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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, Environ. 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, 2009

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

Rainforest to Reef Program: Marine Geology, Coastal Sedimentology, James Cook Univ., Australia, 2004

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

PROFESSIONAL EXPERIENCE

Assistant Professor of Planetary Science, *Division of Geological & Planetary Sciences, California Institute of Technology*, 8/2011-present

Research Scientist, Jet Propulsion Laboratory, *California Institute of Technology*, 10/2011-present

Mastcam-Z, Co-I; SHERLOC, Co-I, Mars 2020 mission 2014-present

Dawn Science Team, Affiliate, 2015-present

Mars Science Laboratory Participating Scientist, 11/2011-present

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

Macelwane Medal, American Geophysical Union, 2015

Kavli Fellow, National Academy of Sciences, 2015

Mineralogical Society of America, Distinguished Lecturer, 2014-2015

National Geographic Emerging Explorer, 125th anniversary class (2013)

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

NASA Group Achievement Award, MSL ChemCam Instrument Development & Science Team (2013)

Editors' Citation for Excellence in Refereeing for *Geophysical Research Letters* (2012)

Zeldovich Medal, Comm. B (Planetary Science), Committee on Space Research (COSPAR) and Russian Academy of Sciences (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, fall 2014, fall 2015, fall 2016
Ge157c, Caltech. Remote Sensing for Environmental & Geological Applications, spring 2013, spring 2014, spring 2015, spring 2016
Ge194, Caltech. Special Topics in Planetary Science:
Current Issues in Understanding Reservoirs of Water on Mars, winter 2012
Isotopic Tracers of Mars Atmosphere-Surface Interactions, spring 2015
Scientific Issues in Mars Rover Landing Site Selection, winter 2016 and spring 2016 (led and co-taught as a multi-institutional seminar with Cornell, Purdue, U Copenhagen, Arizona State, Western Washington Univ., SUNY-Stony Brook) ([weblink](#))
NASA Astrobiology Institute Lecturer, International Summer School of Astrobiology 2011: Mars Exploration: Unveiling a Habitable Planet, Santander, Spain, June 27-July 1, 2011.
Brown University Sherdian Center Certificate IV: Teaching Consultant Program, Teaching Consultant 2009-2010; Certificate I: Introduction to Reflective Teaching Practice, five course seminar, May 2007
Teaching Assistant, GE133, Remote Sensing of the Environment, Brown University, 2010.
Teaching assistant, geosciences undergraduate spring break field trip, Brown University 2008
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

Ph.D. advisor for

Mathieu Lapotre (Caltech, 2017-anticipated; co-advised with Mike Lamb)
Pan Lu (Caltech, 2017-anticipated)
Daven Quinn (Caltech, 2017-anticipated)
Jennifer Buz (Caltech, 2018-anticipated)
Ellen Leask (Caltech, 2019-anticipated)
Nancy Thomas (Caltech, 2019-anticipated)

1st year projects with Dana Anderson (Caltech, 2018-anticipated), Peter Buhler (Caltech, 2018-anticipated), Peter Martin (Caltech, 2019-anticipated), Alistair Hayden (Caltech, 2019-anticipated), Nathan Stein (Caltech, 2020-anticipated)

Ph.D. Thesis Advisory Committee Member for Kathryn Stack (Caltech, 2014), Kirsten Siebach (Caltech, 2016), Joe O'Rourke (2016-anticipated), Patrick Fischer (Caltech 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)

SURF/SIP/high school summer student advisor for

Geraint Northwood-Smith (Cambridge '17; co-advised with Abigail Fraeman)
Caue Borlina (U. Michigan '16; now graduate student at MIT, planetary sciences)
Eyjolfur Gundmundsson (U. Reykjavik '13; now graduate student at U Chicago, medical physics)
Bryne Hadnott (WUSTL '13; now graduate student at Cornell, geological sciences)
Cecilia Sanders (Harvard '16; now graduate student at Caltech, planetary science; co-advised with Glenn Sellar (JPL))
David Smith (Troy High School, '13)
Jade Wang (Caltech '15)

Undergraduate advisor for

Daniel Lo (Planetary Science '14)
Valerie Pietrasz (Planetary Science, '16)
Tyler Perez (Planetary Science, '18)
Elise Cutts (Geology, '19)

Postdoctoral advisor for

Christopher Edwards (ASU, 2012; now faculty at Northern Arizona University)
Cedric Pilorget (IAS-Orsay, 2012; now research faculty at IAS-Orsay)
Abigail Fraeman (Washington University, 2014; now research scientist at JPL)
Rebecca Greenberger (Brown Univ., 2015; presently JPL Postdoctoral fellow co-advised with R. Green)

PROFESSIONAL SERVICE AND OUTREACH

National Academy of Sciences, Committee on Astrobiology and Planetary Sciences (April 2016-April 2021)
NASA Europa Lander Science Definition Team (May 2016-)
Organizing Committee, National Academy of Sciences, Arab-American Frontiers of Science, Engineering and Medicine symposium (2016-)
Mars 2020 Project Landing Site Working Group (2016-)
MEPAG Next Orbiter Science Analysis Group (May 2015-September 2015)
Convener, Eighth International Conference on Mars, July 14-18, 2014, Pasadena, California.
Scientific Program Committee, Planetary Systems: A Synergistic View, Rencontres du Vietnam, Jan-July 2015
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, AGU, 2011, 2012; IEEE Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing, 2013; Clay Minerals Society Annual Meeting, 2014; Goldschmidt 2016
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, NASA Earth & Space Sciences Fellowship Program, Lunar Advanced Science and Exploration Research Program
The Guardian Op-Ed (invited) on Curiosity's Exploration, 2013
Rhodes Scholar Selection Committee, District XIII (2009-2012; 2014-present)
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 2nd & 4th grades at Vartan Gregorian Elementary School (2006-2010)

UNIVERSITY & JPL COMMITTEES

Keck Institute for Space Studies Steering Committee (2012-present)
Caltech Library Committee (2012-present)
GPS GIS Committee (2012-present)
JPL Hiring Committee, Planetary Science: Mars (2013-2015)
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)

RESEARCH GRANTS (external)

