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**EDUCATION**

**Ph.D.**, 2010; **Sc. M.**, 2008, Brown University, Geological Sciences (advisor, J. Mustard)  
**M.Sc. by research**, 2007, University of Oxford, Geography (Geomorphology; advisor, H. Viles)  
**M.Sc. with distinction**, 2005, Univ. of Oxford, Environmental Change & Management (advisor, J. Boardman)  
**A.B. summa cum laude**, 2004, Washington University in St. Louis (advisor, R. Arvidson)

Majors: Earth & Planetary Sciences, Environmental Studies; Minor: Mathematics

**International Baccalaureate Diploma**, Rickards High School, Tallahassee, Florida, 2000

Additional Training:

Nordic/NASA Summer School: Water, Ice and the Origin of Life in the Universe, Iceland, July 2009

Vatican Observatory Summer School in Astronomy & Astrophysics, Castel Gandolfo, Italy, 2005

Rainforest to Reef Program: Marine Geology, James Cook University, Australia, July 2004

School for International Training, Development and Conservation Program, Panamá, Sept-Dec 2002

**PROFESSIONAL EXPERIENCE**

**Mars Science Laboratory Participating Scientist**, 11/2011-present

**Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) Science Team Co-Investigator**,  
3/2013-present and **Collaborator** 9/2006-3/2013

**European Union Marie Curie Fellow**, *Institut d'Astrophysique Spatiale, Universite Paris-Sud XI*, France,  
7/2010-8/2011

**Graduate Research Fellow**, *Brown University*, 9/2006-5/2010

**Postgraduate Researcher**, *School of Geography & Environment, Environmental Change Institute, University of Oxford*, 2004-2006.

**Mars Exploration Rovers (MER) Athena Science Team, Science Collaborator**, 5/2003-9/2004

**Undergraduate Researcher**, *Remote Sensing Laboratory, Washington University*, 2001-2004

**Space Studies Board Intern**, *National Research Council, National Academy of Sciences*, 2003

**Student Science Consultant**, *Interdisciplinary Enviro. Law Clinic, Washington Univ. School of Law*, 2003

**Research Associate**, *NASA Astrobiology Academy, Ames Research Center*, 2002

**AWARDS AND FELLOWSHIPS**

Mineralogical Society of America, Distinguished Lecturer, 2014-2015

NASA Group Achievement Award, MSL Science Office Development and Operations Team (2013)

National Geographic Emerging Explorer, 125<sup>th</sup> anniversary class (2013)

Editors' Citation for Excellence in Refereeing for *Geophysical Research Letters* (2013)

Zeldovich Medal, Comm. B (Planetary Science), awarded by Committee on Space Research (COSPAR) and Russian Academy of Sciences every two years for excellence and achievements by a young scientist (2012)

Joukowsky Family Foundation Outstanding Dissertation Award, Brown University (2010)

Sherwood Chang-Eliot Kalmbach Award for Excellence in Astrobiology Research, student speaker award at the Gordon Origins of Life conference (2010)

Best student oral presentation, runner-up, International Clay Conference, Italy (2009)

Pellas-Ryder Award, best student-led, peer-reviewed planetary sciences paper, Geological Society of America and Meteoritical Society (2009)

Best Student Paper Award, Planetary Sciences Section, American Geophys. Union Fall Meeting (2008)

NASA Group Achievement Award, Mars Exploration Rover Science Operations Team (2005)

National Science Foundation Graduate Research Fellowship (2004-2009)

Rhodes Scholar (Missouri and Keble/Hertford, 2004)

Morris K. Udall Scholar in Environmental Studies (2002, 2003)

Barry M. Goldwater Scholar in Science, Mathematics, and Engineering (2002)

## TEACHING EXPERIENCE

**Ge151, Caltech.** Fundamentals of Planetary Surfaces, fall 2013

**Ge157c, Caltech.** Remote Sensing for Environmental & Geological Applications, spring 2013

**Ge194, Caltech.** Special Topics in Planetary Science: Current Issues in Understanding Reservoirs of Water on Mars, winter 2012

**NAI Lecturer, International Summer School of Astrobiology 2011:** Mars Exploration: Unveiling a Habitable Planet, Santander, Spain, June 27-July 1, 2011.

**Teaching Assistant, GE133, Remote Sensing of the Environment, Brown University, 2010.**

**Sherdian Center Certificate IV: Teaching Consultant Program, Teaching Consultant 2009-2010.**

**Teaching assistant, geosciences undergraduate spring break field trip, Brown University 2008**

**Sherdian Center Certificate I: Introduction to Reflective Teaching Practice, five course seminar, May 2007**

**Tutor for Remote Sensing-GIS, Oxford University Hilary and Trinity terms 2005, Michaelmas term 2006.**

Hired by colleges to teach seminar courses in remote sensing (term-long and revision) for first-year Geography students (Mansfield, Worcester, St. Hilda's, Christ Church, Merton, Wadham, St. Edmond's Hall Colleges)

**Teaching Assistant, EPSc 407 Remote Sensing, Washington University, 2003**

Honorable Mention, Best Teaching Assistant, Earth & Planetary Sciences Dept., May 2003

**Academic Tutor, Earth & Planetary Sci. Courses, Washington Univ., 2001-2002**

## ADVISING

Undergraduate advisor for Daniel Lo (Planetary Science '14), Valerie Pietrasz (Planetary Science, '16)

Graduate student advisor for Pan Lu (Caltech, 2018-anticipated), Jennifer Buz (Caltech, 2018-anticipated),

Daven Quinn (Caltech, 2018-anticipated), Mathieu Lapotre (2<sup>nd</sup> project, Caltech, 2018-anticipated)

Postdoctoral advisor for Christopher Edwards (ASU, 2012) and Cedric Pilorget (IAS-Orsay, 2012)

Ph.D. Thesis Advisory Committee Member for Kathryn Stack (Caltech, 2014-anticipated), Mathieu Lapotre (2018-anticipated)

Ph.D. examination committee member: Alejandro Soto (Caltech, 2011), Congcong Che (SUNY, 2011), Steven Chemtob (Caltech, 2012), Cedric Pilorget (IAS-Orsay, 2012), Renyu Hu (MIT, 2013)

EN 11 mentor (Vivian Sun '12)

