

**Joshua L. Bandfield**  
**Curriculum Vitae**

***Education:***

May 2000                      **Arizona State University**, Tempe, AZ  
Ph.D. in Geology  
Isolation and Characterization of Martian Atmospheric Constituents  
and Surface Lithologies Using Thermal Infrared Spectroscopy

June 1996                      **University of California at Santa Barbara**  
B.S. in Geological Sciences: Earth Systems  
Science emphasis

***Professional Experience:***

**Space Science Institute**

Period:                              9/13–  
Position:                             Senior Research Scientist

**University of Washington**

Department of Earth and Space Sciences  
Period:                              3/08–  
Position:                             Research Associate Professor / Affiliate Associate Professor

**Arizona State University**

Mars Space Flight Facility, Department of Geological Sciences  
Period:                              6/02–2/08  
Position:                             Research Specialist Principal

**Mesa Community College/Chandler Gilbert Community College**

Maricopa Community College District  
Period:                              8/02–5/05  
Position:                             Adjunct Faculty

**NASA Goddard Space Flight Center, Laboratory for Extraterrestrial Physics**

Period:                              12/00–5/02  
Position:                             Consultant/National Research Council Postdoctoral Research Associate

**NASA Ames Research Center**

Period:                              6/00–11/00  
Position:                             Independent Contractor

***Spacecraft Operational Experience:***

- OSIRIS-REx (2017-present)
- 2001 Mars Odyssey, Thermal Emission Imaging System (2002-present)
- Mars Reconnaissance Orbiter, Mars Climate Sounder (2007-present)
- Lunar Reconnaissance Orbiter, Diviner Lunar Radiometer Experiment (2009-present)
- Mars Global Surveyor, Thermal Emission Spectrometer (1997-2005)
- Mars Exploration Rovers (2003-2004)
- Mars Science Laboratory landing site characterization (2008-2011)

- Mars Scout Phoenix landing site characterization (2006-2008)
- Mars Reconnaissance Orbiter Aerobraking Atmospheric Advisory Group, 2006

***Guest Lectures and Invited Presentations:***

- Colloquium, Lunar and Planetary Institute, 2018
- Colloquium Boise State Physics, 2017
- Invited Presentation, Hayabusa Symposium, 2016
- Colloquium, Boise State University Physics, 2016
- Colloquium, University of Colorado, Laboratory for Atmospheric and Space Physics, 2015
- Colloquium, Boise State University Geosciences, 2013, 2014
- Colloquium, Southwest Research Institute, Boulder, CO, 2014
- Colloquium, University of Washington, Earth and Space Sciences, 2012
- Colloquium, Lunar and Planetary Institute, 2012
- Colloquium, University of Nevada, Las Vegas Department of Geoscience, 2011
- Colloquium, University of Pittsburgh Department of Geology and Planetary Science, 2010
- Colloquium, Stony Brook University Department of Geosciences, 2009
- Colloquium, University of Washington Astrobiology Institute Seminar Series, 2008
- Invited Presentation, 3<sup>rd</sup> Mars Science Laboratory Landing Site Workshop, 2008
- Invited Presentation, Geological Society of America Annual Meeting, 2007
- Invited Presentation, American Geophysical Union, Fall Meeting, 2006
- Invited Presentation, American Geophysical Union, Spring Meeting, 2004
- Seminar, UC Berkeley Department of Astronomy Special Lecture, 2004
- Invited Presentation, TES Data Users Workshop, 2001

***Education/Public Outreach Activities:***

- Public Lecture, Boise State University, 2017
- Public Lecture, Mars Opposition, Boise State University, 2016
- Idaho Science and Aerospace Scholars Program, 2013-2014
- Mars Revisited, Boise Art Museum, 2013
- Science Café, Discovery Center of Idaho, Postcards From Mars, 2013
- Science Café, Pacific Science Center/KCTS, To the Moon, Mars, and Beyond: Robotic Spacecraft Exploration, 2012
- Pacific Science Center, Track for Earth and Space Science Achievement Program, 2012
- Co-Investigator, Bringing NASA themed space research to the public in an interactive, dynamic environment, NASA E/PO supplemental award with Pacific Science Center, 2011-2014
- Collaborator, Expedition Earth and Beyond, NASA JSC, 2009-2012
- Pacific Science Center Portal to the Public Program, 2009-2013
- Ice on Mars!, UW/Pacific Science Center Polar Science Weekend, 2010/2011/2012
- Science Café/Science on Tap, Pacific Science Center/KCTS, A tour of familiar and alien landscapes on Mars, 2010
- Seattle Astronomical Society Guest Lectures, 2010/2011
- Northwest Geological Society Meeting Speaker, 2009/2013
- Instructor and Curriculum Development, Mars Student Imaging Project, 2003-2010
- Guest Lecture, National Science Teachers Association Web Seminars, 2006-2008
- Guest Lecture, NASA Winter's Story Teachers Workshop, 2006, 2007
- Instructor/field guide, National Remote Sensing Educator Workshop, 1999-2005
- Guest Instructor, University of Arizona Astronomy Camp, 1998, 1999
- Guest Instructor, ASU Mars K-12 Education Outreach spring and fall teacher workshops, 1996-1999
- Field guide, TES Composition Workshop, 1997

