

Curriculum Vitae – James J. Wray

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Employment:

- **Associate Professor of Earth and Atmospheric Sciences, Georgia Institute of Technology, 2017 – Present**
- Assistant Professor of Earth and Atmospheric Sciences, Georgia Institute of Technology, 2011 – 2017
- Postdoctoral Associate, Cornell University and NASA Jet Propulsion Laboratory, 2010 – 2011
 - Mars aqueous mineralogy and stratigraphy w/ Steve Squyres (Cornell)
 - Europa and Mars icy surface spectral studies w/ Kevin Hand (JPL)
- Hertz and NSF Graduate Research Fellow, Cornell University, 2006 – 2010
- NASA Academy Research Associate, Goddard Space Flight Center, summer 2006
 - Pre-phase A mission design (Enceladus Astrobiology & Geophysics Landing Expedition)
 - Electromagnetic modeling and testing of millimeter-wave detectors for space-based astrophysics
- NSF REU Student (w/ Michael Liu), Institute for Astronomy, University of Hawaii-Manoa, summer 2005
 - Identified planetesimal debris disks around nearby low-mass stars (K and M dwarfs)
 - Observed candidates at Keck 2 (NIRC-2) and Caltech Submillimeter Observatory (heterodyne)

Education:

- **Ph.D., Cornell University, 2010** (Astronomy with Geology Minor)
 - Dissertation (w/ Squyres): “High-resolution studies of aqueous environments on ancient Mars”
- **A.B., Princeton University, *summa cum laude*, 2006** (Major: Astrophysics; Minor: Engineering Physics)
 - Senior Thesis (w/ Ed Turner): “High-Dispersion Spectroscopy of Europa and Enceladus: Probing the Tenuous Atmospheres of Active Icy Moons”
- Agouron Institute Geobiology Field Course, July 2013 (Belt Supergroup rocks, Montana & Idaho, USA)

Awards/Honors:

- Georgia Tech Early Career Research Award, 2018
- Georgia Tech Sigma Xi Young Faculty Award, 2015
- Cranson W. and Edna B. Shelley Award for Graduate Research in Astronomy, Cornell University, 2010
- Fannie & John Hertz Foundation Fellowship, 2006 – 2010
- NSF Graduate Research Fellowship, 2006 – 2010
- NASA Group Achievement Awards: MSL SAM science team (2013), HiRISE science team (2011), MER 3rd + 4th Extended Mission (2008)
- Gerald Soffen Leadership Award, GSFC NASA Academy, 2006
- Sigma Xi Book Award for Astrophysical Sciences, Princeton University, 2006
- National Merit Scholar, 2002
- US National Chemistry Olympiad Finalist, 2002

Current Research Grants:

- Principal Investigator, NASA Outer Planets Research 2013, “Icy Satellite Surface Compositions from Thermal Infrared Spectroscopy” (\$329k over FY14–18)
- Co-Investigator, High-Resolution Imaging Science Experiment (HiRISE) and Compact Reconnaissance Imaging Spectrometer for Mars (CRISM), Mars Reconnaissance Orbiter (\$420k to JJW over FY13–18)
- Co-Investigator, Colour and Stereo Surface Imaging System (CaSSIS) on the ExoMars Trace Gas Orbiter (\$90k to JJW over FY17-18)
- Co-Investigator, NASA Astrobiology Institute Cycle 7, “Changing Planetary Environments & the Fingerprints of Life” (PI Nathalie Cabrol; \$182k to JJW over FY15–19)

Selected Invited Talks:

- Simons Foundation Lecture, Flatiron Institute, New York City (11/2017)
- Colloquium, Department of Geology, University of Georgia (9/2016)
- Astrophysics Colloquium *and* Solid Earth Brown Bag Seminar, Princeton University (3/2016)
- Colloquium, Department of Geosciences, Georgia State University (10/2015)
- Colloquium, Department of Geology, University of Georgia (9/2014)
- Klepser Seminar, Department of Earth & Planetary Sciences, University of Tennessee-Knoxville (1/2014)