PI, NASA MSL Participating Scientist Program Recognizing Aqueous Alteration While Roving and Disentangling Diagenesis, 2016-2020, \$600k
PI, NASA Solar Systems Working, Identifying and Quantifying Phyllosilicate-Bearing Materials on Solar System Bodies, 2015-2018, \$398k
Co-I, NASA Mars 2020 Investigations (J. Bell, PI), Mastcam-Z: A Geologic, Stereoscopic, and Multispectral Investigation for the NASA Mars 2020 Rover Mission, 2015-2020, \$198k
Co-I, NASA Mars 2020 Investigations (L. Beegle, PI), SHERLOC: Scanning Habitable Environments with Raman & Luminescence for Organics & Chemicals for Mars 2020, 2015-2020
Co-I, NASA Exbiology (J. Kirschvink, PI), Application of New Paleomagnetic and Rock Magnetism Techniques to Test the Origin of Magnetites in ALH84001 Carbonates, 2015-2018
PI (Science PI, postdoc C. Pilorget,), **NASA Mars Fundamental Research Program**, Long-term Stability of the Polar Reservoirs of CO₂ Ice on Mars, 2014-2017, \$170k
Co-I, NASA Mars Fundamental Research Program (T. McCollom, PI), Methods for Remote Detection of Mineral Composition for the Alunite-Jarosite Group, 2014-2017, \$72k
PI, National Geographic Society, Emerging Explorers grant, 2013-2017, \$10k
Co-I, NSF Astronomy and Astrophysics Research Grants (M. Brown, PI), The Nature of Europa's Surface and Ocean from New Infrared Spectroscopy, 2013-2017
Co-PI, Caltech-JPL PDF/RTD program, Surface-Based Hyperspectral Imaging for Advanced Planetary and Terrestrial Applications, 2013-2015, \$299k
PI, NASA Mars Fundamental Research Program, Planetary Major Equipment A Hyperspectral VNIR camera for Microscopic- and Outcrop-Scale Studies, 2013-2014, \$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, 2012-2016, \$310k
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, 2012-2016, \$598k
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." 2012-2016, \$252k

PEER-REVIEWED PUBLICATIONS

(see <https://goo.gl/MmmXiY>(Chrome, Firefox) for pdfs, w/ updates; or download 300MB [.zip](#))

(student under direct supervision; student-led collaboration; *=ugrad or #=postdoc under direct supervision)

In circulation with co-authors

107. Pan, L., **BL Ehlmann**, J Carter, C Ernst. Stratigraphy and aqueous activity in Mars' northern plains through mineralogy of impact craters: a global survey. in prep for to *JGR-Planets*
106. **Ehlmann, BL** et al. Chemistry and Mineralogy of the Bagnold Dune Field: A Synthesis of MSL Curiosity Observations Revealing Mafic Enrichment and Volatile Depletion, in prep for *JGR-Planets*
105. Lapotre, M. G. A., **B. L. Ehlmann**, S. E. Minson, A Probabilistic Approach to Remote Compositional Analysis of Planetary Surfaces. in prep for *JGR-Planets*
104. Wordsworth, R, Kalugina, Y, Lokshatnov, S., Vigasin, A., Head, J., **Ehlmann, B**, Sanders, C, Wang, H. Episodic methane greenhouse warming on Early Mars, in prep for *Geophysical Res. Letters*
103. Poston, MJ, A Mahjoub, J Blacksborg, M Brown, RW Carlson, **BL Ehlmann**, J Eiler, KP Hand, R Hodyss, I Wong. The Colors of Irradiated Mixed Ices and Application to Kuiper Belt and Jupiter Trojan Small Bodies, in prep. for *The Astrophysical Journal*

In revision or Submitted

102. Anderson, D. E., **B. L. Ehlmann**, O. Forni, S.M. Clegg, A. Cousin, N.H. Thomas¹, J. Lasue, D. M. Delapp, R.E. McNroy, O. Gasnault, M.D. Dyar, S. Schröder, S. Maurice, and R.C. Wiens. Characterization of Laser-Induced Breakdown Spectroscopy (LIBS) emission lines for the identification of chlorides, carbonates, and sulfates in salt/basalt mixtures for the application to MSL ChemCam data, submitted to *JGR-Planets*
101. Buz, J., **Ehlmann, B.L.**, Pan, L., Grotzinger, J.P. Mineralogy and stratigraphy of the Gale crater rim, wall, and floor units, submitted to *JGR-Planets*
100. Lapotre, M. G. A., **B. L. Ehlmann**, S. E. Minson, R. E. Arvidson, F. Ayoub, A. A. Fraeman[#], R. C. Ewing, and N. T. Bridges, Compositional Variations in Sands of the Bagnold Dunes at Gale Crater, Mars, from Visible-Shortwave Infrared Spectroscopy and Comparison to Ground-Truth from the Curiosity Rover, submitted to *JGR-Planets*
99. Prettyman, T (incl. **B. Ehlmann**), Extensive water ice within Ceres' aqueously altered regolith, submitted to *Science*
98. Yerebakan, H.Z., B. Rajwa, **B. Ehlmann**, M. Dundar. The Infinite Mixture of Infinite Gaussian Mixtures for Clustering Data Sets with Multi-mode and Rare Clusters, submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence*
97. Buhler, P. B., A.P. Ingersoll, **B.L. Ehlmann**, C.I. Fassett, and J. W. Head. How the Martian Residual South Polar Cap Develops Quasi-Circular and 1 Heart-Shaped Pits, Troughs, and Moats, *Icarus*, in revision.
96. Anderson, RB, SM Clegg, J Frydenvang, RC Wiens, S McLennan, RV Morris, **B Ehlmann**, MD Dyar. Improved Accuracy in Quantitative Laser-Induced Breakdown Spectroscopy Using Sub-Model Partial Least Squares, submitted to *Spectrochimica Acta Part B: Atomic Spectroscopy*
95. Clegg, SM et al. (incl. **BL Ehlmann**), Recalibration of the Mars Science Laboratory ChemCam Instrument with an Expanded Geochemical Database, submitted to, *Spectrochimica Acta B: Atomic Spectroscopy*
94. Wellington, DE, JF Bell III, JR Johnson, KM Kinch, MS Rice, AA Fraeman, C Hardgrove, A Godber, **BL Ehlmann**, and the MSL science team. Visible to near-Infrared MSL/Mastcam multispectral imaging results from select high-interest science targets within Gale Crater, Mars. *American Mineralogist*, in revision
93. Watkins, JA, **BL Ehlmann**, A Yin. Spatiotemporal evolution, mineralogical composition, and transport mechanisms of long-runout landslides in Valles Marineris, Mars, *Icarus*, in revision

