at Icarus*.

In Preparation

Drafts available upon request

Hamill, C. D. and **A. V. Johnson**: Experimental Scattering Measurements of KCl Particles as an Exoplanet Cloud Analog. *In prep for Nature Astronomy*.

Walker, K. and **A. V. Johnson**: A Novel Exoplanet Electrodynamic Balance (exoEDB) for the Study of Exotic Clouds. *In prep for*

Published

Grey, L., **A. V. Johnson**, T. Matthews, L. B. Perry, A. C. Elmore, A. Khadka, D. Shrestha, S. Tuladhar, S. K. Baidya, D. Aryal, and A. P. Gajurel, 2022: Mount Everest's photogenic weather during the post-monsoon. *Weather*, **77**, 156-160.

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-Sensor 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

Underlined names represent those of advised students

Invited Talks

American Chemical Society Bridging the Interfaces of Atmospheric Chemistry Symposium invited presentation – Indianapolis, IN (2023)

Cloud Zwei Con keynote speaker – Bavaria, Germany (2023)

Penn State Department of Meteorology and Atmospheric Science Colloquium – Virtual (2022)

University of Illinois Urbana-Champaign Atmospheric Sciences Graduate Seminar – Virtual (2021)

Indiana Astronomical Society June Meeting – Virtual (2021)

Boston University Center for Space Physics Seminar - Virtual (2021)

Laboratory Astrophysics Division Invited Speaker for the 234th American Astronomical Society Meeting - St. Louis, MO (2019)

RI Space Grant Annual Symposium Keynote Speaker - Bristol, RI (2019)

University of Wisconsin – Madison Department of Atmospheric and Oceanic Sciences Colloquium - Madison, WI (2019)

Brown University Department of Earth, Environmental and Planetary Sciences Colloquium - Providence, RI (2019)

University of Washington Atmospheric Sciences Colloquium - Seattle, WA (2018)

Brown University BASS Colloquium - Providence, RI (2016)

University of Illinois Urbana-Champaign Atmospheric Sciences Graduate Seminar - Urbana, IL (2016)

Michigan Technological University Remote Sensing Seminar - Houghton, MI (2016)

Templeton Foundation Opportunity Meeting - Cambridge, MA (2016)

Harvard Center for Astrophysics Small Scale Seminar - Cambridge, MA (2016)

Massachusetts Institute of Technology Planetary Lunch Colloquium Series - Cambridge, MA (2015)

Massachusetts Institute of Technology - Cambridge, MA (2013)

NCAR RAF - Broomfield, CO (2012)

Oral Conference Presentations

Hamill, C. D., and **A. V. Johnson**, 2021: Characterizing Super-Earth and Mini-Neptune Light Scattering via Experimental Phase Curves. *Division of Planetary Sciences Meeting*, Virtual.

Walker, K., and **A. V. Johnson**, 2021: A Novel Exoplanet Electrodynamic Balance (exoEDB) for the Study of Exotic Clouds. *Division of Planetary Sciences Meeting*, Virtual.

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.

Service, Engagement, & Activities

University Service

2021	Continuing Lecturer in Purdue EAPS search committee
2020 – 2022	Purdue EAPS Code of Conduct Task Force
2019 – present	Purdue EAPS Seminar Committee, Faculty Chair
2019 – 2021	Purdue EAPS Alumni and Corporate Relations Committee
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 Service

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

NSF external and panel grant reviewer (~ yearly)

NASA panel grant reviewer (~ yearly)

2023	Associate Editor for the Journal of the Atmospheric Sciences
2021	DPS LOC Committee for Providence, RI meeting (transitioned to virtual)
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

Diversity Activities

2022	Teaching for Equity Extravapalooza (part of the summer Professional Learning Academy through CalTeach)
2022	Maximizing Student Potential Conference at Purdue – Belonging – A Virtual Gathering for Exploring, Reflecting, and Acting
2022	AGU / AGI Building Antiracist Spaces in your Department seminar
2021	Trans inclusion training through Purdue LGBTQ center
2021	Promoting LGBTQIA+ Student Success in the Classroom Workshop through Purdue LGBTQ center
2021	Bystander Intervention to stop anti-Asian/American and xenophobic harassment training presented by Asian Americans Advancing Justice (AAJC) and Hollaback!

2021	Maximizing Student Potential Conference at Purdue – Infusing Inclusive Pedagogy Throughout the Curriculum
2020	EAPS Anti-racism Workshop through the Office of Diversity and Inclusion at Purdue
2020	UNH PowerPlay and Inclusion Works: Bias Awareness and Intervention training
2020	Pursing Racial Justice Together Series at Purdue University
2020	Division of Diversity and Inclusion’s Democracy, Civility, and Freedom of Expression programming series at Purdue [Cancelled due to COVID-19]
2019	Instrumental in bringing LGBTQ center in for a departmental seminar on inclusivity and bystander intervention
2019	Safe Space Training at Purdue University
2019	Maximizing Student Potential Conference at Purdue University
2018-2019	Out in Science, Technology, Engineering, and Math (oSTEM) at Brown University
2018-2019	(Chair) Task Force on Climate in Planetary Science at Brown University
2017	Safe Space training at Brown University

Community Engagement

2022	Graduate Student Government at Michigan Tech career panel guest speaker
2018-2021	Earth Science Women’s Network Science-a-thon Participant
2020	Academic Women in STEM at UIUC – Career Panel on Job Searching in times of COVID-19
2019-2020	Skype-a-Scientist Participating Scientist
2019	Purdue University Meteorological Association (PUMA) Guest lecture
2017-2018	Letters to a Pre-Scientist