- Wilbert Lecture, Department of Geology & Geophysics, Louisiana State University (9/2013)
- Kliegel Lecture in Planetary Science, California Institute of Technology (6/2013)
- Geology Department Colloquium, Auburn University (4/2013)
- Seminar, School of Earth and Atmospheric Sciences, Georgia Institute of Technology (3/2010)
- Seminar, School of Earth and Space Exploration, Arizona State University (3/2010)
- *Workshop on Methane on Mars*, Frascati, Italy (11/2009)
- Planetology Seminar, Universität Bern, Switzerland (11/2009)
- *Third Mars Science Laboratory Landing Site Workshop*, Pasadena, CA (9/2008)

Other Activities:

- Past Chair, Planetary Geology Division of the Geological Society of America, 2017-Present
 - Chair, 2016-17; 1st Vice Chair, 2015-16; 2nd Vice Chair, 2014-15; Secretary-Treasurer, 2013-14
- Collaborator, Sample Analysis at Mars (SAM) on the Mars Science Laboratory; Mars Exploration Rovers
- Co-Investigator, HabitAbility, Brine Irradiation and Temperature (HABIT) on ExoMars Surface Platform
- Member, MEPAG “Next Orbiter” Science Analysis Group (NEX-SAG)
- Member, MEPAG Science Analysis Group “Review of Potential Habitats on Mars: Special Regions Definitions, Locations, and Resource Relationships” (SR-SAG2)
- Manuscript Referee for *Nature Geosci.*, *Science Advances*, *Geology* (x2), *Geophys. Res. Lett.* (x9), *J. Geophys. Res.* (x8), *Icarus* (x12), *Planet. Space Sci.* (x2), *Earth Planet. Sci. Lett.* (x2), *Am. Mineral.*, *Int. J. Astrobiol.*, *MNRAS*
- Associate Editor for *JGR-Planets* special issue “New Results on the Geology, Atmosphere, and Satellites of Mars from OMEGA and CRISM”
- Group Chief, Panelist, or External Reviewer for NASA Mars Fundamental Research, Mars Data Analysis, Moon & Mars Analog Missions Activities, Outer Planets Research, Solar System Workings, Planetary Science and Technology through Analog Research, Maturation of Instruments for Solar System Exploration, Planetary Science Deep Space SmallSat Studies, and Cassini Data Analysis and Participating Scientists Programs; and multiple NASA mission AOs (2009–2017)
- Member, Science Organizing Committee, Astrobiology Science Conference 2015-Chicago, 2012-Atlanta
- Member, Joint Technical Program Committee, GSA Annual Meeting 2017-Seattle, 2016-Denver, 2015-Baltimore
- Member, Program Committee, Lunar & Planetary Science Conference 2015, Houston, TX
- Member, Local Organizing Committee, and Chair, Posters Subcommittee, DPS 2008, Ithaca, NY
- Session Convener at GSA 2017, 2014, 2012, AGU 2017, 2014, 2011, AbSciCon 2015, 2012, CMS 2016
- Session Chair at LPSC 2017, 2011, DPS 2014, 2010, 2008

Teaching/Advising at Georgia Tech:

- EAS 4370/6370: “Physics of Planets,” Fall 2011, Fall 2012, Fall 2014, Fall 2016
- EAS 4803/8803-JW: “Land Remote Sensing,” Fall 2013, Fall 2015, Fall 2017
- EAS 4803/8803-JW/YT: “Earth and Planetary Materials,” Spring 2013, Spring 2015, Spring 2017
- EAS 8802-JW: “Seminal Papers in Astrobiology,” Spring 2014
- *Postdoctoral Fellows Cindy Young (Spring 2015–Fall 2016), Kennda Lynch (Fall 2016–Present)*
- *Ph.D. student Lujendra Ojha (NSF Graduate Research Fellow), Fall 2012–Summer 2016*
- *Ph.D. student Mary Beth Wilhelm (GT President’s & NSF Graduate Research Fellow), Fall 2012–2017*
- *Ph.D. student George McDonald (NDSEG Fellow), Fall 2014–Present*
- *Ph.D. student Gabriel Eggers (GT President’s Fellow), Fall 2014–Present*
- *Ph.D. student Angela Dapremont (NSF Graduate Research Fellow), Fall 2016–Present*
- *Ph.D. student Alexander Sessa, Spring 2017–Present (previously advised M.S., Fall 2015–Fall 2016)*
- *B.S. students Sheridan Ackiss (Fall 2011–Fall 2012), S. J. Ralston (2012–2014), Jiawei Li (Fall 2013–Fall 2014), Sergio Parra (Fall 2015–Present), Lauren Kimbrough (Summer 2016–Present)*