92. Gainey, SR, EM Hausrath, CT Adcock, O Tschauer, J Hurowitz, **BL Ehlmann**, CL Bartlett. Clay minerals detected on Mars can form in environments that may destroy organic matter, in revision, *Nature Comm.*

Accepted for publication

91. **Ehlmann, BL** et al. (and 45 others) The Sustainability of Habitability on Terrestrial Planets: Insights, Questions, and Needed 5 Measurements from Mars for Understanding the Evolution of Earth-like Worlds, *J. Geophys. Res.*, doi: 10.1002/2016JE005134
90. Hadnott, BA*, **BL Ehlmann**, BL Jolliff. Mineralogy and chemistry of San Carlos high-alkali basalts: analyses of alteration with application for Mars exploration. *American Mineralogist*, accepted
89. Dunder, M., **Ehlmann BL**. Rare jarosite detection in CRISM imagery by non-parametric Bayesian clustering. *IEEE Transactions, IEEE 6th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS)*, 2016, accepted
88. Greenberger, R.N.#, **Ehlmann, BL.**, Jewell, P.W., Birgenheier, L. P., Green, R.O. Detection of organic-rich oil shales of the Green River Formation, Utah, with ground-based imaging spectroscopy. *IEEE Transactions, IEEE 6th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS)*, 2016, accepted
87. Leask, EL, **Ehlmann, BL**. Identifying and quantifying mineral abundance through VSWIR microimaging spectroscopy: a comparison to XRD and SEM. *IEEE Transactions, IEEE 6th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS)*, 2016, accepted
86. Fraeman, AA#, **Ehlmann, BL**, Northwood-Smith, GWD*, Liu, Y, Wadhwa, M, Greenberger, RN#. Using VSWIR microimaging spectroscopy to explore the mineralogical diversity of HED meteorites. *IEEE Transactions, IEEE 6th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS)*, 2016, accepted
85. Steiner, MH, EM Hausrath, ME Elwood Madden, **BL Ehlmann**, AA Olsen. Dissolution of nontronite in low water activity brines and implications for the aqueous history of Mars, accepted

Published

84. Fraeman, AA#, **B. L. Ehlmann**, R. E. Arvidson, C. S. Edwards, J. P. Grotzinger, R.E. Milliken, D. P. Quinn, M. S. Rice. The Stratigraphy and Evolution of Lower Mt. Sharp from Spectral, Morphological, and Thermophysical Orbital Datasets, *JGR-Planets*, doi: 10.1002/2016je005095, 2016
83. Ammannito, E.A., et a. (incl. **BL Ehlmann**) Distribution of phyllosilicates on the surface of Ceres, *Science*, 353, 10.1126/science.aaf4279
82. DeSanctis, M.C. et al. (incl. **BL Ehlmann**), Bright Carbonate deposits as evidence of aqueous alteration on (1) Ceres. *Nature*, 536, doi:10.1038/nature1829, 2016
81. Edwards, CS. and **Ehlmann, BL**. Carbon sequestration on Mars: Reply. *Geology*, 44(6). e389, doi: 10.1130/G37984 Y.1, 2016
80. **Ehlmann, BL**, GA Swayze, RE Milliken, JJ Wray, JF Mustard, GN Breit, RN Clark, B Gondet, F Poulet, RO Rye, WM Calvin, WM Benzel, KD Seelos, J Carter, SL Murchie. Discovery of alunite in Cross Crater, Terra Sirenum, Mars: Evidence for precipitation from acidic, sulfurous groundwaters on the margin of a paleolake. *American Mineralogist*, doi: 10.2138/am-2016-5574, 2016
79. Wray, J. J., 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, doi:10.1002/2015JE004972.
78. Turner, SMR, JC Bridges, S. Grebby, **BL Ehlmann**. Hydrothermal Activity Recorded in Post Noachian-aged Impact Craters on Mars, *JGR-Planets*, doi: 10.1002/2015JE004989, 2016
77. Maurice, S. and 48 others (incl. **B Ehlmann**). ChemCam Activities and Discoveries during the Nominal Mission of Mars Science Laboratory in Gale crater, Mars, submitted to *Journal of Analytical Atomic Spectroscopy*, 1,863-889, doi: 10.1039/C5JA00417A, 2016
76. Johnson, JR, Bell, JF III, Bender, S, Blaney, D, Cloutis, E, **Ehlmann, B**, Fraeman, A, Gasnault, O, Kinch, K, Le Mouélic, S, and others. Constraints on iron sulfate and iron oxide mineralogy from ChemCam visible/near-infrared reflectance spectroscopy of Mt. Sharp basal units, Gale Crater, Mars. *American Mineralogist*, 101, 1501–1514.