## ***Peer Review***

### *External written grant reviews:*

- NASA Postdoctoral Program
- German Research Foundation
- Lunar Advanced Science and Exploration Research Program (NASA)
- Mars Data Analysis Program (NASA)
- Mars Fundamental Research Program (NASA)
- MESSENGER Participating Scientist Program (NASA)
- Astrobiology Institute Director's Discretionary Fund (NASA)
- Discovery Mission Program (NASA)
- Experimental Program to Stimulate Competitive Research (NASA)
- Lunar and Planetary Science U.S. Participating Investigator Program (NASA)
- Planetary Data System LRO Spacecraft Dataset Review (NASA)
- Discovery Data Analysis Program (NASA)
- Solar System Workings Program (NASA)
- Petrology and Geochemistry (NSF)

### *Scientific journal reviews:*

- Advances in Space Research
- Astrobiology
- Astronomical Society of the Pacific
- Astronomy and Astrophysics
- Earth and Planetary Science Letters
- Geology
- Geophysical Research Letters
- Icarus
- Journal of Geophysical Research
- Journal of Image and Data Fusion
- Journal of Volcanology and Geothermal Research
- Nature Geoscience
- Remote Sensing of Environment
- Science
- Space Science Reviews

### ***Committees/Groups:***

- UW Astrobiology Program (2008-2013)
- UW Astrobiology Program Steering Committee (2011-2013)
- Faculty Advisor – University Kayak Club (2010-2013)
- Planetary oceans research faculty search committee (UW ESS) – 2010-2011
- Planetary science research faculty search committee (UW ESS) – 2008

### ***Teaching:***

ESS 418 – Geoscience Communication  
University of Washington, Winter 2013

ESS 595 – Planetary Science Seminar  
University of Washington, Winter/Spring/Fall 2012

ESS 421 – Introduction to Geological Remote Sensing

University of Washington, Spring 2012/2013

ESS 306 – Planetary Geology  
University of Washington, Summer 2009

GLG 101/103 – Introduction to Physical Geology/Laboratory  
Maricopa Community Colleges, Fall 2002, Spring 2003/2004, Fall 2004

***Graduate Student Supervision:***

Jonathan Bapst, Ph.D. (ESS/Astrobiology), 2018, Chair  
Regolith vapor diffusion and the martian water cycle

Gabriel Garcia M.S., 2018 (BSU Geosciences), Thesis committee member  
Identifying evidence for explosive volcanism on Mars through geomorphologic and thermophysical observations

Elena Amador, Ph.D. (ESS/Astrobiology), 2017, Chair  
Combined spectral analyses of martian aqueously altered surfaces

Frances Rivera-Hernandez, M.S., 2014, Chair  
Laboratory measurements and radiative transfer modeling of dust coatings on Earth and Mars

Carin Cornwall, M.S., 2014, Chair  
Physical Abrasion of Mafic Minerals and Basalt Grains: Application to Martian Aeolian Deposits

Eugenie Song, M.S., Spring 2012, Chair  
Compositional analysis of lunar central peaks using Diviner Radiometer data

Matthew Smith, Ph.D., Spring 2012, Co-chair  
Spectral and morphological characterization of silica-rich regions on Mars

Iryna Danilina, Ph.D., Spring 2012, Dissertation committee member  
Thermal infrared radiosity and heat diffusion model for sub-pixel radiant temperature estimation

Christopher Hughes, Ph.D., Spring 2011, U. Pittsburgh external committee member  
Improved Mapping Accuracy of Planetary Surfaces Using Super-Resolution of Thermal Infrared Data

***Undergraduate Student Research Supervision:***

- Nancy Thomas (Astronomy, 2010-2014) Mars near-infrared spectroscopy
- Eleni Bohacek (ESS, 2013) Mars geomorphology
- Sophia Tsang (Brown Geosciences, 2012) Mars thermophysics
- Margot Nelson (ESS, 2011-2012) Mars geomorphology
- Jason Lai (ESS, 2009-2011) Mars geomorphology
- Scott Becker (ESS, 2010) Mars geomorphology
- Laura Mayorga (Astronomy, 2008-2010) Mars thermal-infrared spectroscopy
- Rebecca Wu (Biology, 2009) Mars thermophysics
- Jennifer Braun (Computer Science, 2008) Mars thermal-infrared spectroscopy

***Current Funding:***

Principal Investigator, OSIRIS-REx Participating Scientist Program  
Rocks and roughness: Accounting for anisothermality on Bennu in OSIRIS-REx spectral datasets, NASA, 2017-2020

