

# Briony H. N. Horgan

Associate Professor  
Department of Earth, Atmospheric, and Planetary Sciences  
Purdue University

February 2022

550 Stadium Mall Drive,  
West Lafayette, IN 47907  
briony@purdue.edu  
(503) 703-8473

## Education and Appointments

- 2020-present **Associate Professor**, Purdue University  
2014-2020 **Assistant Professor**, Purdue University  
*Department of Earth, Atmospheric, and Planetary Sciences*  
*Courtesy appointment: School of Aeronautics and Astronautics*  
2013 **Faculty Research Associate**, Arizona State University  
*School of Earth and Space Exploration*  
2010-2012 **Exploration Postdoctoral Fellow**, Arizona State University  
*Advisor: Prof. Phil Christensen*  
2005-2010 **Ph.D., Cornell University**, Astronomy and Space Sciences  
*Advisor: Prof. Jim Bell*  
2001-2005 **B.S., Oregon State University**, Physics, *summa cum laude*

## Fields of Expertise

- Geology and mineralogy of the terrestrial planets from rovers and orbital remote sensing
- Visible, near-infrared, and thermal-infrared spectroscopy
- Mapping and analysis of large hyperspectral and multispectral datasets
- Analog field studies of Earth and planetary surface processes
- Tactical and strategic rover operations

## NASA Mission Experience

- 2015-present Co-I, Mastcam-Z imaging investigation, Mars 2020 Mission  
2021-present Long-Term Planner and Tactical Science Lead, Mars 2020 Mission  
2016-present Participating Scientist, Mars Science Laboratory Mission  
2019-2020 Co-I, Mars Orbiter for Resources, Ices, and Env., Mission Concept Study  
2018 Co-I, Chariot to the Moons of Mars, PSDS3 Mission Concept Study  
2008-2014 Science Team, THEMIS, Mars Odyssey Mission

## Awards and Honors

- 2022 College of Science Research Award, Purdue University  
2021 University Faculty Scholar, Purdue University  
2016 Purdue College of Science Undergraduate Mentoring Award  
2010-2012 Arizona State University Exploration Postdoctoral Fellowship  
2009 Cornell University Eleanor Norton York Prize in Astronomy  
2009, 2010 NASA Mars Exploration Student Travel Award  
2009 Lunar and Planetary Institute Career Development Award  
2008 NASA Harriet G. Jenkins Pre-doctoral Fellowship  
2008 NASA Earth and Space Science Fellowship

## Publications

*G* = grad student, *U* = undergrad, *P* = postdoc,            = Horgan is primary advisor

1. A. Broz<sup>G</sup>, J. Clark, B. Sutter, D. Ming, V. Tu, **B. Horgan**, L. Silva (2022). Mineralogy and diagenesis of Mars-analog paleosols from eastern Oregon, USA. *Icarus*, accepted.
2. E. Rampe, **B. Horgan**, R. Smith<sup>P</sup>, N. Scudder<sup>G</sup>, E. Bamber<sup>U</sup>, A. Rutledge<sup>P</sup>, R. Christofferson (2022). A Mineralogical Study of Glacial Flour from Three Sisters, Oregon: An Analog for a Cold and Icy Early Mars. *Earth and Planetary Science Letters*, accepted.
3. J. Tarnas, K. Stack, M. Parente, A. Koepfel, J. Mustard, K. Moore, **B. Horgan**, F. Seelos, E. Cloutis, P. Kelemen, D. Flannery, A. Brown, K. Frizzell, P. Pinet (2021). Characteristics, origins, and biosignature preservation potential of carbonate-bearing rocks within and outside of Jezero crater, *Journal of Geophysical Research - Planets*, 126, doi: 10.1029/2021JE006898.
4. N. Mangold, S. Gupta, O. Gasnault, G. Dromart, J. Tarnas, S. Sholes, **B. Horgan**, and 32 others (2021). Perseverance rover finds a delta-lake system and ancient flood deposits at Jezero crater, Mars. *Science*, 374, 711-717, doi:10.1126/science.abc4051.
5. S. Holm-Alwmark, K. Kinch, M. Hansen, S. Shahrzad, K. Svennevig, W. Abbey, R. Anderson, F. Calef III, S. Gupta, E. Hauber, **B. Horgan**, and 7 others (2021). Stratigraphic Relationships in Jezero Crater, Mars – Constraints on the Timing of Fluvial-Lacustrine Activity from orbital observations, *Journal of Geophysical Research - Planets*, doi: 10.1029/2021JE006840.
6. K. Bennett, F. Rivera-Hernandez, C. Tinker<sup>U</sup>, **B. Horgan**, D. Fey, C. Edwards, L. Edgsar, R. Kronyak, K. Edgett, A. Fraeman, L. Kah, M. Henderson<sup>G</sup>, N. Stein, E. Dehouck, A. Williams (2021). Extensive diagenesis revealed by fine-scale features at Vera Rubin ridge, Gale crater, Mars, *Journal of Geophysical Research – Planets*, 126, doi:10.1029/2019JE006311
7. R. Smith<sup>P</sup> and **B. Horgan** (2021). Nanoscale variations in natural amorphous and nanocrystalline weathering products in mafic to intermediate volcanic terrains on Earth: Implications for amorphous detections on Mars. *Journal of Geophysical Research – Planets*, 126, doi:10.1029/2020JE006769.
8. R. Smith, S. McLennan, C. Achilles, E. Dehouck, **B. Horgan**, N. Mangold, E. Rampe, M. Salvatore, K. Siebach, V. Sun (2021). X-ray amorphous components in sedimentary rocks of Gale crater, Mars: Evidence for ancient formation and long-lived aqueous activity, *Journal of Geophysical Research - Planets*, doi:10.1029/2020JE006782.
9. K. Kinch, J. Sølberg, **B. Horgan**, J. Adler, A. Hayes, J. Hurowitz, M. Rice (2021). Landing on Mars: A cross-institutional research-based seminar series, *International Journal of Teaching and Learning in Higher Education*, accepted.
10. J. Bell, 34 co-authors, **B. Horgan**, and 13 others (2021). The Mars 2020 Perseverance rover Mast Camera Zoon (Mastcam-Z) Multispectral Stereoscopic Imaging Investigation, *Space Science Reviews*, 217, doi:10.1007/s11214-020-00755-x.
11. A. Hayes, P. Corlies, C. Tate, J. Bell, J. Maki, M. Caplinger, K. Kinch, K. Herkenhoff, **B. Horgan**, and 30 others (2021) Pre-flight calibration of the Mars 2020 rover Mastcam Zoom (Mastcam-Z) Multispectral Stereoscopic Imager, *Space Science Reviews*, 217, doi:10.1007/s11214-021-00795-x.
12. N. Scudder<sup>G</sup>, **B. Horgan**, E. Rampe, R. Smith, A. Rutledge (2021), The effects of magmatic evolution, crystallinity, and microtexture on the visible/near-infrared and