75. Mahjoub, A., MJ Poston, K Hand, M Brown, R Hodyss, J Blacksborg, J Eiler, R Carlson, **BL Ehlmann**, M Choukroun. Electron Irradiation and Thermal Processing of Mixed-iced of Potential Relevance to Jupiter Trojans Asteroids. *The Astrophysical Journal*, , 820:141, 2016.
74. Murchie, SL et al. (and 16 others incl **BL Ehlmann**) Mars-Moons Reconnaissance and Landed Investigation (MERLIN). *IEEE Transactions, IEEE Aerospace Conference*, Big Sky, Montana, March 5-12, 2016
73. Pilorget, C#, J Fernando, **BL Ehlmann**, F Schmidt, T Hiroi. Wavelength dependence of photometric properties in the VIS-NIR and link with the grains' physical and compositional properties, *Icarus*, 267, 296-314, 2016.
72. Greenberger, R#, JF Mustard, **BL Ehlmann**, DL Blaney, EA Cloutis, JH Wilson, RO Green, AA Fraeman, Imaging spectroscopy of geological samples and outcrops: novel insights from microns to meters, *GSA Today*, *GSA Today*, 25(12) doi: 10.1130/GSATG252A.1, 2015.
71. Hu, R, DM Kass, **BL Ehlmann**, Y Yung. Tracing the fate of carbonate and the atmospheric evolution of Mars, *Nature Communications*, doi: 10.1038/ncomms10003, 2015
70. Borlina, C.S.*, **BL Ehlmann**, E. Kite. Modeling the Thermal and Physical Evolution of Mount Sharp's Sedimentary Rocks, Gale Crater, Mars: Implications for Diagenesis on the MSL Curiosity Rover Traverse. *J. Geophys. Res.*, doi: 10.1002/2015JE004799, 2015
69. Edwards, CS# and **BL Ehlmann**. Carbon sequestration on Mars, *Geology*, doi:10.1130/G36983.1, 2015
68. Johnson, SS. MG Chevrette, **BL Ehlmann**, KC Benison. Insights from the metagenome of an acid salt lake: the role of biology in an extreme depositional environment. *PLOS One*, DOI: 10.1371/journal.pone.0122869, 2015.
67. Bristow, TF et al. (incl. **BL Ehlmann**), The origin and implications of clay minerals from Yellowknife Bay, Gale Crater, Mars, *Am. Mineralogist*, 100 (4). pp. 824-836, 2015.
66. **Ehlmann, BL** and J.Buz. Mineralogy and Fluvial History of the Watersheds of Gale, Knobel, and Sharp craters: A Regional Context for MSL Curiosity's Exploration. *Geophys. Res. Lett.*, doi: 10.1002/2014GL062553, 2015.
65. Watkins, JA, **BL Ehlmann**, A Yin. Long-runout landslides and the long-lasting effects of early water activity on Mars, *Geology*, doi:10.1130/G36215.1, 2015
64. Pilorget, C#, J Fernando, **BL Ehlmann**, S Doute. Photometry of the particulate mixtures: what controls the phase curve?, *Icarus*, 250, 188-203, doi:10.1016/j.icarus.2014.11.036, 2015.
63. Mangold, N., et al. (incl. **B Ehlmann**), Chemical variations in Yellowknife Bay formation sedimentary rocks analyzed by ChemCam on board the Curiosity rover on Mars. *J. Geophys. Res. Planets*, 120, 452–482. doi: 10.1002/2014JE004681, 2015.
62. Melikechi, N. and Mezzacappa, A. and Cousin, A. et al. Correcting for variable laser-target distances of laser-induced breakdown spectroscopy measurements with ChemCam using emission lines of Martian dust spectra. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 96. pp. 51-60, doi: org/10.1016/j.sab.2014.04.004, 2014
61. **Ehlmann, B.** Beaty, D., Meyer M. Developing an Updated, Integrated Understanding of Mars. *Eos*, vol. 95(39), 30 Sept 2014 (conference report for The Eighth International Conference on Mars, Pasadena, CA, 14-18 July 2014).
60. Nachon, M. et al. (incl. Ehlmann, B.) Calcium sulfate veins characterized by ChemCam/Curiosity at Gale crater, Mars. *Journal of Geophysical Research. Planets*, 119 (9). pp. 1991-2016, doi: 10.1002/2013JE004588, 2014
59. O'Rourke, JG, AS Wolf, **BL Ehlmann**. Venus: Interpreting the spatial distribution of volcanically modified craters, *Geophys. Res. Lett.*, 41, 8252–8260, doi:10.1002/2014GL062121, 2014.
58. Seelos, KD, FP Seelos, CE Viviano-Beck, SL Murchie, RE Arvidson, **BL Ehlmann**, AA Fraeman. Mineralogy of the MSL Curiosity Landing Site in Gale Crater as Observed by MRO/CRISM, *Geophys. Res. Lett.*, 41, 4880–4887, 2014
57. Viviano-Beck CE, FP Seelos, SL Murchie, EG Kahn, KD Seelos, HW Taylor, K Taylor, **B.L. Ehlmann**, SM Wiseman, JF Mustard, MF Morgan. Revised CRISM Spectral Parameters and Summary Products Based on the Currently Detected Mineral Diversity on Mars, *J. Geophys. Res.*, 119, 1403–1431, doi:10.1002/2014JE004627, 2014
56. Johnson, JR et al. (incl. **B Ehlmann**), ChemCam Passive Reflectance Spectroscopy of Surface Materials at the Curiosity Landing Site, Mars. *Icarus*, 10.1016/j.icarus.2014.02.028, 74-92, 2015

55. 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*, 99, 948-964, doi: 10.2138/am.2014.4617, 2014.
54. **Pan, L**, **BL Ehlmann**. Phyllosilicate and hydrated silica detections in the knobby terrains of Acidalia Planitia, *Geophysical Research Letters*, 41, 1890-1898, doi:10.1002/2014GL059423, 2014.
53. **Marlow, JJ**, DE LaRowe, **BL Ehlmann**, JP Amend, VJ Orphan. The Potential for Biologically Catalyzed Anaerobic Methane Oxidation on Ancient Mars, *Astrobiology*, 14(4), 1-16, doi:10.1089/ast.2013.1078, 2014.
52. 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*, 8(1), 084988, doi: 10.1117/1.JRS.8.084988, 2014
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, 2014.
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.
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FIRST-AUTHOR, POST-DOC, OR STUDENT CONFERENCE PRESENTATIONS (partial)

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

2016

Anderson, DE, **BL Ehlmann**, O Forni, SM Clegg, A Cousin, NH Thomas, J Lasue, DM Delapp, RE McInroy, O Gasnault, MD Dyar, S Maurice, RC Wiens. Emission lines selected for the identification of chlorides, carbonates, and sulfates dispersed in basaltic rock using laser-induced breakdown spectroscopy (LIBS). 47th Lunar & Planetary Science Conference, March 21-25, 2016, The Woodlands, TX, abs. # 2325.