SURF/SIP students: Caue Borlina (U. Michigan '16), Jade Wang (Caltech '15), Cecilia Sanders (Harvard '16),

Bryne Hadnott (WUSTL '13), Eyjolfur Gundmundsson (U. Reykjavik '13)

High school summer intern David Smith (Troy High School, '13)

## RESEARCH GRANTS

**PI (Science PI, postdoc C. Pilorget,), NASA Mars Fundamental Research Program, Long-term Stability of the Polar Reservoirs of CO<sub>2</sub> Ice on Mars, 2014-2016, \$170k**

**Co-I, NASA Mars Fundamental Research Program, Methods for Remote Detection of Mineral Composition for the Alunite-Jarosite Group, 2014-2016, \$72k**

**Co-PI, Caltech-JPL President and Director's Fund/Research & Technology Development, Surface-Based Hyperspectral Imaging for Advanced Planetary and Terrestrial Applications, 2013-2014, \$336k**

**PI, NASA Mars Fundamental Research Program, Planetary Major Equipment A Hyperspectral VNIR camera for Microscopic- and Outcrop-Scale Studies, 2013, \$200k**

**PI, JPL RFP Mars Future Landing Sites. Jezero Crater Basin Stratigraphy, Sedimentology, and Mineralogy. 2012-2013, \$35k**

**PI, JPL RFP Mars Future Landing Sites. Land-on science at the Nili Fossae Carbonate Plains: Aqueous Alteration of Ultramafic Rocks and Clay-Carbonate Stratigraphy, 2012-2013, \$35k.**

**PI, NASA Mars Data Analysis. Phyllosilicates of the Northern Lowlands: Implications for Aqueous Alteration on Mars, 2012-2015, \$313k**

**PI, NASA MSL Participating Scientist Program "Recognizing Evidence of Aqueous Alteration While Roving: Linking hydrated mineral detections from orbit to MSL remote and in-situ measurements", 2012-2015, \$384k**

**PI, NASA Mars Fundamental Research Program "Aqueous Alteration of Ultramafic Rocks in Oman as an Analog for Understanding Martian Carbonates: a Remote, Field and Laboratory Investigation." 2012-2014, \$250k**

**PEER-REVIEWED PUBLICATIONS** (underlined = student under direct supervision; *italics* = student led)

58. Watkins, JA, **BL Ehlmann**, A Yin. Long-runout landslides and the long-lasting effects of early water activity on Mars, *Geology*, submitted.
57. Viviano-Beck, C.E., F.P. Seelos, S.L. Murchie, E.G. Kahn, K.D. Seelos, H.W. Taylor, K. Taylor, **B.L. Ehlmann**, S.M. Wiseman, J.F. Mustard, M.F. Morgan. Revised CRISM Spectral Parameters and Summary Products Based on the Currently Detected Mineral Diversity on Mars, *J. Geophys. Res.*, submitted.
56. Van Gorp, B, P Mouroulis, D Blaney, RO Green, **BL Ehlmann**, J Rodriguez. Ultra-compact Imaging Spectrometer (UCIS) for remote, in-situ, and microscopic planetary mineralogy, *Journal of Applied Remote Sensing*, in revision
55. Pan, L, **BL Ehlmann**. Phyllosilicate and hydrated silica detections in the knobby terrains of Acidalia Planitia, *Geophysical Research Letters*, in press.
54. Johnson, JR et al. (incl. **B Ehlmann**), ChemCam Passive Reflectance Spectroscopy of Surface Materials at the Curiosity Landing Site, Mars. *Icarus*, in press
53. Marlow, JJ, LaRowe, DE, **Ehlmann, BL**, Amend, JP, Orphan, VJ. The Potential for Biologically Catalyzed Anaerobic Methane Oxidation on Ancient Mars, *Astrobiology*, in press.
52. McCollom, TM, **BL Ehlmann**, A Wang, BM Hynek, B Moskowicz, TS Berquo. Detection of iron substitution in natroalunite-natrojarosite solid solutions and potential implications for Mars, *American Mineralogist*, doi: 10.2138/am.2014.4617, in press
51. **Ehlmann, B.L.** and Edwards, C.S., Mineralogy of the Martian Surface. *Annual Reviews of Earth & Planetary Sciences*, 42; doi: 10.1146/annurev-earth-060313-055024, in press.
50. Schmidt, M. et al., (incl. **B Ehlmann**) Geochemical diversity in first rocks examined by the Curiosity Rover in Gale Crater: Evidence for and significance of an alkali and volatile-rich igneous source. *J. Geophys. Res.*, 119, 64–81, doi:10.1002/2013JE004481, 2014.
49. Sautter, V, et al. (incl. **B Ehlmann**), Igneous mineralogy at Bradbury Rise: The first ChemCam campaign at Gale crater, *J. Geophys. Res. Planets*, 119, 119, 30–46, doi:10.1002/2013JE004472, 2014.
48. Ming, DW et al. (incl. **B Ehlmann**). Volatile and Organic Compositions of Sedimentary Rocks in Yellowknife Bay, Gale Crater, Mars, *Science*, 343, 6169 2014
47. McLennan, SM et al. (incl. **B Ehlmann**). Elemental Geochemistry of Sedimentary Rocks in Yellowknife Bay, Gale Crater, *Science*, 343, 6169 2014
46. Vaniman, DT, et al (incl. **B Ehlmann**). Mineralogy of a mudstone on Mars., *Science*, 343, 6169 2014
45. Grotzinger, JP et al. (incl. **B Ehlmann**), A Habitable Fluvio-Lacustrine Environment a Yellowknife Bay, Gale Crater, Mars, *Science*, 343, 6169 2014
44. Pilorget, C, CS Edwards, **BL Ehlmann**, F Forget, E Millour. Material ejection by the cold jets and temperature evolution of the south seasonal polar cap of Mars from THEMIS/CRISM observations and implications for surface properties, *J. Geophys. Res.*, 118(12), 2520-2536
43. Meslin, P.-Y. et al. (incl. **B. Ehlmann**), Soil Diversity and Hydration as Observed by ChemCam at Gale Crater, Mars, *Science*, 341, 6153 2013.
42. Creveling, J.R., Knoll, A.H., Fernandez-Remolar, D., Bergmann, K.D., Gill, B.C., Garcia-Bellida, D.C., Menendez, S., Rodriguez-Martinez, M., **Ehlmann, B.L.**, Stack, K.M., Hallmann, C., Amils, R., Grotzinger, J.P., Abelson, J. Geobiology of a Lower Cambrian Carbonate Platform, Pedroche Formation, Spain, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 386: 459-478, 2013.
41. **Ehlmann, BL**, G Berger, N Mangold, JR Michalski, D Catling, SW Ruff, E Chassefiere, PB Niles, V Chevrier, F Poulet, Geochemical Consequences of Widespread Clay Mineral Formation in Mars' Ancient Crust. *Space Science Reviews*, doi: 10.1007/s11214-012-9930-0, 2013.
40. Niles, PB, DC Catling, G Berger, E Chassefiere, **BL Ehlmann**, JR Michalski, R. Morris, SW Ruff, B. Sutter, Geochemistry of carbonates on Mars: implications for climate history and nature of aqueous environments. *Space Science Reviews*, doi: 10.1007/s11214-012-9940-y.
39. **Ehlmann, BL**, DL Bish, SW Ruff, JF Mustard. Mineralogy and chemistry of altered Icelandic basalts: application to clay mineral detection and understanding aqueous environments on Mars. *J. Geophys. Res.*, 117, E00J16, doi:10.1029/2012JE004156.
38. Meunier, A., S Petit, **BL Ehlmann**, P Dudoignon, F Westall, A Mas, A El Albani, E Ferrage. Magmatic precipitation as a possible origin of Noachian clays on Mars, *Nature Geoscience*, doi: 10.1038/ngeo1572, 2012.
37. Etioppe, G., **BL Ehlmann**, M. Schoell, Potential exhalation and isotopic signatures of methane from serpentinized rocks on Mars: insights from low temperature terrestrial analogs. *Icarus*, doi: 10.1016/j.icarus.2012.05.009, 2012.
36. **Ehlmann, BL** and JF Mustard. An in-situ record of major environmental transitions on early Mars at Northeast Syrtis Major, *Geophys. Res. Lett.*, 39, L11202, doi:10.1029/2012GL051594.
35. Hu, R, **BL Ehlmann**, S Seager. Theoretical Spectra of Terrestrial Exoplanet Surfaces. *The Astrophysical Journal*, 752(7), doi:10.1088/0004-637X/752/1/7.