Refereed Publications: (Wray group indicated by *) — h-index = 38 (Google Scholar)

66. H. T. Chilton, B. E. Schmidt, K. Duarte, K. L. Ferrier, K. H. G. Hughson, J. E. C. Scully, **J. J. Wray**, H. G. Sizemore, A. Nathues, T. Platz, N. Schorghofer, P. M. Schenk, M. E. Landis, M. Bland, S. Byrne, C. T. R. Russell, and C. A. Raymond. “Landslides on Ceres: Inferences into ice content and layering in the upper crust.” Submitted (4/2018).
65. C. Huber, L. Ojha*, and **J. J. Wray**. “The nature of recurring slope lineae on Mars: Dry or wet gravity currents?” Submitted (3/2018).
64. C. L. Young*, M. J. Poston, **J. J. Wray**, K. P. Hand, and R. W. Carlson. “The mid-IR spectral effects of darkening agents and porosity on the silicate surface features of airless bodies. In revision (3/2018).

63. L. Ojha*, S. L. Murchie, M. Massé, A. S. McEwen, C. Dundas, **J. J. Wray**, M. B. Wilhelm*, and J. Hanley. “Oxychlorine salts in the northern mid-latitudes of Mars: Implications for ice stability and habitability.” In revision (3/2018).
62. M. B. Wilhelm*, A. F. Davila, M. N. Parenteau, L. L. Jahnke, M. Abate, G. Cooper, E. T. Kelly, V. Parro García, M. G. Villadangos, Y. Blanco, B. Glass, **J. J. Wray**, J. L. Eigenbrode, R. E. Summons, and K. Warren-Rhodes. “Constraints on the metabolic activity of microorganisms in Atacama surface soils inferred from refractory biomarkers: Implications for Martian habitability and biomarker detection.” *Astrobiology*, in press.
61. S. Ackiss, B. Horgan, F. Seelos, W. Farrand, and **J. Wray**. “Mineralogic evidence for subglacial volcanism in the Sisyphi Montes region of Mars.” *Icarus*, in press, doi:10.1016/j.icarus.2018.03.026.
60. R. P. Irwin III, **J. J. Wray**, S. C. Mest, and T. A. Maxwell (2018). “Wind-eroded crater floors and intercrater plains, Terra Sabaea, Mars.” *J. Geophys. Res. Planets* 123, 445–467.
59. L. L. Tornabene, and 23 coauthors including **J. J. Wray** (2018). “Image simulation and assessment of the colour and spatial capabilities of the Colour and Stereo Surface Imaging System (CaSSIS) on the ExoMars Trace Gas Orbiter.” *Space Sci. Rev.* 214, 18.
58. C. M. Dundas, A. M. Bramson, L. Ojha*, **J. J. Wray**, M. T. Mellon, S. Byrne, A. S. McEwen, N. E. Putzig, D. Viola, S. Sutton, E. Clark, and J. W. Holt (2018). “Exposed subsurface ice sheets in the Martian mid-latitudes.” *Science* 359, 199–201.
57. L. Ojha*, M. Chojnacki, G. D. McDonald*, A. Shumway*, M. J. Wolff, M. D. Smith, A. S. McEwen, K. Ferrier, C. Huber, **J. J. Wray**, and A. Toigo (2017). “Seasonal slumps in Juventae Chasma, Mars.” *J. Geophys. Res. Planets* 122, 2193–2214.
56. N. Thomas, and 60 coauthors including **J. J. Wray** (2017). “The Colour and Stereo Surface Imaging System (CaSSIS) for the ExoMars Trace Gas Orbiter.” *Space Sci. Rev.* 212, 1897–1944.
55. P. Brož, E. Hauber, **J. J. Wray**, and G. Michael (2017). “Amazonian volcanism inside Valles Marineris on Mars.” *Earth Planet. Sci. Lett.* 473, 122–130.
54. J. S. Méndez Harper, G. D. McDonald*, J. Dufek, M. J. Malaska, D. M. Burr, A. G. Hayes, J. McAdams, and **J. J. Wray** (2017). “Electrification of sand on Titan and its influence on sediment transport.” *Nature Geosci.* 10, 260–265. (*Nature Research Highlight*, 30 March 2017)