- thermal-infrared spectra of volcanic rocks, *Icarus*, 359, doi:10.1016/j.icarus.2021.114344.
13. **M. Henderson<sup>G</sup>**, **B. Horgan**, M. Rowe, K. Wall, **N. Scudder<sup>G</sup>** (2020), Determining the eruption style of explosive volcanic eruptions from spectroscopy of tephra deposits. *Earth & Space Sciences*, 8, doi:10.1029/2019EA001013.
  14. **B. Horgan**, J. Johnson, A. Fraeman, M. Rice, C. Seeger<sup>G</sup>, J. Bell, K. Bennett, E. Cloutis, and 10 others (2020), Diagenesis of Vera Rubin ridge, Gale crater, Mars from Mastcam multispectral images, *Journal of Geophysical Research – Planets*, 125, doi: 10.1029/2019JE006322.
  15. A. Fraeman, 27 co-authors, **B. Horgan**, and 13 others (2020), The origin of Vera Rubin ridge, Gale crater, Mars: Summary and synthesis of Curiosity's exploration campaign, *Journal of Geophysical Research – Planets*, accepted, doi: 10.1029/2020JE006527.
  16. A. Fraeman, J. Johnson, R. Arvidson, M. Rice, D. Wellington, R. Morris, V. Fox, **B. Horgan**, S. Jacob, M. Salvatore, V. Sun, P. Pinet, J. Bell, R. Wiens, A. Vasavada (2020), Synergistic ground and orbital observations of iron oxides on Mt. Sharp and Vera Rubin ridge, *Journal of Geophysical Research – Planets*, 125, doi: 10.1029/2019JE006294.
  17. S. Jacob<sup>G</sup>, D. Wellington, J. Bell, C. Achilles, A. Fraeman, G. Peters, J. Johnson, **B. Horgan**, E. Rampe, L. Thompson, R. Wiens, S. Maurice (2020), Spectral, Compositional, and Physical Properties of the Upper Murray Formation and Vera Rubin Ridge, Gale Crater, Mars (2020), *Journal of Geophysical Research – Planets*, 125, doi: 10.1029/2019JE006290.
  18. J. L'Haridon, N. Mangold, A. Fraeman, J. Johnson, A. Cousin, W. Rabin, G. David, E. Dehouck, V. Sun, J. Frydenvang, O. Gasnault, P. Gasda, N. Lanza, O. Forni, P.-V. Meslin, S. Schwenzer, J. Bridges, **B. Horgan**, C. House, M. Salvatore, S. Maurice, R. Wiens (2020), Iron Mobility during Diagenesis as Observed by ChemCam at the Vera Rubin Ridge, Gale Crater, Mars, *Journal of Geophysical Research – Planets*, 125, doi: 10.1029/2019JE006299.
  19. K. Stack, 41 co-authors, **B. Horgan**, and 23 others (2020). Photogeologic Map of the Perseverance Rover Field Site in Jezero Crater Constructed by the Mars 2020 Science Team, *Space Science Reviews*, **216**, 127, doi: 10.1007/s11214-020-00739-x.
  20. J. Huang, Z. Xiao, L. Xiao, **B. Horgan**, X. Hu, P. Lucey, X. Xiao, S. Zhao, Y. Qian, R. Xu, B. Xue, H. Hang, VNIS PCAM TCAM LCAM team (2020), No olivine-rich mantle material has been detected by Chang'E-4 in-situ observation, *Geology*, 48, doi:10.1130/G47280.1.
  21. N. Balci, Y. Gunes, J. Kaiser, S. Acker, K. Edis, **B. Garczynski<sup>G</sup>**, **B. Horgan** (2020) Biotic and abiotic imprints on Mg-rich stromatolites: lessons from Lake Salda, SW Turkey, *Biogeosciences*, 37, doi: 10.1080/01490451.2019.1710784.
  22. I. Smith, P. Hayne, S. Byrne, P. Becerra, M. Kahre, W. Calvin, C. Hvidberg, S. Milkovich, P. Buhler, M. Landis, **B. Horgan**, and 27 others (2020) The holy grail: A strategy for unlocking the climate record stored within Mars' polar layered deposits, *Planetary & Space Science*, 184, doi:10.1016/j.pss.2020.104841.
  23. J. Bishop, C. Gross, J. Danielson, M. Parente, S. Murchie, **B. Horgan**, J. Wray, C. Viviano, B. Ehlmann, F. Seelos (2020) Multiple mineral horizons in layered outcrops at Mawrth Vallis, Mars, signify changing geochemical environments on early Mars, *Icarus*, 341, doi:10.1016/j.icarus.2020.113634.