Co-Investigator (Institutional PI), Solar System Observations Program  
Ground-based Observations of the Moon at 3 $\mu$ m, NASA, 2017-2020

Principal Investigator, Lunar Data Analysis Program  
Investigation of the effects of surface roughness on lunar infrared spectra, NASA, 2016-2019

Principal Investigator, Planetary Data Archiving, Restoration, and Tools Program  
Production and validation of Planetary Fourier Spectrometer calibrated radiance, NASA, 2015-2018

Co-Investigator, Planetary Data Archiving, Restoration, and Tools Program  
Re-calibration of the MGS TES spectrometer dataset, NASA 2016-2019

Co-Investigator (Institutional PI), Lunar Reconnaissance Orbiter  
Diviner Lunar Radiometer Experiment, UCLA, 2011-2019

Co-Investigator (Institutional PI), 2001 Mars Odyssey Spacecraft Thermal Emission Imaging System,  
Arizona State University, 2008-2019

Principal Investigator, Mars Data Analysis Program  
Integrated Analyses of Martian Surface Compositions Using Near-Infrared through Thermal Infrared Spectroscopic Data, NASA, 2014-2018

### ***Past Funding:***

Co-Investigator (Institutional PI), Mars Data Analysis Program  
Spectroscopic and Geologic Analyses of Chloride Salt Deposits on Mars, NASA, 2014-2017

Co-Investigator, Supplemental Outreach Awards for ROSES Investigators  
Bringing current NASA themed space research to the public in an interactive, dynamic environment, NASA, 2011-2014

Principal Investigator, Planetary Geology and Geophysics Program Investigation of planetary surface anisothermality using thermal infrared observations, NASA, 2012-2013

Principal Investigator, Critical Data Products for Mars Landing Site Characterization (CDP V)  
Characterization of Altered and Evolved Lithologies in Antoniadi Crater/Syrtis Major, Mars: Assessment of Potential Future Landing Sites, Jet Propulsion Laboratory, 2010-2011

Principal Investigator, Mars Fundamental Research Program  
Laboratory and Remotely Sensed Spectroscopic Characterization of Chlorides, NASA, 2010-2013

Principal Investigator, Mars Data Analysis Program  
Integrated Analyses of Martian Surface Compositions Using Near-Infrared through Thermal Infrared Spectroscopic Data, NASA, 2010-2013

Principal Investigator, Lunar Reconnaissance Orbiter Participating Scientist Program  
Characterization of lunar thermophysical and spectral properties with the Diviner radiometer, NASA, 2008-2011

Principal Investigator, Critical Data Products for Mars Landing Site Characterization (CDP IV)

TES and THEMIS Surface Mineralogy, Dust Cover, and Emissivity for MSL Landing Site Characterization, Jet Propulsion Laboratory, FY 2008-2011

Co-Investigator (Institutional PI), Mars Data Analysis Program  
Geologic Characterization of Likely Chloride Salt Deposits on Mars, NASA, 2008-2011

Principal Investigator, Mars Data Analysis Program  
Investigation of spectral diversity in Thermal Emission Imaging System data, NASA, 2007-2011

Principal Investigator, Mars Reconnaissance Orbiter Participating Scientist Program  
Mars Climate Sounder: Ensuring continuity with previous thermal infrared measurements, NASA, 2007-2011

### ***Pending Funding:***

Instrument Scientist, Earth Venture Instrument – 4  
I-THEMIS: A multispectral imager for thermal infrared data continuity and atmospheric plume measurements, NASA 2017-2024

Co-Investigator (Institutional PI), Discovery Data Analysis Program  
A Window Into the Thermophysical Properties of Mercury NASA, 2018-2020.