Buhler, P.B., Ingersoll, A.P., **Ehlmann, B.L.**, Fassett, C.I., Head, J.W., 2016. How the Martian South Polar Residual Cap Loses Mass. 47th LPSC, Abstract # 2550

Buhler, P.B., Ingersoll, A.P., **Ehlmann, B.L.**, Fassett, C.I., Head, J.W., 2016. New Observations Reveal How the Martian Residual South Polar Cap Develops Heart-Shaped and Quasi-Circular Pits, Troughs, and Moats. 6th Int. Conf. Mars Pol. Sci., Abstract #6070

Buhler, P.B., Ingersoll, A.P., **Ehlmann, B.L.**, Fassett, C.I., Head, J.W., 2016. New Observations Reveal How the Martian Residual South Polar Cap Develops Quasi-Circular Pits, Heart-Shaped Pits, Troughs, and Moats. DPS 48, Abstract # 513.01

Buz, J, **Ehlmann, B.L.**, Pan, L., Grotzinger, J.P. (2016). Mineralogy and stratigraphy of the Gale crater rim, wall, and floor units from remote sensing, Geological Society of America Annual Meeting. Paper #197-12

Ehlmann B. L. Blaney D. L. Green R. O. Mouroulis P. VSWIR Microimaging Spectroscopy for Geologic History and Identifying and Quantifying Mineral, Ice, and Organic Abundances on Planetary Surfaces. 3rd International Workshop on Instruments for Planetary Missions. October 24-26, 2016, abs 4097.

Ehlmann, BL et al. Chemistry and mineralogy in situ at the Bagnold sand dunes: evidence for aeolian sorting and size-dependence in sand composition, LPSC 2016, abs. 1536

Ehlmann, BL Linking meteorites and asteroids: Visible-shortwave infrared (VSWIR) microimaging spectroscopy as a tool for rapid non-destructive assay of infrared spectral properties. The Asteroid-Meteorite Connection Workshop, UCLA April 21-22, 2016.

Ehlmann, BL. Mars Time and Martian Environments: Changing Habitability Through Time and Prospects for Ancient Mars Biosignatures, Biosignature Preservation and Detection in Mars Analog Environments. Workshop on Biosignature Preservation and Detection in Martian Environments. Lake Tahoe, May 16-18, 2016, abs. 2080

(*invited*) **Ehlmann, BL** Mars: Early Aqueous Alteration from Orbital Infrared and In Situ Spectroscopies: A review of the history of water on Mars. In Lester Strock Award Symposium Honoring Raymond Arvidson SciX, Minneapolis, 19-24 September, 2016

(*invited*) **Ehlmann, BL** Serpentinization on Mars & in Oman: New insights and new technologies for exploration. 4th Serpentine Days Workshop, 25-29 September, 2016, France.

Ehlmann, B.L. et al. MSL Chemistry and Mineralogy of the Bagnold Dunes, Gale Crater. Goldschmidt June 2016

Ehlmann, B and M Dundar. Acidic Conditions During Open System Weathering on Late Noachian/Early Hesperian Mars? Newly Identified Outcrops of Alunite and Jarosite from Orbital CRISM Data. DPS 2016 abs 500.04D

Fraeman, A.A., **Ehlmann, B.L.**, Liu, Y., Greenberger, R., Wadhwa, M., (2016). "Micrometer-Scale Spectral Properties of Howardite, Eucrite, and Diogenite Meteorites," DPS/EPSC Conference.

Fraeman, A.A., **Ehlmann, B.L.**, Arvidson, R., Edwards, C., Grotzinger, J., (2016) "The Evolution of Lower Mt. Sharp: An Orbital Perspective," Goldschmidt Conference, Yokohama, Japan, 2016.

Fraeman, A.A., **Ehlmann, B.L.**, Arvidson, R., Edwards, C., Grotzinger, J., Rice, M. (2016) "The stratigraphy and evolution of lower Mt. Sharp from spectral, morphological, and thermophysical orbital datasets," LPSC oral presentation Abstract #2224.

