

December 2019

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Education and Appointments

- 2014-present **Assistant Professor**, Purdue University
- 2013 **Faculty Research Associate**, Arizona State University
- 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

- Surface geology, mineralogy, rover studies, and remote sensing of the terrestrial planets
- Visible, near-infrared, and thermal-infrared spectroscopy
- Mapping and analysis of large hyperspectral datasets
- Planetary analog field studies of weathering, aeolian, volcanic, and glacial processes

NASA Mission Experience

- 2016-present Participating Scientist, Mars Science Laboratory Mission
- 2015-present Co-I, Mastcam-Z imaging investigation, Mars2020 Mission
- 2008-2014 Science Team, THEMIS, Mars Odyssey Mission

Support: Current and Past

- 2021-2024 Co-Investigator, NASA Solar Systems Working Program
Between a rock and a frozen place: Cold-based glacial chemical alteration of volcanic bedrock as an analog for Mars (PI: Dr. Alicia Rutledge)
- 2020-2021 Co-Investigator, NASA Planetary Mission Concepts Studies
Mars Orbiter for Resources, Ice, and Environment (PI: Prof. Wendy Calvin)
- 2020-2023 Co-Investigator, NASA Mars2020 Mission Phase E
Mastcam-Z: A Geologic, Stereoscopic, and Multispectral Investigation for the NASA Mars 2020 Rover Mission (PI: Prof. Jim Bell)
- 2020-2023 Co-Investigator, NASA Lunar Data Analysis Program
Investigating Explosive Volcanic Deposits in the Montes Apenninus area using Moon Mineralogy Mapper Data (PI: Dr. Kristen Bennett)

- 2019-2022 Co-Investigator, NASA Lunar Data Analysis Program
Remote Sensing Investigations of Irregular Mare Patches and Implications for Young Volcanism (PI: Dr. Julie Stopar)
- 2018-2021 Co-Investigator, NASA Planetary Science Through Analog Research Program,
SAND-E: Semi-Autonomous Navigation for Detrital Environments (PI: Prof. Ryan Ewing)
- 2017-2018 Co-Investigator, NASA Planetary Science Deep Space SmallSats Program,
Chariot to the Moons of Mars (PI: Prof. David Minton)
- 2016-2021 Principal Investigator, NASA MSL Participating Scientist Program
Using composition to constrain paleoenvironments and sites of organic preservation in Gale Crater
- 2016-2019 Principal Investigator, NASA Solar System Workings Program
Icy environments on Mars: Investigating Glacial Weathering in Volcanic Terrains
- 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 Investigation for the NASA Mars 2020 Rover Mission (PI: Prof. Jim Bell)
- 2013-2016 Principal Investigator, NASA Mars Data Analysis Program
Investigating the origin and alteration history of north polar sediments with high resolution spectroscopy
- 2012-2015 Co-Investigator, NASA Mars Data Analysis Program
Imaging and spectroscopic studies of the martian surface (PI: Prof. Jim Bell)
- 2012-2013 Mars Odyssey THEMIS Mission Phase E
Compositional and analog studies of Mars (PI: Prof. Phil Christensen)
- 2010-2012 Fellow, Exploration Postdoctoral Fellowship, Arizona State University
Reconstructing ancient surface environments on Mars: Spectral and analog studies
- 2008-2011 Student Co-I, NASA Mars Data Analysis Program
Mineralogic and morphologic studies of Mars and implications of observed water-rock alteration (PI: Prof. Jim Bell)
- 2008-2010 Fellow, NASA Harriet G. Jenkins Pre-doctoral Fellowship
Minerals, ice, and dunes: Signs of water-related processes in the martian north polar basin (Mentor: Dr. Kenneth Tanaka)

Publications

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

1. 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*, accepted.
2. **B. Horgan**, R. Anderson, G. Dromart, E. Amador^P, 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.
3. S. Warren^G, 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.
4. **P. Kinzelman**^U, **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.
5. **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>.
6. J. Lai^G, **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
7. **R. Smith**^P, 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.
8. 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.
9. **A. Rutledge**^P, **B. Horgan**, J. Havig, E. Rampe, **N. Scudder**^G, T. Hamilton (2018) Silica dissolution and precipitation in glaciated volcanic environments, and implications for Mars, *Geophysical Research Letters*, doi: 10.1029/2018GL078105.
10. 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.
11. **S. Ackiss**^{*G}, **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.