### ***Refereed Research Articles:***

- Bandfield, J.L., M.J. Poston, R.L. Klima, C.S. Edwards, Widespread distribution of OH/H<sub>2</sub>O on the lunar surface inferred from spectral data, *Nature Geoscience*, 10.1038/s41561-018-0065-0, 2018.
- Salvatore, M.R., T.A. Goudge, M.S. Bramble, C.S. Edwards, J.L. Bandfield, E.S. Amador, J.F. Mustard, P.R. Christensen, Bulk mineralogy of the NE Syrtis and Jezero crater regions of Mars derived through thermal infrared spectral analyses. *Icarus*, 10.1016/j.icarus.2017.09.019, 2018.
- Amador, E.S., J.L. Bandfield, W.J. Brazelton, D. Kelley, The Lost City Hydrothermal Field: A Spectroscopic and Astrobiological Analogue for Nili Fossae, Mars. *Astrobiology*, 17, 1138-1160 10.1089/ast.2016.1606, 2017.
- Bandfield, J.L., J.T.S. Cahill, L.M. Carter, C.D. Neish, G.W. Patterson, J.-P. Williams, D.A. Paige, Distal ejecta from lunar impacts: Extensive regions of rocky deposits, *Icarus*, 10.1016/j.icarus.2016.05.013, 2017.
- Cloutis, E.A., V. Jonatanson, J.L. Bandfield, E.S. Amador, F. Rivera-Hernández, P. Mann, S.A. Mertzman, Hydrothermally-altered dacite terrains in the Methana peninsula Greece: Relevance to Mars. *Planetary and Space Science*, 138, 55-74 10.1016/j.pss.2017.01.013, 2017.
- Elder, C.M., P.O. Hayne, J.L. Bandfield, R.R. Ghent, J.-P. Williams, K.L. Donaldson Hanna, D.A. Paige, Young lunar volcanic features: Thermophysical properties and formation. *Icarus*, 290, 224-237, 10.1016/j.icarus.2017.03.004, 2017.
- Hayne, P. O., J.L. Bandfield, M.A. Siegler, A.R. Vasavada, R.R. Ghent, J.-P. Williams, B. T. Greenhagen, O. Aharonson, C.M. Elder, P.G. Lucey, D.A. Paige (2017) Global Regolith Thermophysical Properties of the Moon From the Diviner Lunar Radiometer Experiment. *Journal of Geophysical Research (Planets)*, 122, 2371-2400 10.1002/2017JE005387, 2017.
- Neish, C.D., C.W. Hamilton, S.S. Hughes, S.K. Nawotniak, W.B. Garry, J.R. Skok, R.C. Elphic, E. Schaefer, L.M. Carter, J.L. Bandfield, G.R. Osinski, D. Lim, J.L. Heldmann, Terrestrial analogues for lunar impact melt flows. *Icarus*, 281, 73-89 10.1016/j.icarus.2016.08.008, 2017.
- Thomas, N.H., J. L. Bandfield, Identification and refinement of martian surface mineralogy using factor analysis and target transformation of near-infrared spectroscopic data. *Icarus*, 291, 124-135, 10.1016/j.icarus.2017.03.001, 2017.
- Bandfield, J.L., E.S. Amador, Extensive aqueous deposits at the base of the dichotomy boundary in Nilosyrtis Mensae, Mars, *Icarus*, 10.1016/j.icarus.2016.04.002, 2016.