53. D. Susko, S. Karunatillake, G. Kodikara, J. R. Skok, **J. Wray**, J. Heldmann, A. Cousin, and T. Judice (2017). “Rapid magmatic evolution of a major Martian volcanic province.” *Scientific Reports* 7, 43177.
52. M. B. Wilhelm*, A. F. Davila, J. L. Eigenbrode, M. N. Parenteau, L. L. Jahnke, X.-L. Liu, R. E. Summons, **J. J. Wray**, B. N. Stamos, S. S. O’Reilly, and A. Williams (2017). “Xeropreservation of functionalized lipid biomarkers in hyperarid soils in the Atacama Desert.” *Org. Geochem.* 103, 97–104.
51. B. L. Ehlmann, and 46 coauthors including **J. J. Wray** (2016). “The sustainability of habitability on terrestrial planets: Insights, questions, and needed measurements from Mars for understanding the evolution of Earth-like worlds.” *J. Geophys. Res. Planets* 121, 1927–1961.
50. S. Karunatillake, **J. J. Wray**, O. Gasnault, S. M. McLennan, A. D. Rogers, S. W. Squyres, W. V. Boynton, J. R. Skok, N. E. Button, and L. Ojha* (2016). “The association of hydrogen with sulfur on Mars across latitudes, longitudes, and compositional extremes.” *J. Geophys. Res. Planets* 121, 1321–1341.
49. B. L. Ehlmann, G. A. Swayze, R. E. Milliken, J. F. Mustard, R. N. Clark, S. L. Murchie, G. N. Breit, **J. J. Wray**, B. Gondet, F. Poulet, J. Carter, W. M. Calvin, W. M. Benzel, and K. D. Seelos (2016). “Discovery of alunite in Cross Crater, Terra Sirenum, Mars: Evidence for acidic, sulfurous waters.” *Am. Mineral.* 101, 1527–1542. (*Featured in Highlights and Breakthroughs*, Vol. 101, pp. 1499–1500)
48. **J. J. Wray**, S. L. Murchie, J. L. Bishop, B. L. Ehlmann, R. E. Milliken, M. B. Wilhelm*, K. D. Seelos, and M. Chojnacki (2016). “Orbital evidence for more widespread carbonate-bearing rocks on Mars.” *J. Geophys. Res. Planets* 121, 652–677. (*JGR-Planets Editor’s Highlight and Cover Story*, Vol. 121, Issue 4)
47. V. Sautter, M. J. Toplis, P. Beck, N. Mangold, R. Wiens, P. Pinet, A. Cousin, S. Maurice, L. LeDeit, R. Hewins, O. Gasnault, C. Quantin, O. Forni, H. Newsom, P.-Y. Meslin, **J. Wray**, N. Bridges, and V. Payré (2016). “Magmatic complexity on early Mars as seen through a combination of orbital, *in-situ* and meteorite data.” *Lithos* 254–255, 36–52.
46. G. Komatsu, C. H. Okubo, **J. J. Wray**, L. Ojha*, M. Cardinale, A. Murana, R. Orosei, M. A. Chan, J. Ormö, and R. Gallagher (2016). “Small edifice features in Chryse Planitia, Mars: Assessment of a mud volcano hypothesis.” *Icarus* 268, 56–75.
45. L. Ojha*, M. B. Wilhelm*, S. L. Murchie, A. S. McEwen, **J. J. Wray**, J. Hanley, M. Massé, and M. Chojnacki (2015). “Spectral evidence for hydrated salts in recurring slope lineae on Mars.” *Nature Geosci.* 8, 829–832. (*Highest Altimetric score ever in Nature Geoscience*: <http://www.altmetric.com/details/4561706#score>)
44. C. L. Young*, **J. J. Wray**, R. N. Clark, J. R. Spencer, D. E. Jennings, K. P. Hand, M. J. Poston, and R. W. Carlson (2015). “Silicates on Iapetus from Cassini’s Composite Infrared Spectrometer.” *Astrophys. J. Lett.* 811, L27.