12. H. Melosh, J. Kendall*^G, **B. Horgan**, B. Johnson, T. Bowling, P. Lucey, G. Taylor (2017). South Pole-Aitken basin ejecta reveal the Moon's upper mantle, *Geology*, *45*(12), 1063-1066.
13. 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.
14. R. Smith*^G, **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.
15. **B. Horgan**, R. Smith*^G, 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.
16. 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.
17. L. Fenton, J. Bishop, S. King, B. Lafuente*^G, **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.
18. K. Bennett*^G, **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.
19. 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.
20. K. Lynch*^G, **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.
21. **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.
22. 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.
23. **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.
24. **B. Horgan** (2013). Planetary Science: Evolved Magma on Mars (News & Views). *Nature Geoscience*, doi:10.1038/ngeo2010.

25. 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, Flagstaff, Arizona, USA, June 12–15, 2012. *Aeolian Research*, 8, 29-38, doi: 10.1016/j.aeolia.2012.10.006.
26. G. Berard*^U, 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.
27. 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.
28. J. Huang*^G, 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.
29. **B. Horgan**, J. Bell (2012). Widespread weathered glass on the surface of Mars, *Geology*, 40, 391-394, doi: 10.1130/G32755.1.
30. **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.
31. 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
32. **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.
33. 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.
34. M. Kangas, M. Ansmann, K. Copsy, **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. **B. Horgan**, J. Johnson, A. Fraeman, M. Rice, C. Seeger^G, J. Bell, K. Bennett, E. Cloutis, and 10 others. Diagenesis of Vera Rubin ridge, Gale crater, Mars from Mastcam multispectral images, *Journal of Geophysical Research – Planets*, submitted.
2. K. Bennett, F. Rivera-Hernandez, **C. Tinker^U**, **B. Horgan**, D. Fey, C. Edwards, L. Edgsar, R. Kronyak, K. Edgett, A. Fraeman, L. Kah, **M. Henderson^G**, N. Stein, E. Dehouck, A.

- Williams, Extensive diagenesis revealed by fine-scale features at Vera Rubin ridge, Gale crater, Mars, *Journal of Geophysical Research – Planets*, submitted.
3. 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, Synergistic ground and orbital observations of iron oxides on Mt. Sharp and Vera Rubin ridge, *Journal of Geophysical Research – Planets*, submitted.
 4. S. Jacob^G, D. Wellington, J. Bell, C. Achilles, A. Fraeman, G. Peters, J. Johnson, **B. Horgan**, E. Rampe, L. Thompson, R. Wiens, S. Maurice, Spectral, Compositional, and Physical Properties of the Upper Murray Formation and Vera Rubin Ridge, Gale Crater, Mars, *Journal of Geophysical Research – Planets*, submitted.
 5. J. L'Haridon, N. Mangold, A. Fraeman, J. Johnson, A. Cousin, W. Rapin, 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, Iron Mobility during Diagenesis as Observed by ChemCam at the Vera Rubin Ridge, Gale Crater, Mars, *Journal of Geophysical Research – Planets*, submitted.
 6. M. Yant^G, A. D. Rogers, **B. Horgan**, Spectral Evidence for Widespread Acid-Altered Surfaces in Acidalia Planitia, Mars, *Journal of Geophysical Research - Planets*, submitted.
 7. **S. Ackiss^G**, **B. Horgan**, **N. Scudder^G**, J. Gudnason, **R. Smith^P**, C. Haberle, T. Thorsteinnsson, The composition and crystallinity of Icelandic palagonites: An analog study for Mars, *Journal of Geophysical Research - Planets*, submitted.
 8. **M. Henderson^G**, **B. Horgan**, M. Rowe, K. Wall. Determining the eruption style of explosive volcanic eruptions from spectroscopy of tephra deposits. *Earth & Space Sciences*, submitted.
 9. 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, The holy grail: A strategy for unlocking the climate record stored within Mars' polar layered deposits, *Icarus*, submitted.
 10. J. Bishop, C. Gross, J. Danielson, M. Parente, S. Murchie, **B. Horgan**, J. Wray, C. Viviano, B. Ehlmann, F. Seelos, Multiple mineral horizons in layered outcrops at Mawrth Vallis, Mars, signify changing geochemical environments on early Mars, *Icarus*, in revision.
 11. N. Balci, Y. Gunes, J. Kaiser, S. Acker, K. Edis, **B. Garczynski^G**, **B. Horgan**, Biotic and abiotic imprints on Mg-rich stromatolites: lessons from Lake Salda, SW Turkey, *Biogeosciences*, in revision.
 12. 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, No olivine-rich mantle material has been detected by Chang'E-4 in-situ observation, *Geology*, in revision.
 13. **R. Smith^P**, **B. Horgan**. Nano-scale variations in the composition and crystallinity of X-ray amorphous materials in rocks and sediments, *American Mineralogist*, submitted.