- Amador, E.S., J.L. Bandfield, Elevated bulk-silica exposures and evidence for multiple aqueous alteration episodes in Nili Fossae, Mars, *Icarus*, 10.1016/j.icarus.2016.04.015, 2016.
- Greenhagen, B.T., C.D. Neish, J.P. Williams, J.T.S. Cahill, R.R. Ghent, P.O. Hayne, S.J. Lawrence, N.E. Petro, J.L. Bandfield, Origin of the anomalously rocky appearance of Tsiolkovskiy crater, *Icarus*, 10.1016/j.icarus.2016.02.041, 2016.
- Ghent, R.R., L.M. Carter, J.L. Bandfield, C.J. Tai Udovicic, B.A. Campbell, Lunar crater ejecta: Physical properties revealed by radar and thermal infrared observations, *Icarus*, 10.1016/j.icarus.2015.12.014, 2016.
- Rivera-Hernandez, F., J.L. Bandfield, S.W. Ruff, M.J. Wolff, Hemispheric asymmetry in martian seasonal surface water ice from MGS TES, *Icarus*, 10.1016/j.icarus.2015.07.001, 2015.
- Bapst, J., J.L. Bandfield, S.E. Wood, Hemispheric asymmetry in martian seasonal surface water ice from MGS TES, *Icarus*, 10.1016/j.icarus.2015.07.025, 2015.
- Cornwall, C., J.L. Bandfield, T.N. Titus, B.C. Schreiber, D.R. Montgomery, Physical abrasion of mafic minerals and basalt grains: Application to martian aeolian deposits, *Icarus*, 10.1016/j.icarus.2015.04.020, 2015.
- Glotch, T.D., J.L. Bandfield, P.G. Lucey, P.O. Hayne, B.T. Greenhagen, J.A. Arnold, R.R. Ghent, D.A. Paige, Formation of lunar swirls by magnetic field standoff of the solar wind, *Nature Communications*, 10.1038/ncomms7189, 2015.
- Davidsson, B. J.R., H. Rickman, J.L. Bandfield, O. Groussin, P.J. Gutiérrez, M. Wilska, M.T. Capria, J.P. Emery, J. Helbert, L. Jorda, A. Maturilli, and T.G. Mueller, Interpretation of thermal emission. I. The effect of roughness for spatially resolved atmosphereless bodies, *Icarus*, 10.1016/j.icarus.2014.12.029, 2015.
- Shirley, J.H., T.H. McConnochie, D.M. Kass, A. Kleinböhl, J.T. Schofield, N.G. Heavens, D.J. McCleese, J. Benson, D.P. Hinson, J.L. Bandfield, Temperatures and aerosol opacities of the Mars atmosphere at aphelion: Validation and inter-comparison of limb sounding profiles from MRO/MCS and MGS/TES, *Icarus*, 10.1016/j.icarus.2014.05.011, 2015.
- Bandfield, J.L., P.O. Hayne, J.-P. Williams, B.T. Greenhagen, D.A. Paige, Lunar surface roughness derived from LRO Diviner Radiometer observations, *Icarus*, 10.1016/j.icarus.2014.11.009, 2015.
- Ghent, R.R., P.O. Hayne, J.L. Bandfield, B.A. Campbell, C.C. Allen, L.M. Carter, D.A. Paige, Constraints on the recent rate of lunar ejecta breakdown and implications for crater ages, *Geology*, G35926.1, 2014.
- Edwards, C.S., J.L. Bandfield, P.R. Christensen, A.D. Rogers, The formation of infilled craters on Mars: Evidence for widespread impact induced decompression of the early martian mantle? *Icarus*, 10.1016/j.icarus.2013.10.005, 2014.
- Bandfield, J.L., E. Song, P.O. Hayne, B.D. Brand, R.R. Ghent, A.R. Vasavada, D.A. Paige, Lunar cold spots: Granular flow features and extensive insulating materials surrounding young craters, *Icarus*, 10.1016/j.icarus.2013.12.017, 2014.
- Bandfield, J.L., E.S. Amador, N.H. Thomas, Extensive hydrated silica materials in western Hellas Basin, Mars, *Icarus*, 10.1016/j.icarus.2013.08.005, 2013.
- Bandfield, J.L., M.J. Wolff, M.D. Smith, J.T. Schofield, D.J. McCleese, Radiometric comparison of Mars Climate Sounder and Thermal Emission Spectrometer measurements, *Icarus*, 10.1016/j.icarus.2013.12.722, 2013.
- Bandfield, J.L., C.S. Edwards, D.R. Montgomery, B.D. Brand, The Dual Nature of the Martian Crust: Young Lavas and Old Clastic Materials, *Icarus*, 10.1016/j.icarus.2012.10.023, 2013.
- Pankine, A.A., L.K. Tamppari, J.L. Bandfield, T.H. McConnochie, and M.D. Smith, Retrievals of martian atmospheric opacities from MGS TES nighttime data, *Icarus*, 10.1016/j.icarus.2013.06.024, 2013.
- Song, E., J.L. Bandfield, P.G. Lucey, B.T. Greenhagen, D.A. Paige, Bulk mineralogy of Lunar crater central peaks via thermal infrared spectra from the Diviner Lunar Radiometer - A study of the Moon's crustal composition at depth, *Journal of Geophysical Research*, 10.1029/2012JE004182, 2013.
- Smith, M.R., J.L. Bandfield, E.A. Cloutis, M.S. Rice, Hydrated Silica on Mars: Combined Analysis with Near-Infrared and Thermal-Infrared Spectroscopy, *Icarus*, 10.1016/j.icarus.2013.01.024, 2013.
- Lawrence, S.J., J.D. Stopar, B.R. Hawke, B.T. Greenhagen, J.T.S. Cahill, J.L. Bandfield, B.L. Jolliff, B.W. Denevi, M.S. Robinson, T.D. Glotch, D.B.J. Bussey, P.D. Spudis, T.A. Giguere, W.B. Garry, LRO Observations of Morphology and Surface Roughness of Volcanic Cones and Lobate Lava Flows in the Marius Hills, *Journal of Geophysical Research*, 10.1029/2012JE004130, 2013.