43. V. Sautter, and 25 coauthors including **J. J. Wray** (2015). “*In situ* evidence for continental crust on early Mars.” *Nature Geosci.* 8, 605–609.
42. F. J. Martín-Torres, and 24 coauthors including **J. Wray** (2015). “Transient liquid water and water activity at Gale crater on Mars.” *Nature Geosci.* 8, 357–361. (***Nature Geoscience Cover Story***, Vol. 8, Issue 5)
41. R. E. Arvidson, J. F. Bell III, J. G. Catalano, B. C. Clark, V. K. Fox, R. Gellert, J. P. Grotzinger, E. A. Guinness, K. E. Herkenhoff, A. H. Knoll, M. G. A. Lapotre, S. M. McLennan, D. W. Ming, R. V. Morris, S. L. Murchie, K. E. Powell, M. D. Smith, S. W. Squyres, M. J. Wolff, and **J. J. Wray** (2015). “Mars Reconnaissance Orbiter and Opportunity observations of the Burns Formation: Crater-hopping at Meridiani Planum.” *J. Geophys. Res. Planets* 120, 429–451.
40. J. C. Stern, and 23 coauthors including **J. J. Wray** (2015). “Evidence for indigenous nitrogen in sedimentary and aeolian deposits from the Curiosity rover investigations at Gale crater, Mars.” *Proc. Natl. Acad. Sci. U.S.A.* 112, 4245–4250.
39. C. M. Weitz, E. Noe Dobrea, and **J. J. Wray** (2015). “Mixtures of clays and sulfates within deposits in western Melas Chasma, Mars.” *Icarus* 251, 291–314.
38. P. R. Mahaffy, and 27 coauthors including **J. J. Wray** (2015). “The imprint of atmospheric evolution in the D/H of Hesperian clay minerals on Mars.” *Science* 347, 412–414.
37. S. Karunatillake[^], **J. J. Wray**[^], O. Gasnault, S. M. McLennan, A. D. Rogers, S. W. Squyres, W. V. Boynton, J. R. Skok, L. Ojha*, and N. Olsen (2014). “Sulfates hydrating bulk soil in the martian low and mid-latitudes.” *Geophys. Res. Lett.* 41, 7987–7996. (***GRL Editor’s Highlight***)
([^] listed as equal contributors)
36. J. D. Rummel, and 24 coauthors including **J. J. Wray** (2014). “A new analysis of Mars ‘Special Regions’: Findings of the Second MEPAG Special Regions Science Analysis Group (SR-SAG2).” *Astrobiology* 14, 887–968. (***Astrobiology Cover Story***, Vol. 14, Issue 11)
35. S. E. Ackiss* and **J. J. Wray** (2014). “Occurrences of possible hydrated sulfates in the southern high latitudes of Mars.” *Icarus* 243, 311–324.
34. A. C. McAdam, and 24 coauthors including **J. J. Wray** (2014). “Sulfur-bearing phases detected by evolved gas analysis of the Rocknest aeolian deposit, Gale Crater, Mars.” *J. Geophys. Res. Planets* 119, 373–393. (***JGR-Planets Cover Story***, Vol. 119, Issue 2)