Selected Conference Proceedings (Non-Refereed)

1. Horgan B, Rampe E, Rutledge A, Scudder N & Graly J (2019), Was Ancient Mars Warm and Wet or Cold and Icy? Mineral Signatures of Climate in Rover, Orbiter, and Terrestrial Analog Studies, *Goldschmidt*, invited.

2. Horgan, B., Anderson, R., Dromart, G., Amador, E., Rice, M. (2019) Possible Lacustrine Carbonates in Jezero Crater: Implications for Mars 2020 and Mars Sample Return, *9th Intl. Conf on Mars*, #6443.
3. B. Horgan, Fraeman A., Johnson J. R., Thompson L., et al. (2019) Redox Conditions During Diagenesis in the Vera Rubin Ridge, Gale Crater, Mars, from Mastcam Multispectral Images, *Lunar and Planetary Science Conference*, abstract #1424.
4. B. Horgan, P. Sinha, B. Howl, M. McBride (2018) Impact spherules as a source of sand on Amazonian Mars. *GSA Annual Meeting*, #15-4.
5. B. Horgan, P. Sinha, F. Seelos (2018) Volcanic soils and sediments within the North Polar Layered Deposits on Mars and implications for quantitative climate records, *Mars Workshop on Amazonian and Present Day Climate*, #4039.
6. B Horgan, R. Smith, O. Chadwick, G. Retallack, E. Noe Dobrea, P. Christensen (2018) The effects of climate, environment, and diagenesis on the spectral properties of volcanic soils, *55th Annual Clay Minerals Society Meeting*.
7. B. Horgan, R. Anderson, S. Ruff (2018) The nature, origin, and importance of carbonate-bearing terrains for Mars 2020 and Mars Sample Return, *2nd International Conference on Mars Sample Return*, #6113.
8. B. Horgan, R. Anderson (2018) Possible lacustrine carbonates in Jezero crater, Mars – A candidate Mars 2020 landing site, *LPSC 49*, #1749.
9. B. Horgan, M. S. Rice, A. Fraeman, D. Wellington, J. R. Johnson, V. Fox, R. Arvidson, J. F. Bell III (2017) Constraints on aqueous environments for hematite formation in Gale Crater from Mastcam and CRISM spectra, *AGU Fall Meeting*.
10. B. Horgan, L. Baker, J. Carter, and O. Chadwick (2017) Where is the climate signature in the mineral record of early Mars?, *4th Conference on Early Mars*, #3077.
11. B. Horgan, R. Smith, O. Chadwick, G. Retallack, E. Noe Dobrea, P. Christensen (2017) The effects of climate, environment, and diagenesis on the spectral properties of volcanic soils, *GSA Cordilleran Section Meeting*, #292837.
12. B. Horgan, A. Fraeman, M. Rice, J. Bell III, D. Wellington, J. Johnson (2017) New constraints from CRISM and Mastcam spectra on the mineralogy and origin of Mt. Sharp geologic units, Gale crater, Mars, *LPSC 48*, #3021.
13. B. Horgan (2017) Origin and astrobiological potential of ancient surface and subsurface environments at Mawrth Vallis. *3rd Mars 2020 Landing Site Workshop*.
14. B. Horgan, A. Rutledge, N. Scudder, and E. Rampe (2016). Glacial and periglacial chemical weathering on Mars. *6th Intl Conference on Mars Polar Science and Exploration*, abstract #6113.
15. B. Horgan (2016). Strategies for searching for biosignatures in ancient martian sub-aerial surface environments. *Biosignature Preservation and Detection in Mars Analog Environments*, abstract #2032.
16. B. Horgan, D. Loizeau, F. Poulet, J. Bishop, and 7 others (2015). Habitable Noachian Environments and Abundant Resources in the Mawrth Vallis Exploration Zone. *1st EZ Workshop for Human Missions to Mars*, abstract #1009.