24. F. Poulet, C. Gross, **B. Horgan**, D. Loizeau, J. Bishop, J. Carter, C. Orgel, J.-P. Bibring. (2020) Mawrth Vallis, Mars: A fascinating place for future in situ exploration, *Astrobiology*, 20, doi:10.1089/ast.2019.2074.
25. **B. Horgan**, R. Anderson, G. Dromart, E. Amador<sup>P</sup>, M. Rice (2020), The mineral diversity of Jezero crater: Evidence for possible lacustrine carbonates on Mars, *Icarus*, 339, doi: 10.1016/j.icarus.2019.113526.
26. S. Warren<sup>G</sup>, E. Kite, J-P. Williams, **B. Horgan** (2019), Through the thick and thin: New constraints on Mars paleopressure history 3.8 - 4 Ga from small exhumed craters. *Journal of Geophysical Research*, 124, doi: 10.1029/2019JE006178.
27. **P. Kinzelman**<sup>U</sup>, **B. Horgan** (2019). Preservation of surface and subsurface environments on Mars in filled fractures at Mawrth Vallis. *Journal of Purdue Undergraduate Research*, 9, 42-48, doi:10.5703/1288284316931.
28. **iMOST** (2019), *The Potential Science and Engineering Value of Samples Delivered to Earth by Mars Sample Return*, (co-chairs D. W. Beaty, M. M. Grady, H. Y. McSween, E. Sefton-Nash; documentarian B. L. Carrier; plus **66 co-authors**), *Meteoritics & Planetary Science*, 54(3), 667-671 (executive summary only), <https://doi.org/10.1111/maps.13232>; open access web link to full report (*Meteoritics & Planetary Science*, vol. 54, S3-S152): <https://doi.org/10.1111/maps.13242>.
29. J. Lai<sup>G</sup>, **B. Horgan**, J. Bell (2019), Assessing martian bedrock mineralogy through “windows” in the dust using near-infrared and thermal-infrared remote sensing, *Icarus*, doi:10.1016/j.icarus.2019.01.019
30. **R. Smith**<sup>P</sup>, E. Rampe, **B. Horgan**, E. DeHouck (2018), Deriving amorphous component abundance and composition of rocks and sediments on Earth and Mars, *Journal of Geophysical Research - Planets*, doi: 10.1029/2018JE005612.
31. E. Rampe, M. Lapotre, T. Bristow, R. Arvidson, R. Morris, C. Achilles, C. Weitz, D. Blake, D. Ming, S. Morrison, D. Vaniman, S. Chipera, R. Downs, J. Grotzinger, R. Hazen, T. Peretyazhko, B. Sutter, V. Tu, A. Yen, **B. Horgan**, and 9 others (2018), Sand mineralogy within the Bagnold Dunes, Gale crater, as observed in situ and from orbit, *Geophysical Research Letters*, doi: 10.1029/2018GL079073.
32. **A. Rutledge**<sup>P</sup>, **B. Horgan**, J. Havig, E. Rampe, **N. Scudder**<sup>G</sup>, T. Hamilton (2018) Silica dissolution and precipitation in glaciated volcanic environments, and implications for Mars, *Geophysical Research Letters*, doi: 10.1029/2018GL078105.
33. T. Bristow, E. Rampe, C. Achilles, D. Blake, S. Chipera, P. Craig, J. Crisp, D. Des Marais, R. Downs, R. Gellert, J. Grotzinger, R. Hazen, **B. Horgan**, and 12 others (2018), Clay mineral diversity and abundance in sedimentary rocks of Gale crater, Mars, *Science Advances*, 4, doi: 10.1126/sciadv.aar3330.
34. **S. Ackiss**<sup>\*G</sup>, **B. Horgan**, F. Seelos, W. Farrand, J. Wray (2018), Mineralogic evidence for subglacial volcanism in the Sisyphi Montes Region of Mars, *Icarus*, 311, 357-370, doi: 10.1016/j.icarus.2018.03.026.
35. H. Melosh, J. Kendall<sup>\*G</sup>, **B. Horgan**, B. Johnson, T. Bowling, P. Lucey, G. Taylor (2017). South Pole-Aitken basin ejecta reveal the Moon’s upper mantle, *Geology*, *Geology*, 45(12), 1063-1066.
36. L. Hays, H. Graham, **B. Horgan**, S. Potter-McIntyre, A. Williams, D. Des Marais, M. Parenteau, E. Hausrath, T. McCollom, K. Lynch (2017). Report from the Biosignature

- Preservation and Detection in Mars Analog Environments Workshop, *Astrobiology*, 17, 363-400, doi:10.1089/ast.2016.1627.
37. R. Smith\*<sup>G</sup>, **B. Horgan**, P. Mann, E. Cloutis, P. Christensen (2017). Acid weathering of basalt and basaltic glass: II. Effects of microscopic alteration textures on spectral properties, *Icarus*, doi:10.1002/2016JE005112.
  38. **B. Horgan**, R. Smith\*<sup>G</sup>, P. Mann, E. Cloutis, P. Christensen (2017). Acid weathering of basalt and basaltic glass: I. Near-infrared spectra, mid-infrared spectra, and implications for Mars, *Icarus*, doi:10.1002/2016JE005111.
  39. B. Ehlmann, F. Anderson, J. Andrews-Hanna, J. Carter, D. Catling, P. Christensen, B. Cohen, C. Dressing, C. Edwards, L. Elkins-Tanton, K. Farley, C. Fassett, W. Fischer, A. Fraeman, M. Golombek, V. Hamilton, A. Hayes, C. Herd, **B. Horgan**, and 28 others (2016). The sustainability of habitability on terrestrial planets: Insights, questions, and needed measurements from Mars for understanding the evolution of Earth-like worlds, *Journal of Geophysical Research*, doi:10.1002/2016JE005134.
  40. L. Fenton, J. Bishop, S. King, B. Lafuente\*<sup>G</sup>, **B. Horgan**, D. Bustos, P. Sarrazin (2016). Sedimentary differentiation of aeolian grains at the White Sands National Monument, NM, USA, *Aeolian Research*, 26, 117-136, doi:10.1016/j.aeolia.2016.05.001.
  41. K. Bennett\*<sup>G</sup>, **B. Horgan**, L. Gaddis, B. Greenhagen, C. Allen, P. Hayne, J. Bell, and D. Paige (2016). Complex explosive volcanic activity within Oppenheimer Crater on the Moon, *Icarus*, 273, 296–314, doi:10.1016/j.icarus.2016.02.007.
  42. R. Soare, **B. Horgan**, S. Conway, C. Souness, M. El Maarry (2015). Volcanic terrain and the possible periglacial formation of “excess ice” at the mid-latitudes of Utopia Planitia, Mars, *Earth & Planetary Science Letters*, 423, 182–192, doi:10.1016/j.epsl.2015.04.033.
  43. K. Lynch\*<sup>G</sup>, **B. Horgan**, J. Munakata Marr, J. Hanley, and 5 others (2015). Near-infrared spectroscopy of lacustrine sediments in the Great Salt Lake Desert: An analog study for Martian paleolake basins, *J. Geophys. Res.*, 120, doi:10.1002/2014JE004707.
  44. **B. Horgan** and D. Hooper (2015). Dune Apron/Denivation Features (two entries), in *Encyclopedia of Planetary Landforms*, eds: H. Hargitai, A. Kereszturi, doi: 10.1007/978-1-4614-9213-9.
  45. W. Farrand, T. Glotch, **B. Horgan** (2014). Detection of copiapite in the northern Mawrth Vallis region of Mars: Evidence of acid sulfate alteration. *Icarus*, 241, 346-357, doi:10.1016/j.icarus.2014.07.003.
  46. **B. Horgan**, E. Cloutis, P. Mann, J. Bell (2014). Near-infrared spectra of ferrous mineral mixtures and methods for their identification in planetary surface spectra, *Icarus*, 234, 132-154, doi:10.1016/j.icarus.2014.02.031.
  47. L. Fenton, R. Hayward, **B. Horgan**, and 15 others (2013) Summary of the Third International Planetary Dunes Workshop: Remote Sensing and Image Analysis of Planetary Dunes. *Aeolian Research*, 8, 29-38, doi: 10.1016/j.aeolia.2012.10.006.
  48. G. Berard\*<sup>U</sup>, D. Applin, E. Cloutis, J. Stromberg, R. Sharma, P. Mann, S. Grasby, R. Bezys, **B. Horgan**, and 7 others (2013). A hypersaline spring analogue in Manitoba, Canada for potential ancient spring deposits on Mars. *Icarus*, 224, 399–412, doi:10.1016/j.icarus.2012.12.024.
  49. M. Rice, E. Cloutis, J. Bell, D. Bish, **B. Horgan**, S. Mertzman, M. Craig, R. Renaut, B. Gautason, B. Mountain (2013). Reflectance spectra diversity of silica-rich materials:

- Sensitivity to environment and implications for detections on Mars. *Icarus*, 223, 499-533, doi:10.1016/j.icarus.2012.09.021.
50. J. Huang\*<sup>G</sup>, C. Edwards, **B. Horgan**, P. Christensen, M. Kraft, L. Xiao (2012). Identification and mapping of dikes with relatively primitive compositions in Thaumasia Planum on Mars: Implications for Tharsis volcanism and the opening of Valles Marineris. *Geophysical Research Letters*, 39, L17201, doi:10.1029/2012GL052523.
  51. **B. Horgan**, J. Bell (2012). Widespread weathered glass on the surface of Mars, *Geology*, 40, 391-394, doi: 10.1130/G32755.1.
  52. **B. Horgan**, J. Bell (2012). Seasonally active slipface avalanches in the north polar sand sea of Mars: Evidence for a wind-related origin, *Geophysical Research Letters*, 39, L09201, doi:10.1029/2012GL051329.
  53. L. Fenton, M. Bishop, M. Bourke, C. Bristow, R. Hayward, **B. Horgan**, and 5 others (2010). Summary of the Second International Planetary Dunes Workshop: Planetary Analogs — Integrating Models, Remote Sensing, and Field Data. *Aeolian Research*, 2, 173-178, doi: 10.1016/j.aeolia.2010.09.001
  54. **B. Horgan**, J. Bell, E. Noe Dobrea, E. Cloutis, D. Bailey, M. Craig, L. Roach, J. Mustard (2009). Distribution of hydrated minerals in the north polar region of Mars, *Journal of Geophysical Research*, 114, E01005, doi:10.1029/2008JE003187.
  55. M. Kangas, M. Ansmann, **B. Horgan**, N. Lemaster, R. Leonardi, A. Levy, P. Lubin, J. Marvil, P. McCreary, T. Villela (2005). A 31 pixel flared 100-GHz high-gain scalar corrugated nonbonded platelet antenna array, *IEEE: Antennas and Wireless Propagation Letters*, 4, 245-248.
  56. M. Kangas, M. Ansmann, K. Copsey, **B. Horgan**, R. Leonardi, P. Lubin, T. Villela (2005). A 100-GHz High-gain Tilted Corrugated Nonbonded Platelet Antenna, *IEEE: Antennas and Wireless Propagation Letters*, 4, 304 – 307.

## Upcoming Manuscripts

1. R. Smith, S. McLennan, B. Sutter, E. Rampe, E. Dehouck, K. Siebach, **B. Horgan**, V. Sun, A. McAdam, C. Achilles, N. Mangold, and M. Salvatore. X-ray amorphous sulfur-bearing phases in Gale crater sedimentary rocks, Mars. *Journal of Geophysical Research - Planets*, revised.
2. **P. Sinha** and **B. Horgan**, Sediments within the icy north polar deposits of Mars record recent impacts and volcanism, *Geophysical Research Letters*, revised.
3. **A. Rudolph**, **B. Horgan**, J. Johnson, K. Bennett, J. Haber, J. F. Bell III, V. Fox, S. Jacob, S. Maurice, E. Rampe, M. Rice, C. Seeger, R. Wiens, The distribution of clay minerals and their impact on diagenesis in Glen Torridon, Gale crater, Mars. *Journal of Geophysical Research - Planets*, revised.
4. M. Rice, 8 co-authors, **B. Horgan**, 8 co-authors, Spectral diversity of rocks and soils in Mastcam observations along the Curiosity rover's traverse in Gale crater, Mars. *Journal of Geophysical Research - Planets*, revised.
5. K. Bennet, 20 co-authors, **A. Rudolph**, 2 co-authors, **B. Horgan**, 4 co-authors. An Overview of the Curiosity Rover's Campaign in Glen Torridon, Gale Crater, Mars. *Journal of Geophysical Research - Planets*, submitted.
6. K. Farley, K. Stack-Morgan, D. Shuster, **B. Horgan**, and 104 others. Aqueously altered igneous rocks on the floor of Jezero crater, Mars. *Science*, submitted.

7. Y. Liu, 38 co-authors, **B. Horgan**, and 30 co-authors. An olivine cumulate outcrop on the floor of Jezero crater, Mars. *Science*, submitted.
8. J. F. Bell III, 8 co-authors, **B. Horgan**, and 83 co-authors. Geological and Meteorological Imaging Results from the Mars 2020 Perseverance Rover in Jezero Crater. *Science Advances*, submitted.

## Other Publications

1. M. Rice and **B. Horgan** (2021) [NASA's Perseverance Rover Is Closer Than Ever to Finding Ancient Alien Life on Mars](#), October 2021.
2. **B. Horgan** (2021) The Perseverance Mars Rover: NASA's Next Giant Leap in the Search for Signs of Life Beyond Earth, *LPI Bulletin*, January 2021.
3. Mars Architecture Strategy Working Group (MASWG), Jakosky, B., R. Zurek, 6 others, **B. Horgan**, 7 others (2020). [Mars, the Nearest Habitable World—A Comprehensive Program for Future Mars Exploration](#).
4. W. Calvin, N. Putzig, J. Holt, A. Bramdon, C. Dundas, B. Ehlmann, **B. Horgan**, G. Morgan, S. Murchie, W. Patterson, K. Seelos, H. Sizemore (2020) MORIE: Mars Orbiter for Resources, Ices, and Environments, [Planetary Mission Concept Study report](#).
5. **B. Horgan** and M. Rice (2020) NASA's big move to search for life on Mars – and to bring rocks home. [The Conversation](#), 7/30/2020.
6. **B. Horgan** and 18 co-authors (2020) The evolution of habitable environments on terrestrial planets: Insights and knowledge gaps from studying the geologic record of Mars ([White paper](#)). Submitted to the *Planetary Science & Astrobiology Decadal Survey*.
7. **B. Horgan** (2013). Planetary Science: Evolved Magma on Mars (News & Views). *Nature Geoscience*, doi:10.1038/ngeo2010.