34. **Ehlmann, BL**, JF Mustard, SL Murchie, J-P Bibring, A Meunier, AA Fraeman, Y Langevin. Subsurface water and clay mineral formation during the early history of Mars. *Nature*, 479, 53-60, doi: 10.1038/nature10582, 2011.
33. **Ehlmann, BL**, JF Mustard, RN Clark, GA Swayze, SL Murchie. Evidence for low-grade metamorphism, diagenesis, and hydrothermal alteration on Mars from phyllosilicate mineral assemblages. *Clays & Clay Minerals*, 59(4), 359-377, 2011.
32. Wray, JJ, **Ehlmann, BL**. Morphology and mineralogy of possible Martian methane source regions, *Planetary & Space Science*, 59, 196-202, 2011.
31. Wray, J.J., 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. Columbus crater and other possible groundwater-fed paleolakes of Terra Sirenum, Mars. *J. Geophys. Res.*, 116, E01001, doi:10.1029/2010JE003694, 2011.
30. Skok, J.R., Mustard, J.F., **Ehlmann, B.L.**, Milliken, R.E., Murchie, S.L. Silica Deposits in the Nili Patera Caldera on the Syrtis Major Volcanic Complex, Mars. *Nature Geoscience*, 3, 838-841, 2010.
29. Viles, HA, **BL Ehlmann**, CF Wilson, T Cebula, M Bourke. Simulating physical weathering of basalt on Mars and Earth by thermal cycling, *Geophys. Res. Lett.*, 37, L18201, 2010.
28. **Ehlmann, BL**, JF Mustard, S.L. Murchie. Geologic setting of serpentine-bearing rocks on Mars. *Geophys. Res. Letters*, doi:10.1029/2010GL042596, 2010.
27. Skok, JR, JF Mustard, SL Murchie, MB Wyatt, **BL Ehlmann**. Spectrally distinct ejecta in Syrtis Major, Mars: Evidence for environmental change at the Hesperian-Amazonian boundary. *J. Geophys. Res.*, 115, E00D14, doi:10.1029/2009JE003338, 2010.
26. **Ehlmann, BL**. Diverse aqueous environments during Mars' first billion years: the emerging view from orbital visible-near infrared spectroscopy. *Geochemical News*, 142, 2010.
25. Mustard, JF, **BL Ehlmann**, F Poulet, N Mangold, JW Head, SL Murchie, J-P Bibring, LH Roach. Composition, Morphology, and Stratigraphy of Noachian Crust around the Isidis basin. *J. Geophys. Res.*, 114, E00D12, doi:10.1029/2009JE003349, 2009.
24. McKeown, N. K., J. L. Bishop, E. Z. Noe Dobrea, **B. L. Ehlmann**, M. Parente, J. F. Mustard, S. L. Murchie, G. A. Swayze, J. Bibring, and E. A. Silver. Characterization of phyllosilicates observed in the central Mawrth Vallis region, Mars, their potential formational processes, and implications for past climate, *J. Geophys. Res.*, 114, E00D10, doi:10.1029/2008JE003301, 2009.
23. **Ehlmann, BL**, JF Mustard, GA Swayze, RN Clark, JL Bishop, F Poulet, D Des Marais, LH Roach, RE Milliken, J Wray, O Barnouin-Jha SL Murchie. Identification of hydrated silicate minerals on Mars using MRO-CRISM: geologic context near Nili Fossae and implications for aqueous alteration, *J. Geophys. Res.*, E00D08, doi:10.1029/2009JE003339, 2009.
22. Murchie, SL, JF Mustard, **BL Ehlmann**, RE Milliken, JL Bishop, NK McKeown, EZ Noe Dobrea, FP Seelos, DL Buczkowski, SM Wiseman, RE Arvidson, JJ Wray, G Swayze, RN Clark, J-P Bibring, AS McEwen. A synthesis of Martian aqueous mineralogy after one Mars year of observations from the Mars Reconnaissance Orbiter. *J. Geophys. Res.*, doi:10.1029/2009JE003344, 2009.
21. **Ehlmann, BL**, JF Mustard, SL Murchie, F Poulet, JL Bishop, AJ Brown, WM Calvin, RN Clark, DJ Des Marais, RE Milliken, LH Roach, TL Roush, GA Swayze, JJ Wray. Orbital Identification of Carbonate-Bearing Rocks on Mars. *Science*, 322, 1828-1832, 2008
20. Milliken, RE, G Swayze, R Arvidson, J Bishop, R Clark, **B Ehlmann**, R Green, J Grotzinger, R Morris, S Murchie, J Mustard, C Weitz. Opaline silica in young deposits on Mars. *Geology*, 36(11), 847-850, 2008.
19. Bishop, JL, EZ Noe Dobrea, NK McKeown, M Parente, **BL Ehlmann**, JR Michalski, RE Milliken, F Poulet, GA Swayze, JF Mustard, SL Murchie, J-P Bibring. Phyllosilicate Diversity and Past Aqueous Activity Revealed at Mawrth Vallis, Mars, *Science* 321, 830-833, 2008.
18. Wray, J.J., **BL Ehlmann**, SW Squyres, JF Mustard, RL Kirk. Compositional Stratigraphy of Clay-Bearing Layered Deposits at Mawrth Vallis, Mars. *Geophysical Research Letters* 35, L12202, doi: 10.1029/2008GL034385, 2008.
17. Mustard JF, SL Murchie, SL, SM Pelkey, **BL Ehlmann**, RE Milliken, JA Grant, J-P Bibring, F Poulet, J Bishop, E Noe Dobrea, L Roach, F Seelos, RE Arvidson, S Wiseman, R Green, C Hash, D Humm, E Malaret, JA McGovern, K Seelos, T Clancy, R Clark, D Des Marais, N Izenberg, A Knudson, Y Langevin, T Martin, P McGuire, R Morris, M Robinson, T Roush, M Smith, G Swayze, H Taylor, T Titus, M Wolff. Hydrated Silicate Minerals on Mars Observed by the CRISM Instrument on MRO. *Nature* 454, 305-309, 2008.
16. Herkenhoff, KE and 44 others (including **B Ehlmann**) Surface processes recorded by rocks and soils on Meridiani Planum, Mars: Microscopic Imager observations during Opportunity's first three extended missions, *J. Geophys. Res.*, 113, E12S32, doi:10.1029/2008JE003100, 2008.