- Montgomery, D.R., J.L. Bandfield, S.K. Becker, Periodic bedrock ridges on Mars. *Journal of Geophysical Research*, 117, 10.1029/2011JE003970, 2012.
- Smith, M.R., J.L. Bandfield, Geology of quartz and hydrated silica-bearing deposits near Antoniadi Crater, Mars. *Journal of Geophysical Research*, 117, 10.1029/2011JE004038, 2012.
- Vasavada, A.R., J.L. Bandfield, B.T. Greenhagen, P.O. Hayne, M.A. Siegler, J.-P. Williams, and D.A. Paige, Lunar equatorial surface temperatures and regolith properties from the Diviner Lunar Radiometer Experiment. *Journal of Geophysical Research*, 117, 10.1029/2011JE003987, 2012.
- Bandfield, J.L., R.R. Ghent, A.R. Vasavada, D.A. Paige, S.J. Lawrence, M.S. Robinson, Lunar surface rock abundance and regolith fines temperatures derived from LRO Diviner Radiometer data, *Journal of Geophysical Research*, 10.1029/2011JE003866, 2011.
- Bandfield, J. L., A.D. Rogers, C.S. Edwards. The role of aqueous alteration in the formation of martian soils. *Icarus*, 211, 10.1016/j.icarus.2010.08.028, 2011.
- Glotch, T. D., J. L. Bandfield, L. L. Tornabene, H. B. Jensen, F. P. Seelos, Distribution and formation of chlorides and phyllosilicates in Terra Sirenum, Mars. *Geophysical Research Letters*, 37, 1620210.1029/2010GL044557, 2010.
- Glotch, T. D., P. G. Lucey, J. L. Bandfield, B. T. Greenhagen, I. R. Thomas, R. C. Elphic, N. Bowles, M. B. Wyatt, C. C. Allen, K. D. Hanna, D. A. Paige, Highly Silicic Compositions on the Moon, *Science*, 329, 151010.1126/science.1192148, 2010.
- Greenhagen, B.T., P.G. Lucey, M.B. Wyatt, T.D. Glotch, C.C. Allen, J.A. Arnold, J.L. Bandfield, N.E. Bowles, K.L. D. Hanna, P.O. Hayne, E. Song, I.R. Thomas, D.A. Paige, Global Silicate Mineralogy of the Moon from the Diviner Lunar Radiometer, *Science*, 329, 150710.1126/science.1192196, 2010.
- McCleese, D.J., N.G. Heavens, J.T. Schofield, W.A. Abdou, J.L. Bandfield, S.B. Calcutt, P.G. J. Irwin, D.M. Kass, A. Kleinboumlhl, S.R. Lewis, D.A. Paige, P.L. Read, M.I. Richardson, J.H. Shirley, F.W. Taylor, N. Teanby, R.W. Zurek, Structure and dynamics of the Martian lower and middle atmosphere as observed by the Mars Climate Sounder: Seasonal variations in zonal mean temperature, dust, and water ice aerosols, *Journal of Geophysical Research*, 115, 1201610.1029/2010JE003677, 2010.
- Paige, D.A., M.A. Siegler, J.A. Zhang, P.O. Hayne, E.J. Foote, K.A. Bennett, A.R. Vasavada, B.T. Greenhagen, J.T. Schofield, D.J. McCleese, M.C. Foote, E. DeJong, B.G. Bills, W. Hartford, B.C. Murray, C.C. Allen, K. Snook, L.A. Soderblom, S. Calcutt, F.W. Taylor, N.E. Bowles, J.L. Bandfield, R. Elphic, R. Ghent, T.D. Glotch, M.B. Wyatt, P.G. Lucey, Diviner Lunar Radiometer Observations of Cold Traps in the Moon's South Polar Region, *Science*, 330, 47910.1126/science.1187726, 2010.
- Bandfield, J.L., Effects of surface roughness and graybody emissivity on martian thermal infrared spectra, *Icarus*, 202, 10.1016/j.icarus.2009.03.031, 2009.
- Edwards, C.S., J.L. Bandfield, P.R. Christensen, R.L. Fergason, Global distribution of bedrock exposures on Mars using THEMIS high-resolution thermal inertia, *Journal of Geophysical Research*, 114, 10.1029/2009JE003363, 2009.
- Bandfield, J.L., High-silica deposits of an aqueous origin in western Hellas Basin, Mars, *Geophysical Research Letters*, 35, 10.1029/2008GL033807, 2008.
- Bandfield, J.L., A.D. Rogers, Olivine dissolution by acidic fluids in Argyre Planitia, Mars: Evidence for a widespread process?, *Geology*, 36, 10.1130/G24724A.1, 2008.
- Bandfield, J.L., W.C. Feldman, Martian high latitude permafrost depth and surface cover thermal inertia distributions, *Journal of Geophysical Research*, 10.1029/2007JE003007, 2008.
- Bandfield, J.L., C.S. Edwards, Derivation of Martian surface slope characteristics from directional thermal infrared radiometry, *Icarus*, 10.1016/j.icarus.2007.08.028, 2008.
- Feldman, W.C., J.L. Bandfield, B. Diez, R.C. Elphic, S. Maurice, S.M. Nelli, North to south asymmetries in the water-equivalent hydrogen distribution at high latitudes on Mars, *Journal of Geophysical Research*, 113, 10.1029/2007JE003020, 2008.
- Mellon, M.T., W.V. Boynton, W.C. Feldman, R.E. Arvidson, T.N. Titus, J.L. Bandfield, N.E. Putzig, H.G. Sizemore, A prelanding assessment of the ice table depth and ground ice characteristics in Martian permafrost at the Phoenix landing site, *Journal of Geophysical Research*, 113, 10.1029/2007JE003067, 2008.
- Osterloo M.M., V.E. Hamilton, J.L. Bandfield, T.D. Glotch, A.M. Baldridge, P.R. Christensen, L.L. Tornabene, F.S. Anderson, Chloride-Bearing Materials in the Southern Highlands of Mars, *Science*, 319, 10.1126/science.1150690, 2008.