## Support: Current and Past

2021-2024	Principal Investigator, NASA Mars Data Analysis Program <i>Constraining the nature of Noachian surface environments and climates...</i>
2021-2024	Co-Investigator, NASA Solar Systems Working Program <i>Between a rock and a frozen place: Cold-based glacial...</i> (PI: Dr. Allie Rutledge)
2020-2021	Co-Investigator, NASA Planetary Mission Concepts Studies <i>Mars Orbiter for Resources, Ice, and Environment</i> (PI: Prof. Wendy Calvin)
2020-2023	Co-Investigator, NASA Mars2020 Mission Phase E <i>Mastcam-Z: A Geologic, Stereoscopic, and Multispectral...</i> (PI: Prof. Jim Bell)
2020-2023	Co-Investigator, NASA Lunar Data Analysis Program <i>Investigating Explosive Volcanic Deposits in the...</i> (PI: Dr. Kristen Bennett)
2019-2022	Co-Investigator, NASA Lunar Data Analysis Program <i>Remote Sensing Investigations of Irregular Mare Patches...</i> (PI: Dr. Julie Stopar)
2018-2022	Co-Investigator, NASA Planetary Science Through Analog Research Program, <i>SAND-E: Semi-Autonomous Navigation for Detrital...</i> (PI: Prof. Ryan Ewing)
2017-2018	Co-Investigator, NASA Planetary Science Deep Space SmallSats Program, <i>Chariot to the Moons of Mars</i> (PI: Prof. David Minton)
2016-2021	Principal Investigator, NASA MSL Participating Scientist Program <i>Using composition to constrain paleoenvironments and sites of organic...</i>

- 2016-2019 Principal Investigator, NASA Solar System Workings Program  
*Icy environments on Mars: Investigating Glacial Weathering in Volcanic...*
- 2016-2019 Co-Investigator, NASA Lunar Data Analysis Program  
*Lunar pyroclastic deposits: Windows to the Lunar Interior* (PI: Dr. Lisa Gaddis)
- 2016-2019 Co-Investigator, NASA Mars Data Analysis Program  
*Determining the Distribution of Martian Chlorine Salts* (PI: Dr. Jennifer Hanley)
- 2015-2020 Co-Investigator, NASA Mars2020 Mission Phases B-D  
*Mastcam-Z: A Geologic, Stereoscopic, and Multispectral...* (PI: Prof. Jim Bell)
- 2013-2016 Principal Investigator, NASA Mars Data Analysis Program  
*Investigating the origin and alteration history of north polar sediments...*
- 2012-2015 Co-Investigator, NASA Mars Data Analysis Program  
*Imaging and spectroscopic studies of the martian surface* (PI: Prof. Jim Bell)
- 2010-2012 Fellow, Exploration Postdoctoral Fellowship, Arizona State University  
*Reconstructing ancient surface environments on Mars: Spectral and analog...*
- 2008-2011 Student Co-I, NASA Mars Data Analysis Program  
*Mineralogic and morphologic studies of Mars and...* (PI: Prof. Jim Bell)
- 2008-2010 Fellow, NASA Harriet G. Jenkins Pre-doctoral Fellowship  
*Minerals, ice, and dunes: Signs of water-related...* (Mentor: Dr. Ken Tanaka)

## Students and Postdocs Mentored

- |          |           |  |
|----------|-----------|--|
| Postdocs | 2016-2018 | Rebecca Smith (Postdoc, Stony Brook University)  |
|          | 2015-2019 | Alicia Rutledge (Faculty Research Assoc., North. Arizona Univ.)  |
| PhD      | 2025      | Hunter Vannier   |
|          | 2023      | James Haber  |
|          |           | Brad Garczynski <i>NASA Early Career Collaboration Award</i>   |
|          |           | Amanda Rudolph <i>NSF Fellow, Amelia Earhart Fellow</i>  |
|          | 2022      | Prakhar Sinha <i>NASA Future Investigator</i>  |
|          | 2021      | Noel Scudder <i>NASA Fellow, EAPS Andrews Fellow</i>   |
|          | 2020      | Marie McBride <i>NSF Fellow, Amelia Earhart Fellow, EAPS Outstanding Graduate Student Award</i><br>(Postdoc, NASA Goddard Space Flight Cen.) |
|          | 2018      | Sheridan Ackiss <i>NASA Fellow, Purdue Doctoral Fellow</i><br>(Remote Sensing Specialist, Aerospace Corp.)                                   |
| MS       | 2018      | Prakhar Sinha (MS in Aeronautical and Astronautical Engineering)   |
| BS       | 2024      | Madison Schaefer   |
|          | 2023      | Eshaana Aurora   |
|          | 2022      | Emma Rogers, Adrienne Rudolph  |
|          | 2021      | Joseph Heidenreich, Briar Qualizza   |
|          |           | Henry Dawson (PhD student at Washington Univ. at St Louis)   |
|          | 2020      | Adam Lechowicz, Madeson Van Buskirk  |
|          |           | Phoebe Kinzelman (MS student at Boise State Univ.)   |
|          |           | Rebecca Carmack (PhD student at Northern Arizona Univ.)  |
|          |           | Connor Tinker (PhD student at Stony Brook Univ.)   |



- 2019 Jonathan Forss, Dan McGahan, Minna Rubio  
Ben Oxley (PhD student at Northwestern Univ.)  
Bryan Howl (PhD student at Stony Brook Univ.)
- 2018 Brandon Smith  
Laura Chaves Moreno (PhD student at Purdue)
- 2017 John Riccione, Aaron Campbell  
Rhianna Moore (PhD student at Univ. Tennessee – Knoxville)  
Elizabeth Spiers (PhD student at Georgia Tech)
- 2016 Ellen Czaplinski (PhD student at Univ. Arkansas),  
Rachel Maxwell (PhD student at Univ. California – Santa Cruz),  
Caleb Engle (MS, Colorado School of Mines)
- 2014 Danielle Clarke (Engineer, Intel)

*Graduate committees:* Marcella Yant (Stonybrook University Geological Sciences PhD 2017), Ya-Huei Huang (EAPS PhD 2018), Andy Hesselbrock (EAPS PhD 2018), Jordan Hill (IE PhD 2020), Carlisle Wishard (EAPS PhD 2022), Dara Lacznik (EAPS PhD 2023), Alexander Kling (EAPS PhD 2025), Stephanie Menten (EAPS PhD 2026), Eli Mansback (MIT Geophysics PhD 2026)

## Teaching Experience

- 2014-present **Faculty Instructor**, Purdue University  
Curriculum coordinator for Planetary Science major.  
*Primary courses: EAPS 556, “Planetary Geology”, EAPS 105, “The Planets”;*  
*EAPS 577 “Remote Sensing of the Planets”.*
- 2014-present **Advisor** for Undergraduate and Graduate Students, Purdue University
- 2009 **Field trip leader**, Cornell University  
*Astro 577, “Planetary Surface Processes”*
- 2005-2006 **Graduate Teaching Assistant**, Cornell University  
*Astro 102, “Our Solar System”;* *Astro 310, “Planetary Image Processing”*
- 2003-2005 **Undergraduate Teaching Assistant, Oregon State University**  
*Introductory and Advanced Physics courses*
- 2003-2005 **Physics Department Tutor**, Oregon State University