15. **Ehlmann, BL**, JF Mustard, CI Fassett, SC Schon, JW Head, DJ Des Marais, JA Grant, SL Murchie, CRISM team. Clay mineralogy and organic preservation potential of lacustrine sediments from a Martian delta environment, Jezero Crater, Nili Fossae, Mars. *Nature Geoscience*, 1, 355-358, 2008.
14. McGuire, PC and 24 others (including **B.L. Ehlmann**). MRO/CRISM Retrieval of Surface Lambert Albedos for Multispectral Mapping of Mars With DISORT-Based Radiative Transfer Modeling: Phase 1-Using Historical Climatology for Temperatures, Aerosol Optical Depths, and Atmospheric Pressures. *IEEE Transactions on Geoscience and Remote Sensing*, 46(12), 4020-4040, 2008.
13. **Ehlmann, BL**, HA Viles, and MC Bourke. Quantitative morphologic analysis of boulder shape and surface texture to infer environmental history: A case study of rock breakdown at the Ephrata Fan, Channeled Scabland, Washington. *J. Geophys. Res.*, 113, F02012, doi:10.1029/2007JF000872, 2008.
12. Herkenhoff, KE and 42 others (incl. **B.L. Ehlmann**) Overview of the Microscopic Imager Investigation during Spirit's first 450 sols in Gusev crater. *J. Geophys. Res.*, 111, E02S04, doi:10.1029/2005JE002574, 2006.
11. **Ehlmann, BL** and RE Criss. Enhanced Stage and Stage Variability on the Lower Missouri River benchmarked by Lewis and Clark, *Geology* 34(11), 977-980, 2006.
10. Arvidson, RE, F Poulet, RV Morris, J-P Bibring, JF Bell III, SW Squyres, PR Christensen, G Belluci, B Gondet, **BL Ehlmann**, WH Farrand, RL Fergason, M Golombek, JL Griffes, J Grotzinger, EA Guinness, KE Herkenhoff, JR Johnson, G Klingelhoefer, Y Langevin, D Ming, K Seelos, RJ Sullivan, JG Ward, SM Wiseman, M Wolff. Nature and Origin of the Hematite-Bearing Plains of Meridiani Based on Analyses of Orbital and Opportunity Data Sets, *JGR* 111(E12), E12S08, doi:10.1029/2006JE002728, 2006.
9. **Ehlmann, BL**, RE Arvidson, BL Jolliff, SS Johnson, B Ebel, N Lovenduski, JD Morris, JA Byres, NO Snider, RE Criss. Hydrologic and Isotopic Modeling of Alpine Lake Waiau, Mauna Kea, Hawaii. *Pacific Science* 59 (1), 1-15, 2005.
8. **Ehlmann, BL**, J Chowdhury, TC Marzullo, RE Collins, J Litzenberger, S Ibsen, WR Krauser, B DeKock, M Hannon, J Kinnevan, R Shepard, FD Grant. Humans to Mars: A Feasibility and Cost-Benefit Analysis. *Acta Astronautica* 56 (9-12), 851-858, 2005.
7. Golombek, MP, RE Arvidson, JF Bell III, PR Christensen, JA Crisp, LS Crumpler, **BL Ehlmann**, RL Fergason, JA Grant, R Greeley, AFC. Haldemann, DM Kass, TJ Parker, JT Schofield, SW Squyres, RW Zurek. Assessment of Mars Exploration Rover Landing Site Predictions and Implications for Climate Change. *Nature*, 436, 43-46, 2005.
6. Arvidson, RE, RC Anderson, P Bartlett, JF Bell III, PR Christensen, P Chu, K Davis, **BL Ehlmann**, MP Golombek, S Gorevan, EA Guinness, AFC. Haldemann, KE Herkenhoff, G Landis, R Li, R Lindemann, DW Ming, T Myrick, T Parker, L Richter, FP Seelos IV, LA Soderblom, SW Squyres, RJ Sullivan, J Wilson. Localization and Physical Properties Experiments Conducted by Opportunity at Meridiani Planum. *Science* 306, 1730-1733, 2004.
5. Arvidson, RE, RC Anderson, P Bartlett, JF Bell III, D Blaney, PR Christensen, P Chu, L Crumpler, K Davis, **BL Ehlmann**, R Fergason, MP Golombek, S Gorevan, JA. Grant, R Greeley, EA Guinness, AFC. Haldemann, KE Herkenhoff, J Johnson, G Landis, R Li, R Lindemann, H McSween, DW Ming, T Myrick, L Richter, FP Seelos IV, SW Squyres, R Sullivan, A Wang, J Wilson. Localization and physical properties experiments conducted by Spirit at Gusev crater. *Science* 305, 821-824, 2004.
4. Grant, JA, R Arvidson, JF Bell, III, NA Cabrol, MH Carr, P Christensen, L Crumpler, DJ Des Marais, **BL Ehlmann**, J Farmer, M Golombek, FD Grant, R Greeley, K Herkenhoff, R Li, HY McSween, DW Ming, J Moersch, JW Rice, Jr., S Ruff, L Richter, S Squyres, R Sullivan, C Weitz. Surficial Deposits at Gusev Crater Along Spirit Rover Traverses. *Science* 305, 807-810, 2004.
3. Herkenhoff, KE, SW Squyres, R Arvidson, DS Bass, JF Bell III, P Bertelsen, **BL Ehlmann**, W Farrand, L Gaddis, R Greeley, J Grotzinger, AG Hayes, SF Hviid, JR Johnson, B Jolliff, KM Kinch, AH Knoll, MB Madsen, JN Maki, SM McLennan, HY McSween, JW Rice, Jr., L Richter, M Sims, PH Smith, LA Soderblom, N Spanovich, R Sullivan, S Thompson, T Wdowiak, C Weitz, P Whelley. Evidence from Opportunity's Microscopic Imager for Ancient Water on Meridiani Planum. *Science* 306, 1727-1730, 2004.
2. Soderblom, LA, RC Anderson, RE Arvidson, JF Bell III, NA Cabrol, W Calvin, PR Christensen, BC Clark, T Economou, **BL Ehlmann**, WH Farrand, D Fike, R Gellert, TD Glotch, MP Golombek, R Greeley, JP Grotzinger, KE Herkenhoff, DJ Jerolmack, JR Johnson, B Jolliff, G Klingelhoefer, AH Knoll, ZA Learner, R Li, MC Malin, SM McLennan, HY McSween, DW Ming, RV Morris, JW Rice Jr., L Richter, R Rieder, D Rodionov, C Schröder, FP Seelos IV, JM Soderblom, SW Squyres, R Sullivan, WA Watters, CM Weitz, MB Wyatt, A Yen, J Zipfel. Soils of Eagle Crater and Meridiani Planum at the Opportunity Rover Landing Site. *Science* 306, 1723-1726, 2004.
1. Solar System Exploration Survey, National Academy of Sciences, Space Studies Board. (Brian Dewhurst, **Bethany Ehlmann**, and David Smith, text ed.), *New Frontiers in Solar System Exploration*. National Academies Press, 2003, 32pp.

