

Perianne Johnson

Distinguished Postdoctoral Fellow

University of Texas Institute for Geophysics

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Education

2023	<i>Ph.D, Astrophysics and Planetary Science, University of Colorado, Boulder</i>
2019	<i>M.S., Astrophysics and Planetary Science, University of Colorado, Boulder</i>
2017	<i>M.S., Physics, New Mexico Tech</i>
2016	<i>B.S., Physics with a concentration in Astrophysics (highest honors), New Mexico Tech</i>

Research Experience

2023 – present	Distinguished Postdoctoral Fellow, Univ. of Texas Institute for Geophysics
2018 – 2023	Research Assistant, Southwest Research Institute, Boulder CO <i>Advised by Dr. Leslie Young</i> <ul style="list-style-type: none">○ Developed thermophysical model of Pluto’s surface volatiles and atmosphere○ Investigated Pluto’s climate on annual and million-year timescales○ Modeled the filling of Pluto’s Sputnik Planitia Basin via atmospheric condensation○ Calculated Pluto’s primordial N₂ inventory accounting for early orbital migration○ PhD thesis available for download on my website: periannejohnson.wixsite.com/perianne
Summer 2020	Participant in JPL Mission Design School <ul style="list-style-type: none">○ Served as Mission Designer for a 3-month long mock mission proposal program on a team of other graduate students and early career scientists and engineers
2016 – 2017	Graduate Research Assistant, Physics Department, New Mexico Tech <i>Advised by Dr. Raúl Morales-Juberías</i> <ul style="list-style-type: none">○ Measured zonal wind velocities in Jupiter's atmosphere, using Hubble Space Telescope and Voyager images○ Identified temporal and longitudinal deviations from zonal mean velocity○ Funded by NASA EPSCoR “JIVE in NM” project

Peer-Reviewed Publications

- Johnson, P. E.**, Young, L. A., Nesvorny, D., Zhang, X. 2022. “Ancient Climate and Volatile Loss during Pluto’s Wild Years, 4.5 Gy ago.” *Planetary Science Journal* (in prep)
- Hofgartner, J. D., et al. (including **Johnson, P. E.**) 2023. “Bolometric Hemispherical Albedo Map of Pluto from New Horizons Observations.” *Planetary Science Journal*, 4, 7. doi.org/10.3847/PSJ/ace3ab
- Johnson, P. E.**, Keane, J. T., Young, L. A., and Matsuyama, I. 2021. “New Constraints on Pluto's Sputnik Planitia Ice Sheet from a Coupled Reorientation-Climate Model” *Planetary Science Journal*, 2, 194. doi.org/10.3847/PSJ/ac1d42
- Spiers, E. M., et al. (including **Johnson, P. E.**) 2021. “Tiger: Concept Study for a New Frontiers Enceladus Habitability Mission” *Planetary Science Journal*, 2, 195. doi.org/10.3847/PSJ/ac19b7
- Johnson, P. E.**, Young, L. A., Protopapa, S., et al. 2021. “Modeling Pluto's Minimum Pressure: Implications for Haze Production.” *Icarus*. <https://doi.org/10.1016/j.icarus.2020.114070>

Johnson, P., Morales-Juberías, R., Simon, A., et al. 2018. "Longitudinal variability in Jupiter's zonal winds derived from multi-wavelength HST observations." *Planetary and Space Science*, 155: 2-11
doi.org/10.1016/j.pss.2018.01.004

Cosentino, R. G., Morales-Juberías, R., Greathouse, T., Orton, G., **Johnson, P.,** Fletcher, L. N., & Simon, A. 2017. New observations and modeling of Jupiter's quasi-quadrennial oscillation. *Journal of Geophysical Research: Planets*, 122, 2719–2744. doi.org/10.1002/2017JE005342

Invited Talks, Colloquia, & Press

- 2021 "Pluto's Tilt Explains Ice Sheet's History" in *Physics*, by Rachel Berkowitz. Oct 21, 2021: <https://physics.aps.org/articles/v14/146>
- 2021 New Horizons Science Team Meeting, Particles and Atmospheres Team Breakout: "Intermittent Infill and Reorientation of Sputnik Planitia"
- 2021 New Horizons Geology, Geophysics, and Imaging Team meeting: "Intermittent Infill and Reorientation of Sputnik Planitia"

Teaching Experience

- 2017 – 2018 **Teaching Assistant, Astrophysics and Planetary Science Department, Univ. of Colo.**
- Taught laboratory and recitation sections of introductory astronomy courses for both astronomy major and non-major classes, with ~30 student class sizes
- 2014 – 2017 **Teaching Assistant, Physics Department, New Mexico Tech**
- Taught General Physics I (mechanics) recitation and laboratory courses, and General Physics II (E&M) laboratory courses, with ~20 student class sizes
- 2013 **Teaching Assistant, Chemical/Mechanical Engineering Depts., New Mexico Tech**
- Served as a TA for an engineering science course in Matlab programming for two semesters. Worked with ~30 students in the computer lab to explain, debug, and grade coding lab projects.