## Invited Talks

- 2022 Apr. University of Idaho Geology Colloquium, *virtual*  
Apr. University of California – Los Angeles Planetary Science Seminar, *virtual*
- 2021 Apr. University of Nevada – Reno Geology Colloquium, *virtual*  
Apr. Oregon State University Physics Colloquium, *virtual*  
Apr. Montana State Univ. Earth Sciences Colloquium, *virtual*  
Sept. Purdue – Fort Wayne Physics Colloquium, *virtual*
- 2020 June Lunar & Planetary Institute Colloquium, *virtual*  
Sep. University of Notre Dame, Physics Colloquium, *virtual*  
Oct. University of California – Santa Cruz, *virtual*
- 2019 Feb. University of Kentucky, Earth & Env. Sci. Seminar, Lexington, KY  
Mar. University of Michigan, Earth & Env. Sci. Seminar, Ann Arbor, MI  
Aug. Goldschmidt 2019, Keynote Speaker, Barcelona, Spain

- Sep. Southern Illinois University, Geology Colloquium, Carbondale, IL  
 Sep. Purdue University, EAPS Colloquium, West Lafayette, IN  
 2018 Feb. EPS Seminar Series, Northwestern University, Evanston, IL  
 Apr. Earth & Env. Sciences Seminar, University of Illinois, Chicago, IL  
 June Clay Minerals Society Annual Meeting, Champaign-Urbana, IL  
 June Mars Workshop on Amazonian and Present Day Climate, Denver, CO  
 July Star Quest, Central Appalachian Astronomy Club, Greenbank, WV  
 Nov. ExoMars 5<sup>th</sup> Landing Site Selection Workshop, Leicester, UK  
 Dec. American Geophysical Union Fall Meeting, Washington, D.C.  
 2017 Jan. Texas A&M Geology & Geophysics seminar, College Station, TX  
 Apr. Physics Colloquium, IUPUI, Indianapolis, IN  
 2016 Feb. Purdue Back to Class alumni seminar, Naples, FL  
 Mar. Geology Colloquium, Univ. of Cincinnati, Cincinnati, OH  
 Apr. Purdue Meet the Dean alumni seminar, Indianapolis, IN  
 July Purdue President's Council Family Day, Chicago, IL  
 Oct. SESE Colloquium, Arizona State University, Tempe, AZ  
 Oct. Indiana Astronomical Society, Indianapolis, IN  
 Oct. National Geographic Live! Mankind to Mars, Chicago, IL  
 2015 Feb. EPS Colloquium, State University of New York – Stonybrook, Stonybrook, NY  
 May Seminar, NASA Goddard Space Flight Center, Greenbelt, MD  
 June Seminar, Southwest Research Institute, Boulder, CO  
 Sept. Dawn or Doom 2 Conference, Purdue University, West Lafayette, IN  
 Nov. NASA Astrobiology Institute Seminar, University of Washington, Seattle, WA  
 Dec. American Geophysical Union Fall Meeting, San Francisco, CA  
 2014 Nov. University of Tennessee EPS Colloquium, Knoxville, TN  
 2012 May Planetary Science Institute Seminar, Tuscon, AZ  
 Nov. Harvey Mudd Physics Colloquium, Claremont, CA  
 Nov. Geological Society of America Annual Meeting, Charlotte, NC  
 2011 April USGS Astrogeology Science Center Seminar, Flagstaff, AZ  
 2010 Aug. Buffalo State University Science Colloquium, Buffalo, NY  
 2009 April MIT Women in Aerospace Symposium, Cambridge, MA

## Media Coverage

1. Popular Mechanics
2. [Perseverance rover's second year on Mars to focus on rock samples, river delta](#), *UPI*, 02/18/2022.
3. [NASA's Perseverance rover marks its first year hunting for past life on Mars](#), *NPR*, 02/18/2022.
4. [A year after landing on Mars, Perseverance rover sets sights on intriguing new target](#), *CNN*, 02/18/2022.
5. [NASA's Perseverance rover prepares for its longest Mars drive yet](#), *Axios*, 02/17/2022.
6. [A year on Mars & the gift of space](#), *NPR Are We There Yet? Podcast*, 02/15/2022.
7. [Purdue professor, Perseverance member preparing for year two as rover mission reaches landing anniversary](#), *Purdue news*, 02/14/2022.
8. [This Martian Wasteland Was Once a Lake](#), *The Atlantic*, 10/07/2021.
9. [See some of the most intriguing photos from NASA's Perseverance rover so far](#), *Science News*, 08/19/2021.

10. [Excitement as Mars rover drills first rock core for return to Earth](#), *Nature*, 08/06/2021
11. [Perseverance rover prepares to collect Martian samples that will be sent to Earth](#), *CNN*, 07/22/2021.
12. Purdue News
13. [The Focus: Wednesday April 21](#), *Radio Adelaide (AU)*, 04/21/2021.
14. [Purdue Scientist Discusses Role in NASA's Perseverance Mars Rover](#), *This is Purdue Podcast*, 04/29/2021.
15. [Where did Mars's liquid water go? A new theory holds fresh clues](#), *National Geographic*, 3/16/2021.
16. [The Focus: Tuesday March 2](#), *Radio Adelaide (AU)*, 03/02/2021.
17. [Purdue Prof. Discusses work on Mars rover team](#), *WLFI*, 02/25/2021.
18. ['You only get one shot': Purdue professor part of NASA team that landed Mars Perseverance](#), *Journal & Courier*, 02/20/2021.
19. [What we're learning for NASA's Perseverance Mars mission 1 week later](#), *NPR Here & Now*, 02/25/2021.
20. Red Planet 'touchdown' kicks off hunt for ancient life (print), *Washington Post*, 02/22/2021.
21. Mars (special print issue + map), *National Geographic*, 02/2021.
22. [Mars landing: Nasa's Perseverance rover in 'great shape'](#), *BBC News*, 02/19/2021.
23. [NASA Mars rover: Perseverance robot all set for big test](#), *BBC News*, 02/18/2021.
24. [LIVE STREAM: Watch NASA's Perseverance Rover Land on Mars After '7 Minutes of Terror'](#), *Vice News*, 02/18/2021.
25. [NASA's fifth Mars rover, Perseverance, makes historic landing](#), *Al Jazeera*, 02/18/2021.
26. [NASA Rover Successfully Lands On Mars, Begins Search For Remnants Of Ancient Life](#), *NPR Here and Now*, 02/18/2021.
27. [NASA's rover is on Mars. What happens next is up to Washington.](#), *Politico*, 02/18/2021.
28. [NASA Rover Survives 7 Minutes of Terror, Lands on Mars in Search of Ancient Life](#), *Daily Beast*, 02/18/2021.
29. [NASA's Perseverance rover lands on Mars](#), *PBS News Hour*, 02/18/2021.
30. [What a lake in Turkey can tell us about Mars](#), *Earth Matters, NASA Earth Observatory*, 02/17/2021.
31. [How NASA Aims to Achieve Perseverance's High-Stakes Mars Landing](#), *Scientific American*, 02/17/2021.
32. [NASA's Perseverance rover ready to search for signs of ancient life on Mars](#), *LA Times*, 02/17/2021.
33. [Explore Jezero Crater, the future home of NASA's Perseverance rover](#), *CNN*, 02/16/2021.
34. Live interview, 4pm Newscast, *Fox 59 News*, 02/16/2021.
35. [The hunt for life on Mars: A visual guide to NASA's latest mission](#), *Nature*, 02/16/2021.
36. [Upcoming Mars rover landing marks latest step in researching the red planet](#), *Purdue News*, 02/15/2021.
37. *Mars mach mobil*, *Neue Zürcher Zeitung* (Swiss newspaper, printed), 02/14/2021.
38. [NASA's Perseverance rover is about to land on Mars and look for life](#), *New Scientist*, 02/11/2021.
39. [Mars professor searching for signs of the red planet's evolution](#), *Purdue News*, 02/11/2021.
40. [Search For Life On Mars Aided By Purdue Expert](#), *WBAA*, 02/09/2021.
41. [Purdue scientist reflects on her passion for studying Mars' geology, landscape](#), *Purdue News*, 02/09/2021.
42. [Panelist: Perseverance Mars Rover Pre-Landing News Conference](#), NASA, 01/27/2021