- Fraeman, A.A., **Ehlmann, B.L.**, Northwood-Smith, G.*, Liu, Y., Wadhwa, M., Greenberger, R. “Exploring the Mineralogical Diversity of HED Meteorites with Microimaging VSWIR Spectroscopy,” LPSC poster presentation. Abstract #2237. (2016)
- Greenberger, R. N., **B. L. Ehlmann**, R. O. Green, and D. L. Blaney (2016), Scientific Applications of Imaging Spectrometers for Landed Missions: Examples from Terrestrial Field Deployments, Instrumentation for Planetary Missions.
- Greenberger, R. N., **B. L. Ehlmann**, G. R. Osinski, L. L. Tornabene, and R. O. Green (2016), Outcrop-scale imaging spectroscopy of the Haughton impact structure, Canada, AGU Fall Meeting, Abstract #121404.
- Greenberger, R. N., **B. L. Ehlmann**, G. R. Osinski, L. L. Tornabene, R. O. Green, and J. F. Mustard, (2016), Lithologic Mapping of Impactites from the Haughton Structure, Canada, Using Imaging Spectroscopy, 47th LPSC, Abstract #1259.
- Lapôtre, M.G.A., **B.L. Ehlmann**, S.E. Minson, R.E. Arvidson, F. Ayoub, A.A. Fraeman, R.C. Ewing, N.T. Bridges, 2016, Compositional variations in sands of the Bagnold Dunes at Gale crater, Mars, from visible-shortwave infrared spectroscopy and comparison to ground-truth from the Curiosity rover. GSA Annual Meeting 2016, Paper no. 140-12.
- Lapôtre, M.G.A., **B.L. Ehlmann**, A.A. Fraeman, S.E. Minson, F. Ayoub, R.C. Ewing, R.E. Arvidson, N.T. Bridges, 2016, A quantitative assessment of aeolian fractionation at the Bagnold Dunes of Gale crater, Mars, from orbit to the ground. 47th LPSC, Abstract #1513.
- Leask, E.K. and **B.L. Ehlmann** (2016) “Quantifying Mineral Abundance through VSWIR Microspectroscopy in Carbonate/Serpentine Systems.” 47th Lunar and Planetary Science Conference. The Woodlands, TX. Abstract #1409.
- Leask, E.K. and **B.L. Ehlmann** (2016) “Identifying and Quantifying Carbonate and Serpentine Textures and Abundances at Multiple Scales with VSWIR Imaging Spectroscopy, Samail Ophiolite, Oman.” AGU Fall Meeting, Abstract #187346.
- Leask, E.K. and **B.L. Ehlmann** (2016) “Identifying and Quantifying Mineral Abundance through VSWIR Microimaging Spectroscopy: a Comparison to XRD and SEM.” 8th IEEE Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS). Los Angeles, CA. Paper #58.
- Martin, P.E.*, **BL Ehlmann**, et al., (2016) Outcrop-Scale Studies Of A Lacustrine-Volcanic Mars Analog With a Mars 2020-Like Instrument Suite, *Geo. Soc. Amer. Meeting*, Paper No. 79-10
- Martin, P.E., **B.L. Ehlmann**, et al., (2016) Outcrop-Scale Studies Of A Lacustrine-Volcanic Mars Analog With a Mars 2020- Like Instrument Suite, 47th Lunar Plan. Sci. Conf., Abstract #2569
- Pan, L., **B. L. Ehlmann**, J. Carter, and C. M. Ernst. 2016 "The Stratigraphy of the Northern Plains Inferred from Mineralogy of Impact Craters." 47th Lunar and Planetary Science Conference. The Woodlands, TX. Abstract #2338.
- Pan L., **B. L. Ehlmann**, J. Carter, C. M. Ernst. “Insights into the stratigraphy of Mars’ northern plains from impact crater mineralogy ” . 48th Meeting of the Division of Planetary Sciences (DPS) / EPSC 11. 2016 Abstract ID #: 500.04D
- Pan L., **B. L. Ehlmann**, “Aqueous alteration revealed by diverse mineralogy at Amazonian-aged Lyot crater, Mars”. AGU Fall Meeting Abstracts, 2016
- Stein, N.T., **B.L. Ehlmann**, E. Ammannito, E. Palomba, M.C. De Sanctis, R. Jaumann, A. Nathues, C. Raymond, H. Hiesinger, P. Schenk, and A. Longobardo. Bright Spots on Ceres and Implications for Subsurface Composition and Structure. 48th Meeting of the Division of Planetary Sciences (DPS), 2016. Abstract #506.03.
- Thomas, N.H., **B.L. Ehlmann**, S.M. Clegg, O. Forni, S. Schröder, D.E. Anderson, W. Rapin, A. Cousin, P.-Y. Meslin, J. Lasue, D.M. Delapp, R.E. McInroy, M.D. Dyar, G.R. Rossman, O. Gasnault, R.C. Wiens and S. Maurice (2016) Characterization of Hydrogen in Basaltic Materials with Laser-Induced Breakdown Spectroscopy (LIBS), 47th Lunar Plan. Sci. Conf., Abstract #2494.

2015

- Anderson, DE, **BL Ehlmann**, SM Clegg. Quantification of Salt Anions Using Laser-Induced Breakdown Spectroscopy (LIBS). 46th Lunar & Planetary Science Conference, March 16-20, 2015, The Woodlands, TX, abs. # 2724.
- Borlina, C.S.* and B.L. Ehlmann. Modelling Diagenesis of Gale Crater Sedimentary Rocks: Scenarios Testable by the Curiosity rover. 46th Lunar & Planetary Science Conference, 2015, abs. 1208.