**FIRST-AUTHOR OR STUDENT CONFERENCE PUBLICATIONS AND PRESENTATIONS**

(underlined = student under the direct supervision of B. Ehlmann)

- (*invited*) **Ehlmann, B.L.**, C.S. Edwards. The Mineralogy of Mars: A View from Orbital Infrared Spectroscopy. Goldschmidt Conference, 2014
- Quinn, D.P., **B.L. Ehlmann**. Provenance of the Sulfate-bearing Unit at Northeast Syrtis Major: Insights from Structural Geology. 45th Lunar and Planetary Science Conference (2014), Abstract #2312
- Ehlmann, B.L.**, J. Buz. Hydrology and Aqueous Alteration in the Watershed of Gale, Sharp, and Knobel Craters: A Regional Context for Curiosity's Exploration. 45th Lunar and Planetary Science Conference (2014), Abstract #2587
- Buz, J., **B. L. Ehlmann**. Effects of Grain Size on the Reflectance Spectroscopy of Olivine in the Vis-NIR and the Derivation of Olivine Composition Using Modified Gaussian Modeling. 45th Lunar and Planetary Science Conference (2014), Abstract #2810.
- Lapotre, M.G.A., **B. L. Ehlmann**, R. E. Arvidson. Quantitative Composition and Granulometry of Aeolian Bedforms in Endeavour and Gale Craters Inferred from Visible Near-Infrared Spectra. 45th Lunar and Planetary Science Conference (2014), Abstract #1431.
- Pan, L., **B. L. Ehlmann**. Possible Formation Mechanisms of Phyllosilicates and Hydrated Silica in Acidalia Planitia. 45th Lunar and Planetary Science Conference (2014), Abstract #1245
- (*invited*) **Ehlmann, B.L.**, Buz, J. Hydrology and Aqueous Alteration in the Watershed of Gale, Sharp, and Knobel Craters: Regional Context for Curiosity's Exploration. 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec., abs. P21D-02 (talk)
- Sanders, C.B., **B. L. Ehlmann**, R. G. Sellar, B. Van Gorp, P Mouroulis, DL Blaney, RO Green (2013), Mapping, Characterizing, and Interpreting Mineral Fabrics in Mafic and Ultramafic Rock Samples from Mars Analog Sites in Samail, Oman Using the Ultra-Compact Imaging Spectrometer (UCIS), 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec., abs. P51G-1806. (poster)
- Ehlmann, B.L.**, C.S. Edwards, L. Pan. Aqueous Minerals on Early Mars from CRISM, OMEGA, THEMIS and TES. European Planetary Science Congress 2013 (talk).
- (*invited*) **Ehlmann, B.L.** Exploring Mars' Earliest Aqueous Environments. 125<sup>th</sup> Anniversary Pardee Symposium. Geol Soc. America Meeting, Denver, Colorado (2013), paper 2-6 (talk)
- (*invited*) **Ehlmann, B.L.** The Earliest Aqueous, Habitable Environments on Mars: A View from Orbit. 2013 AAAS Annual Meeting, Boston 2013 (talk).
- Ehlmann, B.L.** Potential Habitats Preserved in the Early Martian Rock Record. Gordon Research Conference, 2013, Ventura, CA.(poster)
- Pan, L., **B. L. Ehlmann**. Phyllosilicate and Hydrated Silica Detection in the Knobby Terrains of Acidalia Planitia. 44th Lunar and Planetary Science Conference (2013), Abstract #2572 (talk).
- Buz, J. and **BL Ehlmann**. Bedrock Composition and Surface Mineralogy of the Greater Gale Region. 44th Lunar and Planetary Science Conference (2013), Abstract #2549 (poster)
- Ehlmann, B.L.**, et al. An expanded training set for processing of MSL ChemCam LIBS data: Spectral library samples added and effects on elemental composition results from Mars. Lunar & Planetary Science Conference, abstract #2600, 2013. (poster)
- Gudmundsson, E., **B.L. Ehlmann**, J.F. Mustard, T. Hiroi, F. Poulet. Testing and improving theories of radiative transfer for determining the mineralogy of planetary surfaces. Am. Geophys. Union Fall Meeting, 2012. (poster)
- Hadnott, B. and **B. Ehlmann**. Visible and near-Infrared (VNIR) spectroscopy of altered basalts with application to the ChemCam library for Mars Science Laboratory. Am. Geophys. Union Fall Meeting, 2012. (poster)
- (*invited*) **Ehlmann, B.L.** Mineralogy of the Gale crater rim: the regional context for Curiosity's exploration. Geological Society of America Meeting 2012, abstract #212980 (talk).
- Ehlmann, B.** The Earliest Aqueous, Habitable(?) Environments on Mars: A View from Orbit, 39th COSPAR Scientific Assembly. Held 14-22 July 2012, in Mysore, India. Abstract C2.2-29-12, p.503
- (*invited*) **Ehlmann, B.L.**, J.P. Grotzinger, R.M. Manning, T.P. Rivellini, P.G. Backes, A.J. Ganino, L.R. Shiraishi, K.J. Klein, W.C. Allen, C.L. Kahn, J.K. Ziemer, B. Sherwood, H.J. Eisen. MER caching rover for 2018 exploration of ancient Mars. Concepts & Approaches for Mars Exploration Workshop, June 12-14, 2012, Houston, TX, abstract 4228 (talk).
- (*invited*) **Ehlmann, B.L.** Aqueous minerals on early Mars: weathering, hydrothermal, and diagenetic environments. Third International Conference on Early Mars, Reno, NV, May 2012, abstract 7084 (talk).
- (*invited*) **Ehlmann, B.L.** Serpentinization on Mars: Evidence, Implications and Needed Measurements. Astrobiology Science Conference, Atlanta, Georgia, April 2012, abstract 4096 (talk).
- (*invited*) **Ehlmann, B.L.** Environments on Early Mars: Constraints from the Geologic Record. The Faint Early Sun: Paradox, Problem, or Distraction? Workshop, Space Telescope Science Institute, April 2012 (talk).