- Rogers, A.D., O. Aharonson, J.L. Bandfield, Geologic context of in situ rocky exposures in Mare Serpentis, Mars: Implications for crust and regolith evolution in the cratered highlands, *Icarus*, 200, 10.1016/j.icarus.2008.11.026, 2008.
- Wagstaff, K.L., T.N. Titus, A.B. Ivanov, R. Castaño, J.L. Bandfield, Observations of the north polar water ice annulus on Mars using THEMIS and TES, *Planetary and Space Science*, 10.1016/j.pss.2007.08.008, 2008.
- Bandfield, J.L., High Resolution Subsurface Water Ice Distributions on Mars, *Nature*, 0.1038/nature05781, 2007.
- Feldman, W.C., M.C. Bourke, R.C. Elphic, S. Maurice, J. Bandfield, T.H. Prettyman, B. Diez, D.J. Lawrence, Hydrogen Content of Sand Dunes within Olympia Undae, *Icarus*, 10.1016/j.icarus.2007.08.044, 2007.
- Rogers, A.D., J.L. Bandfield, P.R. Christensen, Global spectral classification of martian low-albedo regions with MGS-TES data, *Journal of Geophysical Research*, 10.1029/2006JE002726, 2007.
- Bandfield, J.L., Extended surface exposures of granitoid compositions in Syrtis Major, Mars, *Geophysical Research Letters*, 10.1029/2005GL025559, 2006.
- Glotch, T.D., J.L. Bandfield, Determination and interpretation of surface and atmospheric Miniature Thermal Emission Spectrometer spectral end-members at the Meridiani Planum landing site, *Journal of Geophysical Research*, 111, 10.1029/2005JE002671, 2006.
- Glotch, T.D., J.L. Bandfield, P.R. Christensen, W.M. Calvin, S.M. McLennan, B.C. Clark, A.D. Rogers, S.W. Squyres, Mineralogy of the light-toned outcrop at Meridiani Planum as seen by the Miniature Thermal Emission Spectrometer and implications for its formation, *Journal of Geophysical Research*, 111, 10.1029/2005JE002672, 2006.
- Wolff, M.J., and 12 colleagues (including J.L. Bandfield), Constraints on dust aerosols from the Mars Exploration Rovers using MGS overflights and Mini-TES, *Journal of Geophysical Research*, 111, 10.1029/2006JE002786, 2006.
- Christensen, P.R., and 11 colleagues (including J.L. Bandfield), Evidence for magmatic evolution and diversity on Mars from infrared observations, *Nature*, 436, 504-509, 2005.
- Rogers, A.D., P.R. Christensen, J.L. Bandfield, Compositional heterogeneity of the ancient Martian crust: Analysis of Ares Vallis bedrock with THEMIS and TES data, *Journal of Geophysical Research*, 110, 10.1029/2005JE002399, 2005.
- Bandfield, J.L., V.E. Hamilton, P.R. Christensen, H.Y. McSween Jr., Identification of quartzofeldspathic materials on Mars, *Journal of Geophysical Research*, 10.1029/2004JE002290, 2004.
- Bandfield, J.L., D. Rogers, M.D. Smith, P.R. Christensen, Atmospheric correction and surface spectral unit mapping using Thermal Emission Imaging System data, *Journal of Geophysical Research*, 10.1029/2004JE002289, 2004.
- Christensen, P.R., and 26 colleagues (including J.L. Bandfield), Mineralogy at Meridiani Planum from the Mini-TES Experiment on the Opportunity Rover, *Science*, 306, 1733-1739, 2004.
- Christensen, P.R., and 26 colleagues (including J.L. Bandfield), Initial Results from the Mini-TES Experiment in Gusev Crater from the Spirit Rover, *Science*, 305, 837-842, 2004.
- Bandfield, J.L., T.D. Glotch, P.R. Christensen, Spectroscopic Identification of Carbonate Minerals in the Martian Dust, *Science*, 301, 1084-1087, 2003.
- Bandfield, J.L., M.D. Smith, Multiple emission angle surface-atmosphere separations of Thermal Emission Spectrometer data, *Icarus*, 161, 47-65, 2003.
- Christensen, P.R., and 21 colleagues (including J.L. Bandfield), Morphology and Composition of the Surface of Mars: Mars Odyssey THEMIS Results, *Science*, 300, 2056-2061, 2003.
- Fenton, L.K., J.L. Bandfield, A.W. Ward, Aeolian processes in Proctor Crater on Mars: Sedimentary history as analyzed from multiple datasets, *Journal of Geophysical Research*, 108, 10.1029/2002JE002015, 2003.
- Hamilton, V.E., P.R. Christensen, H.Y. McSween Jr., J.L. Bandfield, Searching for the Source Regions of Martian Meteorites Using MGS TES: Integrating Martian Meteorites into the Global Distribution of Igneous Materials on Mars, *Meteoritics and Planetary Science*, 38, 871-885, 2003.
- Hamilton, V.E., P.R. Christensen, J.L. Bandfield, Volcanism or aqueous alteration on Mars?, *Nature*, 421, 711-712, 2003.
- Hoefen, T.M., R.N. Clark, J.L. Bandfield, M.D. Smith, J.C. Pearl, P.R. Christensen, Discovery of Olivine in the Nili Fossae Region of Mars, *Science*, 302, 627-630, 2003.