33. P. D. Archer Jr., and 20 coauthors including **J. J. Wray** (2014). “Abundances and implications of volatile-bearing species from Evolved Gas Analysis of the Rocknest aeolian deposit, Gale Crater, Mars.” *J. Geophys. Res. Planets* 119, 237–254.
32. M. Chojnacki, D. M. Burr, J. E. Moersch, and **J. J. Wray** (2014). “Valles Marineris dune sediment provenance and pathways.” *Icarus* 232, 187–219. (***Icarus Cover Story***, Vol. 232)
31. L. Ojha*, A. McEwen, C. Dundas, S. Byrne, S. Mattson, **J. Wray**, M. Masse, and E. Schaefer (2014). “HiRISE observations of Recurring Slope Lineae (RSL) during southern summer on Mars.” *Icarus* 231, 365–376.
30. D. W. Ming, and 57 coauthors including **J. J. Wray** (2014). “Volatile and Organic Compositions of Sedimentary Rocks in Yellowknife Bay, Gale Crater, Mars.” *Science* 343, 1245267. (***Science Cover Story***, Vol. 343, Issue 6169)
29. A. S. McEwen, C. M. Dundas, S. S. Mattson, A. D. Toigo, L. Ojha*, **J. J. Wray**, M. Chojnacki, S. Byrne, S. L. Murchie, and N. Thomas (2014). “Recurring slope lineae in equatorial regions of Mars.” *Nature Geosci.* 7, 53–58. (***Nature Geoscience Cover Story***, Vol. 7, Issue 1)
28. L. Ojha*, **J. J. Wray**, S. L. Murchie, A. S. McEwen, M. J. Wolff, and S. Karunatillake (2013). “Spectral constraints on the formation mechanism of recurring slope lineae.” *Geophys. Res. Lett.* 40, 5621–5626.
27. **J. J. Wray**, S. T. Hansen*, J. Dufek, G. A. Swayze, S. L. Murchie, F. P. Seelos, J. R. Skok, R. P. Irwin III, and M. S. Ghiorso (2013). “Prolonged magmatic activity on Mars inferred from the detection of felsic rocks.” *Nature Geosci.* 6, 1013–1017.
26. L. A. Leshin, and 34 coauthors including **J. J. Wray** (2013). “Volatile, Isotope and Organic Analysis of Martian Fines with the Mars Curiosity Rover.” *Science* 341, 1238937. (***Science Cover Story***, Vol. 341, Issue 6153)
25. L. L. Tornabene, G. R. Osinski, A. S. McEwen, **J. J. Wray**, M. A. Craig, H. M. Sapers, and P. R. Christensen (2013). “An impact origin for hydrated silicates on Mars: A synthesis.” *J. Geophys. Res. Planets* 118, 994–1012.
24. **J. J. Wray** (2013). “Gale crater: the Mars Science Laboratory/Curiosity Rover Landing Site” (Invited Review). *Int. J. Astrobiol.* 12, 25–38.
23. E. Z. Noe Dobrea, **J. J. Wray**, F. J. Calef III, T. J. Parker, and S. L. Murchie (2012). “Hydrated minerals on Endeavour Crater’s rim and interior, and surrounding plains: New insights from CRISM data.” *Geophys. Res. Lett.* 39, L23201.
22. P. R. Mahaffy, and 84 coauthors including **J. Wray** (2012). “The Sample Analysis at Mars Investigation and Instrument Suite.” *Space Sci. Rev.* 170, 401–478.