- Ehlmann, B.L.**, Kelemen, P.B., Pinet, P., Mustard, J.F., Launeau, P., Ceuleneer, G. Aqueous alteration of ultramafic rocks in Oman: an analog for understanding carbonate and serpentine on Mars. LPSC 43, Houston, Texas, March 2012, abstract 1471 (print only).
- Ehlmann, B.L.**, Kelemen, P.B., Pinet, P., Mustard, J.F., Launeau, P., Ceuleneer, G. Aqueous Alteration of Ultramafic Rocks in Oman: an Analog for Understanding Carbonates on Mars". International Conference on the Geology of the Arabian Plate and the Oman Mountains (ICGAPOM) 7- 9 January 2012, Sultan Qaboos University, Oman (talk).
- Ehlmann, B.L.**, Mustard, J.F., Murchie, S.L., Bibring, J.-P., Meunier, A., Fraeman, A.A., Langevin, Y. Clay formation dominantly in the subsurface? Implications for early Mars environments. AGU Fall Meeting, P31D-1726 (poster).
- Ehlmann, B.**, Poulet, F., Arvidson, R.E., Mustard, J.F. Remotely Quantifying the Mineralogic Composition of Planetary Surfaces with Hydrated Silicates: Lessons from the Laboratory and from Mars. EPSC-DPS Joint Meeting, Nantes, France, October 2011 (talk).
- Ehlmann, B.**, J. Mustard, S. Murchie, J.-P. Bibring, A. Meunier, A. Fraeman. Subsurface aqueous alteration on ancient Mars: implications for habitability. International Conference on Exploring Mars Habitability, Lisbon, Portugal, June 2011 (talk).
- (invited) **Ehlmann, B.L.** Clay minerals on Noachian Mars as seen from orbit. Quantifying the Martian Geochemical Reservoirs, ISSI and Europlanets workshop, Bern, Switzerland, April 2011 (talk).
- Ehlmann, B.L.**, J.F. Mustard, F. Poulet, T. Hiroi. Estimating modal mineralogy of mixtures with phyllosilicates using radiative transfer modeling of visible/near-infrared spectra. LPSC 42, Houston, Texas, March 2011, abstract #1704 (poster).
- Ehlmann, B.L.** Diversity, context, precision, and mobility: lessons for sample return sites and systems from Mars Reconnaissance Orbiter results. Workshop on the Importance of Solar System Sample Return Missions to the Future of Planetary Science. The Woodlands, Texas, March 2011, abstract #5022 (panelist, poster).
- Ehlmann, B.L.**, D. Cardace, T. Hoehler, D. Blake, P. Kelemen. Terrestrial serpentinizing systems as mineralogical, geochemical, and biological(?) analogues for Mars. Workshop on Analogue sites for Mars missions: MSL and beyond. Houston, Texas, March 2011, abstract #6021.
- Ehlmann, B.L.**, J.F. Mustard, D.L. Bish. Aqueous alteration of basaltic lavas in Iceland: An Analogue for Noachian Mars. Workshop on Analogue sites for Mars missions: MSL and beyond. Houston, Texas, March 2011, abstract #6020.
- (invited) **Ehlmann, B.L.**, D. Buczkowski, R. Clark, S.L. Murchie, J. Mustard, K. Seelos, J.R. Skok, G. Swayze, and the MRO-CRISM team. Impact craters as probes of the ancient Martian southern highlands: insights on aqueous alteration. Am. Geophys. Union Fall Meeting 2010 (talk).
- Ehlmann, BL**, JF Mustard, DL Bish, F Poulet. How much clay is on Mars? Lessons from visible/near-infrared (VNIR) and XRD study of hydrated silicate mineral assemblages in altered basalts from Iceland. 1<sup>st</sup> Moscow Solar System Symposium, Moscow, 2010. (poster)
- Ehlmann, BL**, JF Mustard. Diverse Hydrothermal and Weathering Environments during Mars' Noachian epoch COSPAR, Bremen, Germany, July 18-24, 2010, abstract #B02-0009-10. (talk)
- Ehlmann, BL**, JF Mustard. "Stratigraphy of the Nili Fossae and the Jezero crater watershed: a reference section for the Martian clay cycle." First International Conference on Mars Sedimentology and Stratigraphy, El Paso, Texas, April 19-21, 2010, Abstract #6064 (talk).
- Ehlmann, BL**, JF Mustard, DL Bish. "Weathering and hydrothermal alteration of basalts in Iceland: mineralogy from VNIR, TIR, XRD and implications for linking Mars orbital and surface datasets." LPSC 41, Houston, Texas, March 1-5, 2010, Abstract #1858 (poster).
- Ehlmann, BL**, JF Mustard, SL Murchie. "Geologic setting of serpentine deposits on Mars." LPSC 41, Houston, Texas, March 1-5, 2010, Abstract #2235 (talk).
- (invited) **Ehlmann, BL**, JF Mustard. "Evidence for diverse hydrothermal and weathering environments on ancient (>3.5Ga) Mars from recent orbital observations" Gordon Research Conference on The Origin of Life, Galveston, TX, January 2010 (talk)
- Ehlmann, BL**, JF Mustard, DL Bish. "Weathering and hydrothermal alteration of basalts in Iceland: mineralogy from VNIR, TIR, XRD and implications for Mars." Am. Geophys. Union Fall Mtg. 2009. (poster)