Academic Awards & Honors

- Recipient of the CU Astrophysical and Planetary Sciences Department Ray Mace Smith Graduate Fellowship, recognizing excellence in research (2022)
- Runner-up in the University of Colorado Boulder "Three Minute Thesis" Competition for a talk titled "Pluto Weather Forecasting" (available to watch here, starting at 34:17: <https://tinyurl.com/3MT-Pluto>)
- Recipient of a Hartmann Student Travel Grant to attend the 2018 Division of Planetary Science Meeting in Knoxville, TN
- Recipient of a 2016 Space Grant from the New Mexico Space Grant Consortium for undergraduate research on Jovian Atmosphere Dynamics
- Recipient of a Hartmann Student Travel Grant to attend the 2016 Division of Planetary Science Meeting in Pasadena, CA

Professional Activities & Service

- High School Science Fair mentor for the project entitled "Applications of the VT3D Model to Triton and Implications for Triton's Seasonal Atmospheric Change" (2021-2022)
- Reviewer for Publications: *Astrophysical Journal Letters*
- New Horizons Science Workshop: session organizer (2021)
- Faculty Meeting Notetaker (2021-2022)
- Graduate Admissions Committee: member (2020-2021)
- Faculty Hire Committee: member (2019, instructor search)

- Admitted Graduate Student Visit Committee: member (2018-21)
- Department Social Committee: member (2018-2021)
- American Astronomical Society: member
- AAS Division of Planetary Sciences: member
- Sigma Pi Sigma Physics Honor Society: member
- Alpha Sigma Kappa - Women in Technical Studies: alumna member and former chapter president

Conference Presentations

- 2022 **Johnson, P. E.**, Young, L. A., Nesvorný, D., and Zhang, X. Ancient Climate and Volatile Loss during Pluto's Wild Years, 4.5 Gy ago, DPS 54 in London, Ontario (oral talk)
- 2021 **Johnson, P. E.**, Keane, J. T., Young, L. A., and Matsuyama, I. Wanderlust on Pluto: Forming Sputnik Planitia with a Coupled True Polar Wander - Climate Model, AGU, (oral talk)
- 2021 **Johnson, P. E.**, Keane, J. T., Young, L. A., and Matsuyama, I. Wanderlust on Pluto: Forming Sputnik Planitia with a Coupled True Polar Wander - Climate Model, DPS 53, Virtual (oral talk)
- 2021 Young, E. F., Young, L.A., **Johnson, P. E.**, and the PHOT Team. More Evidence that Pluto's Atmosphere is Freezing Out: Central Flash Results from the 15-AUG-2018 Occultation, DPS 53, Virtual (iPoster)
- 2021 Spiers, E. M., Weber, J. M., Venigalla, C., Annex, A. M., Berdis, J., Chen, C. P., Lee, C., Pascuzzo, A. C., Czajka, E., do Vale Pereira, P., Gray, P., Kumar, S., McIntyre, K. J., Phillips, D., Tallapragada, S., Carberry Mogan, S. R., **Johnson, P.**, O'Neill, W., Lowes, L., Mitchell, K. L. Nash, A. E., Scully, J. E. TIGER: JPL PSSS Architecture and Feasibility Study for a New Frontiers 5 Mission Concept to Enceladus, LPSC 52, held virtually (poster)
- 2020 **Johnson, P. E.**, Young, L. A., and Keane, J. T. How fast did Pluto's Sputnik Basin fill? Infilling timescales for multiple initial locations and orbits, DPS 52 Virtual. (oral talk)
- 2019 **Johnson, P. E.**, Young, L. A., Protopapa, S., et al. Pluto's Minimum Surface Pressure and Implications for Haze Production, DPS 51 in Geneva, Switzerland. (oral talk)
- 2019 **Johnson, P. E.**, Young, L. A., Protopapa, S., et al. Pluto's Minimum Surface Pressure and Implications for Haze Production, Pluto System After New Horizons meeting in Laurel, MD. (oral talk)
- 2018 **Johnson, P.** and Young, L. Pluto's Minimum Pressure in the Current Season from a Thermophysical Model, DPS 50 in Knoxville, TN. (oral talk)
- 2018 Young, L.A., and **Johnson, P.E.** Haze formation on Pluto on million-year timescales, DPS 50 in Knoxville, TN.
- 2017 Simon, Amy A., Wong, Michael H., Orton, Glenn S., Cosentino, Richard, Tollefson, Joshua, **Johnson, Perianne.** Hubble's Global View of Jupiter During the Juno Mission, DPS 49 in Provo, UT
- 2017 Cosentino, Richard, Simon, Amy A., Greathouse, Thomas K., Fletcher, Leigh, Morales-Juberías, Raúl, Orton, Glenn S., **Johnson, Perianne.** Statistical Estimation of Properties and Variations in Jupiter's Stratospheric Oscillation, DPS 49 in Provo, UT
- 2016 **Johnson, P.** et al, Investigating Wave Structures in Jupiter's Atmosphere using HST Images, 32nd NM Symposium in Socorro, NM. (poster presentation)
- 2016 **Johnson, P.** et al, Investigating Wave Structures in Jupiter's Atmosphere using HST Images, DPS 48/EPSC 11 in Pasadena, CA. (poster presentation)

- 2016 Wong, Michael H., Tollefson, Joshua, Simon, Amy A., Cosentino, Rick, de Pater, Imke, Marcus, Philip, Orton, Glenn S., Morales-Juberías, Raúl, **Johnson, Perianne**. Jupiter's Global Winds in Advance of the Juno Encounters, DPS 48/EPSC 11 in Pasadena, CA.
- 2016 **Johnson, P.** Measuring Jovian Wind Speeds using HST Data, NMT Student Research Symposium in Socorro, NM. (poster presentation)