43. [Purdue's Connection to NASA's Perseverance Mars Rover Mission](#), *Full Steam Ahead Podcast*, 10/20/2020.
44. [Solar System Smackdown: Mars v. Venus](#), *NPR Science Friday*, 10/09/2020.
45. [Is there other life in the universe? Purdue scientist is ready to search for the answers](#), *Purdue News*, 09/28/2020.
46. [Lake Salda, Turkey Shares A Similar Mineralogy With Jezero Crater On Mars](#), *NASA Press Release*, 07/31/2020.
47. [NASA Goes Looking for Tiny Ancient Martians](#), *The Atlantic*, 7/30/2020.
48. [Jez like Mars](#), *NASA Earth Observatory*, 7/30/2020.
49. [With Perseverance, NASA launches new stage in Mars exploration](#), *Christian Science Monitor*, 7/30/2020.
50. [Purdue scientist plays a critical role in 2020 NASA Mars rover mission](#), *Purdue News*, 7/30/2020.
51. [NASA's Perseverance rover will seek signs of past life on Mars](#), *Science News*, 07/28/2020.
52. [The end of the beginning of Mars exploration](#), *Axios*, 7/28/2020.
53. [Mars \(probably\) has a lake of liquid water](#), *Science News*, 07/25/2020.
54. [Nasa Mars rover: How Perseverance will hunt for signs of past life](#), *BBC*, 7/24/2020.
55. [Has life existed beyond Earth? Purdue professor going to great lengths to find out](#), *Purdue News*, 07/22/2020.
56. [Mars Express helps uncover the secrets of Perseverance landing site](#), *ESA*, 07/01/2020.
57. [NASA's new rover will collect martian rocks—and clues to planet's ancient climate](#), *Science*, 06/25/2020
58. [Perseverance Mars Rover & the Search for Ancient Life](#), *NASA Science Live*, 07/22/2020.
59. [Mars 2020: Looking for signs of life with Perseverance and Mars Sample Return](#), *Superheroes of Science Podcast*, 5/20/2020.
60. [The Perseverance Rover Is NASA's Big Move to Search for Life on Mars](#), *The Wire*, 04/08/2020.
61. [The Pros and Cons of a Lunar Pit Stop](#), *The Atlantic*, 02/18/2020.
62. [The Mars 2020 rover will visit the perfect spot to find signs of life, new studies show](#), *The Washington Post*, 11/16/2019
63. [Mars 2020 will search for microscopic fossils](#), *JPL Press Release*, 11/12/2019.
64. [How long was Mars wet?](#), *Planetary Radio*, 10/23/2019.
65. [The role of a Turkish lake in an EAPS student's Mars research](#), *EAPS Newsletter*, 9/12/2019.
66. [EAPS graduate student awarded NASA fellowship for Mars research](#), *EAPS Newsletter* 9/12/2019
67. [EAPS graduate student investigating Gale crater on Mars](#), *EAPS Newsletter*, 9/4/2019.
68. [Life may have existed on warm, rainy, ancient Mars before winter came](#), *CNN*, 8/21/2019. *Goldschmidt press release, also covered by Newsweek, Fox News, NY Post, Space.com, Express.co.uk, Metro.co.uk, and 180 other news sites.*
69. [Robots Explore 'Mars-Like' Lava Field in Iceland as Prep for NASA's Mars 2020 Rover](#), *Space.com*, 8/21/2019.
70. [Mars may have been drenched in rain and supported life in billions of years ago: study](#), *NY Daily Mail*, 8/20/2019.
71. [Ancient Mars had warm weather and rainstorms before the planet turned icy, scientists say](#), *Newsweek*, 8/20/2019.
72. [Is there life on Mars?](#) *Iceland Review*, 8/12/2019.
73. [Humans will never colonize Mars](#). *Gizmodo*, 7/30/2019.