21. A. S. McEwen, L. Ojha, C. M. Dundas, S. S. Mattson, S. Byrne, **J. J. Wray**, S. C. Cull, S. L. Murchie, N. Thomas, and V. C. Gulick (2011). “Seasonal Flows on Warm Martian Slopes.” *Science* 333, 740–743.
20. M. S. Rice, J. F. Bell III, E. A. Cloutis, **J. J. Wray**, K. E. Herkenhoff, R. Sullivan, J. R. Johnson, and R. B. Anderson (2011). “Temporal observations of bright soil exposures at Gusev crater, Mars.” *J. Geophys. Res.* 116, E00F14.
19. **J. J. Wray** and B. L. Ehlmann (2011). “Geology of possible Martian methane source regions.” *Planet. Space Sci.* 59, 196–202.
18. **J. J. Wray**, R. E. Milliken, C. M. Dundas, G. A. Swayze, J. C. Andrews-Hanna, A. M. Baldridge, M. Chojnacki, J. L. Bishop, B. L. Ehlmann, S. L. Murchie, R. N. Clark, F. P. Seelos, L. L. Tornabene, and S. W. Squyres (2011). “Columbus crater and other possible groundwater-fed paleolakes of Terra Sirenum, Mars.” *J. Geophys. Res.* 116, E01001. (**Most Cited JGR-Planets paper published 2011–Present**)
17. J. R. Michalski, J.-P. Bibring, F. Poulet, D. Loizeau, N. Mangold, E. Noe Dobrea, J. L. Bishop, **J. J. Wray**, N. K. McKeown, M. Parente, E. Hauber, F. Altieri, F. G. Carrozzo, and P. B. Niles (2010). “The Mawrth Vallis Region of Mars: A Potential Landing Site for the Mars Science Laboratory (MSL) Mission.” *Astrobiology* 10, 687–703.
16. **J. J. Wray**, S. W. Squyres, L. H. Roach, J. L. Bishop, J. F. Mustard, and E. Z. Noe Dobrea (2010). “Identification of the Ca-sulfate bassanite in Mawrth Vallis, Mars.” *Icarus* 209, 416–421.
15. N. T. Bridges, M. E. Banks, R. A. Beyer, F. C. Chuang, E. Z. N. Dobrea, K. E. Herkenhoff, L. P. Keszhelyi, K. E. Fishbaugh, A. S. McEwen, T. I. Michaels, B. J. Thomson, and **J. J. Wray** (2010). “Aeolian bedforms, yardangs, and indurated surfaces in the Tharsis Montes as seen by the HiRISE Camera: Evidence for dust aggregates.” *Icarus* 205, 165–182.
14. M. A. Chan, J. Ormö, S. Murchie, C. H. Okubo, G. Komatsu, **J. J. Wray**, P. McGuire, J. A. McGovern, and the HiRISE Team (2010). “Geomorphic knobs of Candor Chasma, Mars: New Mars Reconnaissance Orbiter data and comparisons to terrestrial analogs.” *Icarus* 205, 138–153.
13. A. S. McEwen, and 69 coauthors including **J. J. Wray** (2010). “The High Resolution Imaging Science Experiment (HiRISE) during MRO’s Primary Science Phase (PSP).” *Icarus* 205, 2–37.
12. S. Karunatillake, **J. J. Wray**, S. W. Squyres, G. J. Taylor, O. Gasnault, S. M. McLennan, W. Boynton, M. R. El Maarry, and J. M. Dohm (2009). “Chemically striking regions on Mars and Stealth revisited.” *J. Geophys. Res.* 114, E12001.
11. **J. J. Wray**, E. Z. Noe Dobrea, R. E. Arvidson, S. M. Wiseman, S. W. Squyres, A. S. McEwen, J. F. Mustard, and S. L. Murchie (2009). “Phyllosilicates and sulfates at Endeavour Crater, Meridiani Planum, Mars.” *Geophys. Res. Lett.* 36, L21201.
10. **J. J. Wray**, S. L. Murchie, S. W. Squyres, F. P. Seelos, and L. L. Tornabene (2009). “Diverse aqueous environments on ancient Mars revealed in the southern highlands.” *Geology* 37, 1043–1046.
9. B. L. Ehlmann, J. F. Mustard, G. A. Swayze, R. N. Clark, J. L. Bishop, F. Poulet, D. J. Des Marais, L. H. Roach, R. E. Milliken, **J. J. Wray**, O. Barnouin-Jha, and S. L. Murchie (2009). “Identification of hydrated silicate minerals on Mars using MRO-CRISM: Geologic context near Nili Fossae and implications for aqueous alteration.” *J. Geophys. Res.* 114, E00D08.
8. S. L. Murchie, J. F. Mustard, B. L. Ehlmann, R. E. Milliken, J. L. Bishop, N. K. McKeown, E. Z. Noe Dobrea, F. P. Seelos, D. L. Buczkowski, S. M. Wiseman, R. E. Arvidson, **J. J. Wray**, G. Swayze, R. N. Clark, D. J. Des Marais, A. S. McEwen, and J.-P. Bibring (2009). “A synthesis of Martian aqueous mineralogy after 1 Mars year of observations from the Mars Reconnaissance Orbiter.” *J. Geophys. Res.* 114, E00D06.
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