- Ehlmann, BL**, JF Mustard, SL Murchie. "Extensive aqueous alteration of Mars' earliest crust: recent results from NASA's CRISM hyperspectral imager and implications for planetary habitability." Vernadsky/Brown Microsymposium on Comparative Planetology. Moscow, Russia, October 2009. (talk)
- Ehlmann, BL** and JF Mustard. "Regional carbonate- and kaolinite-bearing rock units and how precursors lithologies control alteration products on Mars: An example from the Nili Fossae Region." New Martian Chemistry Workshop, Medford, Massachusetts, July 27-28, 2009, Abstract #8018 (talk)
- Ehlmann, BL** et al. "Evidence for Low-Grade Metamorphism/Diagenesis on Mars from Phyllosilicate Mineral Assemblages" 14<sup>th</sup> International Clay Conference, Castellana Marina, Italy, June 14-20, 2009, Abstract #MC1c.L3 (talk)

- Ehlmann, BL**, et al. “Detection of Serpentine on Mars by MRO-CRISM and Possible Relationship with Olivine and Magnesium Carbonate in Nili Fossae” LPSC 40, Houston, Texas, March 21-25, 2009, Abstract #1787 (talk)
- Ehlmann, BL**, et al. “Modeling Modal Mineralogy of Laboratory Mixtures of Nontronite and Mafic Minerals from Visible Near-Infrared Spectral Data” LPSC 40, Houston, Texas, March 21-25, 2009, Abstract #1771 (poster)
- (invited) **Ehlmann, BL** et al. “Orbital Identification of Carbonate-Bearing Rocks on Mars” Am. Geophys. Union Fall Mtg. 2008 (talk)
- (invited) **Ehlmann, BL** et al. “Diverse Alteration Minerals Around Martian Impact Craters Revealed by MRO-CRISM: Indicators of Hydrothermal Activity or Subsurface Aqueous Alteration?” Am. Geophys. Union Fall Mtg. 2008 (talk)
- Ehlmann, BL** et al. “Phyllosilicates, zeolites, and carbonate near Nili Fossae: evidence for distinct environments of aqueous alteration.” Workshop on Martian Phyllosilicates, Paris, October 2008. (talk)
- Ehlmann, BL**, et al. “Distinct provinces of aqueous alteration in the western Isidis region identified with MRO-CRISM” LPSC 39, Houston, Texas, March 10-14, 2008, Abstract #2326 (talk)
- Ehlmann, BL**, et al. “Infrared spectra of impact products from Lonar Crater: the effects of weathering and implications for Mars.” LPSC 39, Houston, Texas, March 10-14, 2008, Abstract #2437 (poster)
- Ehlmann, BL**, et al. “Mineralogic diversity and geomorphology of CRISM-detected phyllosilicate bearing materials in Nili Fossae, Mars: Implications for aqueous alteration.” Eos Trans. Am. Geophys. Union 88(52), 2007 Fall Meet. Suppl., Abstract H43H-01 (talk).
- Ehlmann, BL**, et al. “New secondary minerals detected by MRO CRISM and their geologic settings: kaolinite, chlorite, illite/muscovite, and the possibility of serpentine or carbonate in Nili Fossae” Seventh International Conference on Mars, Pasadena, California, July 9-13, 2007, Abstract #3270. (talk)
- Ehlmann, BL**, et al. “New phyllosilicate mineral signatures from west of Nili Fossae, Mars through combined OMEGA-CRISM analysis” LPSC 38, Houston, Texas, March 12-15, 2007, Abstract #2078. (poster)
- Ehlmann, BL**, et al. “Quantifying boulder shape and surface texture: A case study using geomorphology to infer environmental history at the Ephrata Fan, Channeled Scablands, Washington” LPSC 38, Houston, Texas, March 12-15, 2007, Abstract #1325. (poster)
- Ehlmann, BL** and RE Criss. “Enhanced Stage Variability on the Lower Missouri River as benchmarked by Lewis and Clark: Implications for Ecosystem Restoration” Eos Trans. Am. Geophys. Union 87(52), 2006 Fall Meet. Suppl., Abstract H43H-01 (talk).
- Ehlmann, BL** and HA Viles. “Fluvial feature persistence and lichen weathering rates on basalt boulders, Ephrata Fan, Washington” Geomorphology & Earth Systems Science, BGRG International Conference, Loughborough, UK, June 28-30, 2006 (poster).
- Ehlmann, BL** et al., “Terrain Roughness from MER Traverse Profiles at Gusev Crater and Meridiani Planum” *Eos Trans. AGU*, 85(47), 2004 Fall Meet. Suppl., Abstract P21A-0201. (poster)
- Sullivan, R. et al., 2004. (talk by **B. Ehlmann**) “Rock and Soil Physical Properties at the MER Terra Meridiani Landing Site”. European Geophysical Union Meeting, Nice, France, April 25-30, 2004
- Ehlmann, BL** and RE Criss. “Stage Variability of the Missouri River as recorded by Lewis and Clark.” *Geological Society of America Abstracts with Programs*, Vol. 36, No. 3, p. 7, GSA Regional Meeting, St. Louis, April 1-2, 2004. (talk)
- Ehlmann, BL** et al., 2002. “Hydrology of Lake Waiiau” *Eos. Trans. AGU*, 83(19), 2002 Spring Meet. Suppl., Abstract H51E-06. (talk)