74. [The Lafayette meteorite and Purdue's 150th anniversary celebration](#), *Meteorite Times Magazine*, 7/1/2019.
75. [Two new Earth-like exoplanets could support life](#), *Purdue News*, 6/21/2019.
76. [China's lunar rover may have found minerals from the moon's mantle](#), *Science News*, 5/15/2019.
77. [China's rover peeks under the crust of the far side of the moon](#), *New Scientist*, 5/15/2019
78. [If Mars Had Water, Where Did It Go?](#), *Gizmodo*, 4/8/2019.
79. [Mars Rover Opportunity's Legacy Continues With Purdue Researchers](#), *Lakeshore Public Radio*, 2/15/2019.
80. [China's lunar planting sows seeds of exploration](#), *China Daily*, 1/23/2019.
81. [US analysts call for more cooperation in space](#), *China Daily*, 1/15/2019
82. [China just landed a spacecraft on the moon's far side. Here's what Chang'e 4 will teach us.](#), *NBC News*, 1/3/2019.
83. [What does the 'far side' of the moon look like?](#), *BBC Radio News*, 1/3/2019.
84. [The Far Side of the Moon: What China and the World Hope to Find](#), *New York Times*, 1/3/2019.
85. [China's Lunar Lander To Explore Moon's Far Side](#), *NPR*, 1/1/2019.
86. [What chance has Nasa of finding life on Mars?](#), *BBC News*, 12/14/2018.
87. Why Jezero Crater is the place for Mars 2020/sample return, *AGU Press Conference*, 12/12/2014.
88. ['Blueberries' on Mars Have a Watery Past. But Scientists Are Still Baffled](#), *Space.com*, 12/5/2018.
89. [A Purdue planet expert shares insight about NASA's InSight lander](#), *WLFI*, 11/26/2018.
90. [Red Planet InSight: Why Do We Keep Going Back to Mars?](#), *Space.com*, 11/26/2018.
91. [We Know Where the 2020 Rover Will Look for Martian Life](#), *Planetary Radio*, 11/21/2018.
92. [NASA's 2020 rover will search Mars for signs of life](#), *Popular Science*, 11/21/2018.
93. [We're going to Jezero! NASA Selects Jezero Crater Landing Site for Mars 2020 Rover.](#) *The Planetary Society*, 11/20/2018.
94. [Texas A&M Leading \\$1.1 Million NASA-Funded Study Of Mars-Like Icelandic Environments.](#) *Texas A&M Today*, 10/18/2018.
95. [Seeing Mars in a Grain of Sand.](#) *Eos Editor's Vox*, 10/17/2018.
96. [NASA's next Mars rover could explore former mineral springs and a fossil river delta](#), *Science*, 10/10/2018.
97. [To Mars and beyond: How a new Mars rover mission could unlock answers about Earth.](#) *WLFI*, 9/30/2018
98. [If intelligent aliens exist, why haven't we seen them?](#) *Purdue Alumni Magazine*, 8/22/2018.
99. [Mars \(probably\) has a lake of liquid water](#), *Science News*, 7/25/2018
100. [EVPRP social media accounts featuring 31 Purdue women researchers.](#) *Purdue Today*, 3/1/2018.
101. Purdue EVPRP Research Highlights, 1/2018 printing, "Mars"
102. [Purdue research team gearing up for an out-of-this-world experience](#), *WLFI*, 12/12/2017.
103. *Sky and Telescope*, 11/2017 print issue, "The Race to Mars?"
104. [Episode 72: Moonquake.](#) *Titanium Physics Podcast*, 5/1/2017.
105. [Three sites where NASA might retrieve its first Mars rock.](#) *Nature*, 2/10/2017.
106. [Let's talk about this whole Moon vs. Mars thing for human spaceflight.](#) *Planetary Society*, 1/26/2017.
107. [Episode 66: Life on Mars with Zach Weinersmith.](#) *Titanium Physicists Podcast*, 7/20/2016.
108. [Mars 2020 mission: Students survey rover landing sites.](#) *Cornell Daily Sun*, 5/4/2016.

109. [Found: Clues about Volcanoes Under Ice on Ancient Mars](#). *NASA*, 5/3/2016.
110. [At Mars Workshop, Science and Human Spaceflight Find Common Ground](#). *Planetary Society*, 10/29/2015.
111. [Mars has an Indiana connection](#). *Indianapolis Star*, 10/1/2015.
112. [Waterlogged Salts on Mars](#). *Sky and Telescope*, also covered by *WIBC*, *WXIN Fox59*, 9/28/2015
113. [Purdue professor will use an array of colors to study the Red Planet](#). *Purdue News*, also covered by *Phys.org*, *WIBC 10 for 10*, *WFLI News 18*, *Lafayette Journal & Courier*, *Purdue Exponent*, 9/17/2015.
114. [LPSC 2013: Watery martian minerals](#). *Planetary Society*, 3/26/2013.
115. [John Day Fossil Beds could help search for water on Mars](#). *The Oregonian*, 8/10/2012.
116. [Wind may have driven avalanches on Martian dunes](#). *EOS Research Highlights*, 5/28/2012.
117. [Martian Volcanic Glass Could Be Hotspot for Life](#). *Astrobiology Magazine*, 4/26/2012.
118. [Mysteriously dark Mars regions are made of glass](#). *New Scientist*, 4/15/2012.
119. [Martian dark spots reveal heart of glass](#). *Discovery News*, 4/2/2012.

## Professional Service and Outreach

- |              |  |
|--------------|--|
| 2022         | <i>Keynote Speaker</i> , Indiana STEM Education Conference   |
| 2022         | <i>Invited Talks</i> : Purdue Undergraduate Research Association, Indiana 4-H  |
| 2021         | <i>Invited Talks</i> : Rotary Club of Greater Lafayette, Purdue Women's Network, Chicago Astronomical Society, Indiana 4-H         |
| 2021         | <i>Invited Speaker</i> , Planetary Science Decadal Survey Panel on Mars  |
| 2020         | <i>Invited Speaker</i> , Purdue Honors College Visiting Scholars   |
| 2020-present | Association of Women Geoscientists, Central Indiana chapter, <i>Founding Member</i>  |
| 2019-2020    | NASA Mars Strategic Architecture Committee, <i>Invited Member</i>  |
| 2018-present | NASA Mars Exploration Program Analysis Group (MEPAG) <i>Geology Representative, Goals Committee</i>                                |
| 2018         | <i>Organizing Committee</i> , Mars Amazonian Climate Workshop  |
| 2017-2018    | <i>Invited Member</i> , International Mars Sample Return Objectives and Samples Team, International Mars Exploration Working Group |
| 2017         | <i>Invited Study Participant</i> , Keck Institute for Space Studies, Caltech   |
| 2017         | <i>Instructor</i> , Wabash Area Lifetime Learning Association  |
| 2016-2019    | <i>Co-Organizer</i> , LPSC Early Career Planetary Faculty Lunch  |
| 2015-2016    | <i>Organizing Committee</i> , 6 <sup>th</sup> Intl. Mars Polar Conference  |
| 2015-2019    | <i>Member</i> , Mars 2020 PSG Landing Site Working Group   |
| 2015-2016    | <i>Organizing Committee</i> , Biosignature Preservation Workshop   |
| 2014-2015    | <i>Organizing Committee</i> , 4 <sup>th</sup> Intl Planetary Dunes Workshop  |
| 2012-2013    | <i>Organizer</i> , Salt River Pima-Maricopa Indian Community Science Fair  |
| 2011-2012    | <i>Organizing Committee</i> , Third Planetary Dunes Workshop   |
| 2010-present | <i>Review panelist</i> , NASA funding programs, Netherlands Space Office   |
| 2010-2014    | <i>Instructor and Advisor</i> , Mars Student Imaging Program, ASU  |
| 2008-present | <i>Referee</i> , JGR, Astrobiology, Icarus, Nature Geoscience, EPSL, GRL, etc.   |
| 2008         | <i>Organizing Committee</i> , 40 <sup>th</sup> AAS Division of Planetary Science Meeting   |
| 2007-2009    | <i>Initial Contacts Chair</i> , Expanding Your Horizons Youth Conference, Cornell  |
| 2006-2009    | Cornell Graduate and Professional Student Assembly<br><i>Co-founder</i> , Student Advocacy Committee                               |

*Assembly Member* for the Physical Sciences  
*Council of Representatives Member* for the Department of Astronomy  
2007-2008 *Vice President*, Cornell Graduate Women in Physics  
2006-2008 *Chair*, Cornell Department of Astronomy Planetary Lunch Seminar  
2006-2008 *Founding VP and President*, Cornell Astronomy Graduate Network