Awards and Honors

College of Science EAPS Undergraduate Advising Award (2023)
Teaching for Tomorrow Junior Fellow (2021-2022)
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 Taught

+ *Indicates teaching honor roll based on student evaluations*

2023 (Spring)	<i>Teaching relief</i>
2022 (Fall)	EAPS 421 Atmospheric Thermodynamics + EAPS 691 Seminar in Earth Sciences
2022 (Spring)	EAPS 391 Planetary Atmospheres + EAPS 591 Exoplanets EAPS 691 Seminar in Earth Sciences
2021 (Fall)	EAPS 421 Atmospheric Thermodynamics + EAPS 691 Seminar in Earth Sciences
2021 (Spring)	EAPS 591 Planetary Atmospheres [Online due to COVID-19] + EAPS 691 Seminar in Earth Sciences [Online due to COVID-19]
2020 (Fall)	EAPS 421 Atmospheric Thermodynamics [Online due to COVID-19] + EAPS 691 Seminar in Earth Sciences [Online due to COVID-19]
2020 (Spring)	EAPS 320 Physics of Climate [Transitioned online due to COVID-19] EAPS 691 Seminar in Earth Sciences
2019 (Fall)	EAPS 421 Atmospheric Thermodynamics + EAPS 691 Seminar in Earth Sciences
2019 (Spring)	Exoplanets Seminar (Brown University)
2017, 2018 (Spring)	Planetary Atmospheres (MIT), Development and Co-instructor as a Postdoctoral Associate and Fellow
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

Currently Advised Students

Giovanni Bacon	Pursuing a Ph.D. in Planetary Atmospheres at Purdue University. Advised 2022 – Present.
Kevin Walker	Pursuing a M.S. in Planetary Atmospheres at Purdue University. Advised 2020 – Present.

Colin Hamill	Pursing a Ph.D. in Planetary Atmospheres at Purdue University. Advised 2020 – Present.
Ashlynn Gary	Undergraduate Planetary Science major at Purdue University. Advised 2023 – Present.
Sydney Brown	Undergraduate Atmospheric Science major at Purdue University. Advised 2023 – Present.
Mariana Aguilar	Undergraduate Planetary Science and Chemistry major at Purdue University. Joined as part of the Louis Stokes Alliance for Minority Participation program. Advised 2022 – Present.
Tommy Pavell	Undergraduate Planetary Atmospheres major at Purdue University. Advised 2022 – Present.
Emma Miller	Undergraduate Planetary Atmospheres major at Purdue University. Advised 2022 – Present.

Past Advised Students

Kyle Morin	Undergraduate Planetary Science major at Purdue University. Advised summer of 2022.
Katherine Meves	Undergraduate Planetary Science major at Purdue University. Started as a summer researcher through the Summer Research Opportunity in Planetary Science Program and continued on. Advised 2021 – 2022.
Logan Grey	Undergraduate Physics major at Purdue University. Currently a part time researcher. Advised 2020 – 2022. Graduated December 2021.
Jasmine Singh	Undergraduate Planetary Atmospheres major at Purdue University. Advised 2020 – 2022. Graduated May 2022.
Julianna Heptinstall	Undergraduate Planetary Atmospheres major at Purdue University. Advised 2020 – 2022. Graduated May 2022
Valeria Garcia	Undergraduate Planetary Atmospheres major at Purdue University. Advised 2020 – 2022. Graduated 2022.
Matt Weller	Postdoctoral Associate at Brown University (co-advised with Prof. Alexander Evans). Advised 2019 – 2021.
Natalie Grober	Undergraduate Planetary Science major with English Minor at Purdue University. Summer researcher as part of the Summer Stay program. Advised 2020. Graduated May 2021.
Kevin Walker	Undergraduate Astrobiology major at Purdue University. Advised 2019-2020. Graduated May 2020.
Robert Washington	Undergraduate Planetary Science major at Purdue University. Advised 2019-2020. Graduated May 2020.
David Tersegno	Ph.D. in Planetary Science at Brown University. Advised 2018-2019.

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

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

Student Committee Service

Ashley Walker – Ph.D. in Atmospheric Science at Howard University. Served 2021 – Present.

Kris Laferriere – Ph.D. in Planetary Sciences at Purdue University. Served 2020 – Present.

Mengxi Wu – Ph.D. in Planetary Sciences at Brown University. Served 2018 – 2019.

Laura Lark – Ph.D. in Planetary Sciences at Brown University. Served 2018 – 2019.

Field Campaign Experience

2011 Ice in Clouds Experiment – Tropical (ICE-T)
In-field researcher, ground-based monitoring and data 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 [<\$5k])
Instrument development, building, testing, and maintenance
Undergraduate, Graduate, and high-school student mentoring
Laboratory management
Group management
Data archiving
Environmental, Health, and Safety compliance
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

In the News and Media

- 2023 'Lifting the Veil' [Science](#)
- 2022 Voiceover for [Purdue EAPS promotional video](#)
- 2022 'Head in the Clouds: Examining Clouds to Better Understand Exoplanet Atmospheres' [InnovatED](#) article featuring Ph.D. student Colin Hamill
- 2021 'Atmospheric professors awarded grant for flexible, portable kit-based lab instruction' [EAPS Departmental News](#)
- 2021 'Metal Clouds and Exoplanet Science' [Superheroes of Science](#)
- 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 'Battle of the Exoplanets' [BBC Documentary](#)
- 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](#)