17. B. Horgan (2015). Evaluating a weathering origin for phyllosilicates in ancient sediments on Mars: Spectral characteristics and clay mineralogy of a terrestrial paleosol sequence. *AGU Fall Meeting*, #P23C-07 (invited).
18. B. Horgan, K. Bennett, L. Gaddis, B. Greenhagen, C. Allen, P. Hayne, J. Bell, D. Paige (2015). Complex Explosive Volcanic Activity on the Moon in Oppenheimer Crater. *AGU Fall Meeting*, #P31H-03.
19. B. Horgan, A. Rutledge, and E. Rampe (2015). Clay mineralogy and crystallinity as a climatic indicator: Evidence for both cold and temperate conditions on early Mars. *LPSC 46*, #2923.
20. B. Horgan, M. Rice, and S. Ackiss (2015). Constraints on the formation and alteration history of Mt. Sharp, Gale Crater, Mars from a new CRISM mineral map. *LPSC 46*, #2943.
21. B. Horgan (2014). Evidence for habitable surface environments in soils on early Mars. *AGU Fall Meeting*, #P32A-06.
22. B. Horgan, J. Bishop, A. Fraeman, W. Farrand (2014). Plateau wetlands at Mawrth Vallis and possible implications for clay and oxide layers in Gale Crater. *8th Int'l Conference on Mars*, #1276.
23. B. Horgan, F. Seelos (2014) Constraints on the geologic and aqueous history of the north polar region of Mars from the mineralogy of north polar sediments. *LPSC 45*, #2158.
24. B. Horgan, M. Chojnacki, J. Lai, K. Bennet, J. Bell (2013). Remote identification of pyroclastic deposits on Mars and the Moon with near-infrared spectroscopy. *AGU Fall Meeting*, #V53C-2816.
25. B. Horgan, J. A. Kahmann-Robinson, J. Bishop, P. Christensen (2013). Climate change and a sequence of habitable ancient surface environments preserved in pedogenically altered sediments at Mawrth Vallis, Mars. *LPSC 44*, #3059.
26. B. Horgan, R. Smith, P. Mann, J. Stromberg, E. Cloutis, P. Christensen, J. Bell (2013). New evidence for a weathering origin for the high-silica component of TES Surface Type 2 on Mars. *LPSC 44*, #3032.
27. B. Horgan, M. Chojnacki, J. Lai, D. Clarke, J. Joseph, and J. Bell (2012). Widespread explosive volcanism on Mars inferred from the global distribution of glass-rich sediments (2012). *GSA 2012*, #208781, *invited*.
28. B. Horgan, J. Farmer, P. Christensen (2011). Soils, soil formation, and paleosols on Mars: Habitability and organic preservation, *Exploring Mars Habitability*, #2186130.
29. B. Horgan, P. Mann, J. Stromberg, E. Cloutis (2011). Acid alteration of basalts: Near-IR spectra and implications for martian soil formation, *LPSC XLII*, #2415.
30. B. Horgan, J. Bell. (2010). New insights into aqueous processes within martian high latitude soils, *AGU 2010*, #P52B-06.
31. B. Horgan, J. Bell, M. Bourke (2010). Ice and sulfate induration in the martian north polar sand sea" *2nd Intl. Planetary Dunes Workshop*, #2023.

Invited Talks

- 2020 Apr. University of Notre Dame, Physics Colloquium, South Bend, IN
Apr. Ball State University, Env. Geo. Nat. Res. Colloquium, Muncie, IN
Aug. COSPAR 2020, Invited Speaker, Sydney, Australia
- 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 5th 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. [Mars 2020 will search for microscopic fossils, JPL Press Release](#), 11/12/2019.