- Buz, J., **Ehlmann, B.L.**, Pan, L., Grotzinger, J.P. (2015), Mineralogy and stratigraphy of Gale rim, wall, and floor units. Geological Society of America Annual Meeting. Paper #71-10
- Edwards, C. S., **B. L. Ehlmann** (2015), Carbon Sequestration on Mars: Constraints from the Nili Fossae Carbonate Plains, *Eos Trans., AGU, Fall Meet. Suppl.*, Abstract P31F-06.
- (invited)* **Ehlmann, B.L.** The Aqueous Environments of Early Mars: Where are the Biosignatures and Where Should We Be Looking? The 3rd ELSI International Symposium. January 13, 2015 - January 15, 2015
- Ehlmann, B.L.** and ME Brown. First Keck adaptive optics global infrared (2.2-4.1 um) spectral map of Ceres: results and a review of key questions in advance of Dawn's exploration. 46th Lunar and Planetary Science Conference, 2015, abs. 2807.
- Ehlmann, B.L.** and M. Dundar. 2015. Are Noachian/Hesperian acidic waters key to generating Mars' regional-scale aluminum phyllosilicates? The importance of jarosite co-occurrences with Al-phyllosilicate units. In Lunar and Planetary Science Conference, 46, abstract 1635.
- Ehlmann, B.L.** Aqueous Environments During Mars' First Billion Years. Planetary Systems: A Synergistic View. 11th Rencontres du Vietnam, July 19-25, 2015.
- (invited)* **Ehlmann, B.L.** Aqueous Environments during Mars' First Billion Years. 2nd Beijing International Forum on Lunar and Deep-space Exploration. Sept 7-10, 2015.
- (invited)* **Ehlmann, B.L.** and Quinn DP. Hydrothermal and Diagenetic Mineralization on Mars, AGU 2015
- (invited)* **Ehlmann, B.L.** Macelwane Medal talk: Mars Exploration - A look forward, AGU 2015
- Fraeman, A., **Ehlmann, B.**, "Deciphering the History and Habitability of Gale Crater with Orbital and Rover Datasets," oral presentation at 11th Recontres du Vietnam, Planetary Systems Conference (2015).
- Fraeman, A., Arvidson, R., **Ehlmann, B.**, Bridges, N., Clark, B., Cousin, A., Des Marais, D., Gellert, R., Johnson, J., Lapotre, M., Schroder, S., Stein, N., Sullivan, R., Wellington, D., "Physical and Material Properties of Gale Crater Sandy Deposits: From Rocknest to Pahrump", poster presentation at LPSC (2015)
- Fraeman, A., Edwards, C., **Ehlmann, B.**, Arvidson, R., and Johnson, J., "Exploring Curiosity's Future Path from Orbit: The View of Lower Mt. Sharp from Integrated CRISM, HiRISE, and THEMIS Datasets," poster presentation at LPSC (2015)
- Fraeman, A., Edwards, C., **Ehlmann, B.**, "Habitable Environments Preserved in Lower Mt. Sharp: Exploring Curiosity's Future Path from Orbit," poster presentation at 3rd ELSI International Symposium (2015)
- Fraeman, A., Edwards, C., **Ehlmann, B.**, Arvidson, R., Horgan, B., Rices, M. "A Detailed Investigation of Lower Mt. Sharp using Coordinated Orbital Datasets," oral presentation at GSA Annual Meeting (2015)
- Green, R.O, **Ehlmann, B.L (presenting)**, Fraeman, A.A., Blaney, D., Liu, Y., Chabot, N.L, Murchie, S., Wadhwa, M., Herd, C.D.K., Velbel, M.A., Mourolis, P., Van Gorp, B., Microimaging spectroscopy for the exploration of small bodies: first laboratory measurements of carbonaceous chondrite and HED meteorites and a proposed M6 instrument for in situ measurement. Lunar & Plan Sci. Conf., abstract #2154.
- Lapôtre, M.G.A., **B.L. Ehlmann**, F. Ayoub, S.E. Minson, N.T. Bridges, A.A. Fraeman, R.E. Arvidson, J.L. Eigenbrode, R.C. Ewing, J.R. Johnson, 2015, The Bagnold dunes at Gale Crater - A key to reading the geologic record of Mount Sharp. 46th LPSC, Abstract #1634.
- Lapôtre, M.G.A., **B.L. Ehlmann**, S.E. Minson, F. Ayoub, R.E. Arvidson, J. Buz, A.A. Fraeman, N.T. Bridges, R.Ewing, D.M. Rubin, 2015, Implications of active surface processes for the interpretation of the Martian sedimentary rock record: Aeolian sands, sediments, and their sources at Gale Crater. GSA Annual Meeting 2015, Paper no. 71-15.
- Leask, E. K. and **B. L. Ehlmann** (2015). "Quantifying Carbonate and Serpentine Abundances through VSWIR Microspectroscopy." AGU Fall Meeting (Abstract #P31A-2035).
- Leask, E.K. and **B.L. Ehlmann**. Identification and quantification of mineral abundance for VSWIR reflectance spectra in carbonate/serpentine systems. 46th Lunar & Planetary Science Conference, 2015, abs. 1689.
- Martin P.E., **B.L. Ehlmann**, et al. (2015) Outcrop-Scale Hyperspectral Studies of a Lacustrine-Volcanic Mars Analog: Examination with a Mars 2020-like Instrument Suite, AGU Fall Meeting Abstracts, Poster #P31A-2033

- Pan, L., **B. L. Ehlmann**, J. Carter, and C. M. Ernst. 2015 "Insights into the Stratigraphy of Mars' Northern Plains from Impact Crater Mineralogy." Bridging the Gap III: Impact Cratering In Nature, Experiments, and Modeling. Abstract #1106.
- Pan, L., **B. L. Ehlmann**, J. Carter, and C. M. Ernst. 2015, "Probing the northern plains stratigraphy with impact craters", 46th Lunar and Planetary Science Conference, the Woodlands, TX. Abstract #1353.
- Quinn, D. P. and B. L. Ehlmann, "The deposition and alteration history of the northeast Syrtis layered sulfates," oral presentation at the Geologic Society of America Fall Meeting, November 2015 (Baltimore, MD).
- Pilorget C., Fernando J., **Ehlmann B.L.**, Schmidt F., Hiroi T., Wavelength dependence of spectrophotometric properties and link with the microtexture. European Planetary Science Congress (EPSC) (Nantes, France), 2015
- Thomas, N.H., **B.L. Ehlmann**, D.E. Anderson, and S.M. Clegg (2015) Characterization of Hydrogen Abundance in LIBS Data, 46th Lunar Plan. Sci. Conf., Abstract #2119.
- 2014
- 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.
- Edwards, C. S., P. D. Asimow, S.T. Stewart, **B. L. Ehlmann** (2014), The Formation of Widespread Volcanically Filled Crater Floors on Mars: Insights from Modeling and Observations, Eos Trans. AGU, Fall Meet. Suppl., Abstract P41B-3903.
- Edwards, C. S., P. D. Asimow, S. T. Stewart, B. L. Ehlmann (2014), An Examination of the Impact-Induced Decompression Melting Formation Hypothesis for the Rocky, Mafic Crater Floors of Mars, 8th International Conference on Mars, Abstract #1303.
- Edwards, C. S., P. D. Asimow, B. L. Ehlmann, S. T. Stewart, (2014), Testing the Impact-Induced Decompression Melting Hypothesis for Mafic Infilled Crater Floors on Mars, 45th LPSC, Abstract # 2644.
- (invited)* **Ehlmann, B.L.**, C.S. Edwards. The Mineralogy of Mars: A View from Orbital Infrared Spectroscopy. Goldschmidt Conference, 2014
- 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
- (invited)* **B. L. Ehlmann**, Mars, The First Billion Years: Warm and Wet vs. Cold and Icy? 8th Mars Conference, July 2014 (Pasadena, CA).
- Ehlmann, B.L.** Composition of Clay Minerals on Mars from Orbiting Infrared Spectroscopy: Key Minerals and Key Questions. Clay Minerals Society Conference, Texas A&M, May 2014.
- Ehlmann, B.L.**, Mouroulis, P., Van Gorp, B., Green, R., Blaney, D., Rodriguez, J., Mustard, J., Murchie, S., Herd, C., Seelos, F., and Feldman, S., 2014, Microimaging VSWIR Spectroscopy Instruments for Planetary Exploration: Measuring In-Situ Mineralogy, Ices, Organics, and Linking to Remote Observation, International Workshop on Instrumentation for Planetary Missions, abs. 1046.
- Fraeman, A., Arvidson, R., **Ehlmann, B.**, Grotzinger, J., Hamilton, V., Martín-Torres, J., Zorzano, M-P., "Compositional and Physical Properties of Materials Along Curiosity's Traverse Inferred from CRISM Hyperspectral Data," poster presentation at AGU Fall Meeting (2014).
- Fraeman, A. A., Arvidson, R., Seelos, K., Johnson, J., Murchie, S., **Ehlmann, B.L.**, Grotzinger, J., (2014). "Curiosity's Traverse from the Kimberley to the Base of Mt. Sharp: A CRISM Perspective," 8th International Conference on Mars.
- 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.
- Lapôtre, M.G.A., B.L. Ehlmann, R.E. Arvidson, S.E. Minson, F. Ayoub, N.T. Bridges, 2014, Two tales of Martian sands and dust. 8th International Conference on Mars, Abstract #1126.
- Oshagan, A., C. Edwards, and **B. Ehlmann** (2014), A Near-Automated Method to Generate Multi-Image HiRISE Mosaics, LPI Contributions, 1791, 1427.
- 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
- Quinn, D. P. and **B. L. Ehlmann**, Structural constraints on the origin of the sulfate-bearing unit at northeast Syrtis Major" poster presentation at 8th Mars Conference, July 2014 (Pasadena, CA).