#### INVITED UNIVERSITY LECTURES

- 2014 University Massachusetts-Amherst; Southwest Research Institute; Silas Peirce Lecture, Boston University
- 2013 Kongsberg Seminar, University of Oslo; LASP seminar, University of Colorado; Planetary Science Seminar, University of California, Santa Cruz; National Geographic Explorers Symposium, Washington, DC; Summer Science Program, Santa Barbara; *The Guardian* Op-Ed on Curiosity’s Exploration; LPL seminar, U. Arizona; Jackson School Geosciences, UT Austin
- 2012 National Geographic 50 Years of Robotic Solar System Exploration, Washington, DC; Division of Nuclear Physics Annual Meeting, Newport, CA; Earth & Space Sciences Colloquium, UCLA; NAI Astrobiology seminar (webcast), University of Washington; Department of Geology, SUNY-Stony Brook; Geological Sciences Department, University of Nevada, Reno
- 2011 Division of Geological & Planetary Sciences, Caltech; Department of Astronomy, Cornell University; Department of Geological Sciences, Brown University; Universite de Lyon, France; The Open University, UK; Universite Toulouse, France; UCLA Planetary Science Seminar
- 2010 D. Foster Hewitt Lecture Series, Lehigh University; Universitat Bern; Universite de Poitiers

- 2009 Washington University in St. Louis; Planetary Sciences Seminar, Caltech PS seminar; JPL; NASA Ames; Indiana University
- 2008 Planetary Sciences Institute
- 2007 NASA Ames Academy for Exploration
- 2005 Oxford University Space and Astronomical Society
- 2004 Macquarie University, Australian Centre for Astrobiology

### **PROFESSIONAL ASSOCIATIONS, OUTREACH ACTIVITIES, AND SERVICE**

- Independent Assessment Team, Mars 2020 Science Definition Team, March-April 2013
- Integration Panel, Concepts & Approaches for Mars Exploration LPI Workshop, June 12-14, 2012, Houston, TX
- Scientific Organizing Committee, Third International Conference on Early Mars, May 2012
- Session convener, Clay Minerals Society Annual Meeting, 2014; IEEE Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing, 2013; AGU, 2011, 2012
- Reviewer for *Science*, *Nature*, *Geology*, *Earth & Planetary Science Letters*, *Journal of Geophysical Research*, *Icarus*, *Planetary & Space Science*, *Eos*; Associate editor, *JGR CRISM* special issue (2012)
- Review panel member, NASA Mars Fundamental Research Program; External grant reviewer for NASA Planetary Geology & Geophysics Program, NASA Mars Fundamental Research Program, NASA Lunar Advanced Science and Exploration Research Program
- Rhodes Scholar Selection Committee, District XIII (2009-2012)
- IAG Planetary Geomorphology Image of the Month contributor (10/2008, 5/2010)
- Curriculum preparation for the National Science Teachers Association. "What we can learn at different spectral and spatial resolutions: an example from Mars" (2009)
- Mentor for JHU-APL's CRISM Mars Exploration Student Data Team, Kickapoo H.S., Missouri (2007-2008)
- Docent for RI Museum of Natural History "Mars 3-D" exhibit (2007)
- Bi-semesterly Earth science lessons for 2<sup>nd</sup> & 4<sup>th</sup> grades at Vartan Gregorian Elementary School (2006-2010)
- American Geophysical Union (since 2001)
- Geological Society of America (since 2003)
- Mineralogical Society of America (since 2010)
- Division of Planetary Sciences, AAAS (since 2012)
- British Society for Geomorphology (since 2005)
- Association Internationale pour l'Etude des Argiles (since 2009)
- NASA Academy Alumni Association (since 2002)
- Executive Selection Board, 2005-9; Soffen Travel Grant Committee, 2006-9, 2011; Phone Interviewer, 2004, 2007, 2010, 2011

### **UNIVERSITY & JPL COMMITTEES AND SERVICE**

- JPL Hiring Committee (2013-present)
- Keck Institute for Space Studies Steering Committee (2012-present)
- Caltech Library Committee (2012-present)
- Core Committee, Caltech-GPS (2013)
- University Resources Committee (sets annual operating budget), graduate student representative, Brown University (2008-2010)
- Rhodes/Marshall Scholarship Nominating Committee, Brown University (2006-2009)
- Geoclub (geoscience graduate student group), Treasurer (2007); Rep. to Grad Student Council (2008)
- Rhodes Scholar Southern Africa Forum, executive committee member (2005-6)
- Committee on Environmental Quality, Washington University, student rep. and co-chair (2002-4)
- Student Union, Washington University, Senator, Academic Affairs committee co-chair (2001-4)

### **ADDITIONAL SKILLS**

- Language: English (native), Spanish (highly proficient), French (intermediate)
- SCUBA: PADI Advanced Open Water Diver