2. [How long was Mars wet?](#), *Planetary Radio*, 10/23/2019.
3. [The role of a Turkish lake in an EAPS student's Mars research](#), *EAPS Newsletter*, 9/12/2019.
4. [EAPS graduate student awarded NASA fellowship for Mars research](#), *EAPS Newsletter* 9/12/2019
5. [EAPS graduate student investigating Gale crater on Mars](#), *EAPS Newsletter*, 9/4/2019.
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Awards and Honors

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

Teaching Experience

2014-present	Faculty Instructor , Purdue University <i>Curriculum coordinator for Planetary Science major.</i> <i>Primary courses: EAPS 556, "Planetary Geology", EAPS 105, "The Planets"; EAPS 577 "Remote Sensing of the Planets".</i>
2014-present	Advisor for Undergraduate and Graduate Students , Purdue University
2009	Field trip leader , Cornell University <i>Astro 577, "Planetary Surface Processes"</i>
2005-2006	Graduate Teaching Assistant , Cornell University <i>Astro 102, "Our Solar System"; Astro 310, "Planetary Image Processing"</i>
2003-2005	Undergraduate Teaching Assistant, Oregon State University <i>Physics 427, "Paradigm: Periodic Systems"; Physics 423, "Paradigm: Energy & Entropy"; Physics 211, "General Physics w/ Calculus"; Physics 201, "General Physics"</i>
2003-2005	Physics Department Tutor , Oregon State University

Students and Postdocs Mentored

Postdocs	Rebecca Smith (Postdoc at Stony Brook University) Alicia Rutledge (Faculty Research Associate at Northern Arizona University)
PhD	2023 James Haber, Amanda Rudolph, Brad Garzcynski 2022 Prakhar Sinha <i>NASA FINESST Fellow</i> 2020 Marie McBride <i>NSF Fellow, Amelia Earhart Fellow</i> 2020 Noel Scudder <i>NASA Earth & Space Sci. Fellow, EAPS Andrews Fellow</i> 2018 Sheridan Ackiss <i>NASA Earth & Space Sci. Fellow, Purdue Doctoral Fellow</i>
MS	2018 Prakhar Sinha (Aeronautical and Astronautical Engineering)
BS	2020 Connor Tinker, Adam Lechowicz, Phoebe Kinzelman, Madeson Van Buskirk, Rebecca Carmack 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: Ya-Huei Huang (EAPS PhD 2018), Andy Hesselbrock (EAPS PhD 2018), Jordan Hill (IE PhD 2020), Zhong Tai (AAE MS 2020), Jake Elliott (EAPS PhD 2021), Carlisle Wishard (EAPS PhD 2022)

Professional Service and Outreach

- 2019-present NASA Mars Strategic Architecture Committee, Invited Member
- 2018-present NASA Mars Exploration Program Analysis Group (MEPAG)
Geology Representative, Goals Committee
- 2018 Organizing Committee, Mars Amazonian Climate Workshop
- 2017-2018 Invited Member, International Mars Sample Return Objectives and Samples Team, International Mars Exploration Working Group
- 2017 Invited Study Participant, Keck Institute for Space Studies, Caltech
- 2017 Instructor, Wabash Area Lifetime Learning Association
- 2016-present Co-Organizer, LPSC Early Career Planetary Faculty Lunch
- 2015-2016 Organizing Committee, 6th Intl. Mars Polar Conference
- 2015-2019 Member, Mars 2020 PSG Landing Site Working Group
- 2015-2016 Organizing Committee, Biosignature Preservation Workshop
- 2014-2015 Organizing Committee, 4th Intl Planetary Dunes Workshop
- 2012-2013 Organizer, Salt River Pima-Maricopa Indian Community Science Fair
- 2011-2012 Organizing Committee, Third Planetary Dunes Workshop
- 2010-present Review panelist, NASA funding programs, Netherlands Space Office
- 2010-2014 Instructor and Advisor, Mars Student Imaging Program, ASU
- 2008-present Referee, *JGR*, *Astrobiology*, *Icarus*, *Nature Geoscience*, *EPSL*, *GRL*
- 2008 Organizing Committee, 40th AAS Division of Planetary Science Meeting
- 2007-2009 Initial Contacts Chair, Expanding Your Horizons Youth Conference, Cornell
- 2006-2009 Cornell Graduate and Professional Student Assembly
Co-founder, 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