- Pan, L., **B. L. Ehlmann**, J. Carter, and C. M. Ernst. 2014, "Probing the northern plains stratigraphy with impact cratering", 8th International Conference on Mars, Pasadena, CA. Abstract # 1353.
- Pan, L., and **Ehlmann B. L.** "Aqueous alteration history of Mars' northern plains." (2014), Third Conference on Earth System Science, Shanghai, China.
- 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
- Pilorget C., Edwards C. S., **Ehlmann B. L.**, Forget F., Millour E., Material Ejection by the Colds Jets and Temperature Evolution of the South Seasonal Polar Cap of Mars from THEMIS/CRISM Observations and Implications for the Surface Properties. 45th Lunar and Planetary Science Conference (LPSC) (Houston, USA), 2014, Contribution No. 1777, p.1538
- Pilorget C., Fernando J., **Ehlmann B.L.**, Douté S., Photometry of Particulate Mixtures: New Insight from Simulations of Light Scattering in a Compact Granular Medium. 45th Lunar and Planetary Science Conference (LPSC) (Houston, USA), 2014, Contribution No. 1777, p.1541
- Pilorget C., Forget F., Edwards C. S., **Ehlmann B.L.**, Seasonal Evolution of Surface CO2 Ice on Mars: Physical Processes and Impacts on Surface Properties. 8th International Conference on Mars (Pasadena, USA), 2014, Contribution No. 1791, p.1313
- 2013
- 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)
- Edwards, C. S., and B. L. Ehlmann (2013), How much carbonate in Mars rocks? A Co-Analysis of CRISM, TES, and THEMIS data at the Nili Fossae Carbonate Plains, Eos Trans. AGU, Fall Meet. Suppl., Abstract. P51D-1759.
- Edwards, C.S., and B. L. Ehlmann, (2013), The Nili Fossae Carbonate Plains as Viewed by TES, THEMIS, and CRISM: Alteration of Ultramafic Rocks and Clay-Carbonate Stratigraphy, 44th LPSC, Abstract #2424.
- 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)
- (invited) **Ehlmann, BL**, 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)
- 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. 125th 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)
- Fraeman, A.A., Arvidson, R.E., Bell, J.F., **Ehlmann, B.L.**, Johnson, J.R., Morris, R.V., Murchie, S., Rice, M.S., Seelos, F., Seelos, K. (2013). "Curiosity's Traverse to Mount Sharp: Enhancing Scientific Investigation with Hyperspectral Orbital Data, 44th Lunar and Planetary Science Conference (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).
- Pilorget, C., Edwards C.S., Ehlmann B.L., Forget F., Millour E., Material ejection through basal sublimation of the CO2 ice on Mars: temporal evolution, thickness evolution and implications for Mars polar sedimentary records. 45th Annual Meeting of the Division for Planetary Science (DPS) of the American Astronomical Society (Denver, USA), 2013, id.405.05
- 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)
- 2012
- 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).

Fraeman, A.A., Arvidson, R.E., **Ehlmann, B.L.,** McGovern, J.A., Milliken, R.E., Murchie, S., Seelos, F., Seelos, K., (2012) "Increasing the spatial resolution of oversampled CRISM images at Gale Crater," LPSC 43, Houston, Texas, March 2012 (poster).

2011

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, Dec. 2011 (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.

2010

- (*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. 1st 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)
- 2009 and prior
- 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" 14th 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 LECTURES

- 2017 University of British Columbia, Harvard University
- 2016 AGU Union Public Outreach Event (featured panelist); IEEE WHISPERS (plenary speaker); Japan Society for the Promotion of Science (Washington, DC); Vatican Observatory Summer School; NASA Ames Summer Seminar Series (center-wide); JPL Mars seminar series
- 2015 Earth & Life Sciences Institute, Tokyo Tech; University of Toulouse, University of Utah, University of the Pacific, California State University, Chico; Mineralogical Society of Southern California; Kavli Symposium, Jerusalem
- 2014 University Massachusetts-Amherst; Southwest Research Institute; Silas Peirce Lecture, Boston University; McGill University; Lafayette College; Westchester University; California State University-Long Beach; Southwest Research Institute; Public event, National Geographic, Washington, DC; TED Youth, New York City
- 2013 Kongsberg Seminar, University of Oslo; University of Colorado; University of California, Santa Cruz; National Geographic Explorers Symposium, Washington, DC; Summer Science Program, Santa Barbara; 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

- American Geophysical Union (since 2001)
- Geological Society of America (since 2003)

Mineralogical Society of America (since 2009)
Division of Planetary Sciences, AAAS (since 2012)
British Society for Geomorphology (since 2005)
Clay Minerals Society (since 2009)
American Society for Photogrammetry and Remote Sensing (since 2014)
NASA Academy Alumni Association (since 2002; Executive Selection Board, 2005-9; Soffen Travel
Grant Committee, 2006-9, 2011; Phone Interviewer, 2004, 2007, 2010, 2011)

ADDITIONAL SKILLS

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