- Smith, M.D., J.L. Bandfield, P.R. Christensen, M.I. Richardson, THEMIS Infrared Observations of Atmospheric Dust and Water Ice Cloud Optical Depth, *Journal of Geophysical Research*, 108, 10.1029/2003JE002115, 2003.
- Bandfield, J.L., K.S. Edgett, P. R. Christensen, Spectroscopic study of the Moses Lake dune field, WA: Determination of compositional distributions and source lithologies, *Journal of Geophysical Research*, 107, 10.1029/2000JE001469, 2002.
- Bandfield, J.L., Global mineral distributions on Mars, *Journal of Geophysical Research*, 107, 10.1029/2001JE001510, 2002.
- Christensen, P.R., M.C. Malin, R.V. Morris, J.L. Bandfield, M.D. Lane, Aqueous Sedimentary Mineralization of the Martian Surface: Evidence for Liquid Water, *Journal of Geophysical Research*, 106, 23,873-23,885, 2001.
- Christensen, P.R., and 25 colleagues (including J.L. Bandfield), The Mars Global Surveyor Thermal Emission Spectrometer experiment: Investigation description and surface science results, *Journal of Geophysical Research*, 106, 23,823-23,871, 2001.
- Pearl, J.C., M.D. Smith, B.J. Conrath, J.L. Bandfield, P.R. Christensen, Mars Global Surveyor Thermal Emission Spectrometer (TES) Observations of ice clouds during aerobraking and science phasing, *Journal of Geophysical Research*, 106, 12,325-12,338, 2001.
- Ruff, S.W., P.R. Christensen, R.N. Clark, H.H. Kieffer, M.C. Malin, J.L. Bandfield, B.M. Jakosky, M.D. Lane, M.T. Mellon, M.A. Prestley, Mars' "White Rock" feature lacks evidence of an aqueous origin: Results from Mars Global Surveyor, *Journal of Geophysical Research*, 106, 23,921-23,927, 2001.
- Bandfield, J.L., V.E. Hamilton, P.R. Christensen, A Global View of Martian Surface Compositions From MGS-TES, *Science*, 287, 1626-1630, 2000.
- Bandfield, J.L., P.R. Christensen, M.D. Smith, Spectral dataset factor analysis and endmember recovery: Application to Martian atmospheric particulates, *Journal of Geophysical Research*, 105, 9573-9588, 2000.
- Christensen, P.R., J.L. Bandfield, M.D. Smith, V.E. Hamilton, Identification of a basaltic component on the Martian surface from Thermal Emission Spectrometer data, *Journal of Geophysical Research*, 105, 9609-9631, 2000.
- Christensen, P.R., J.L. Bandfield, V.E. Hamilton, D.A. Howard, M.D. Lane, J.L. Piatek, S.W. Ruff, W.L. Stefanov, A thermal emission spectral library of rock-forming minerals, *Journal of Geophysical Research*, 105, 9735-9740, 2000.
- Christensen, P.R., and 15 colleagues (including J.L. Bandfield), Detection of crystalline hematite mineralization on Mars by the Thermal Emission Spectrometer, *Journal of Geophysical Research*, 105, 9632-9642, 2000.
- Smith, M.D., J.L. Bandfield, P.R. Christensen, Separation of surface and atmospheric spectral features in Mars Global Surveyor Thermal Emission Spectrometer (TES) spectra, *Journal of Geophysical Research*, 105, 9589-9608, 2000.

#### **Refereed Book Chapters:**

- Christensen, P.R., J.L. Bandfield, R.L. Fergason, V.E. Hamilton, A.D. Rogers, The compositional diversity and physical properties mapped from the Mars Odyssey Thermal Emission Imaging System, in *The Martian Surface - Composition, Mineralogy, and Physical Properties*. J. Bell, III, Ed.. Cambridge University Press, p. 221-241, 2008.
- Christensen, P.R., J.L. Bandfield, A.D. Rogers, T.D. Glotch, V.E. Hamilton, S.W. Ruff, M.B. Wyatt, Global mineralogy mapped from the Mars Global Surveyor Thermal Emission Spectrometer, in *The Martian Surface - Composition, Mineralogy, and Physical Properties*. J. Bell, III, Ed.. Cambridge University Press, p. 195-220, 2008.

#### **Non-Refereed Papers:**

- Bandfield, J.L., Rover observations in Gusev Crater: Evidence for a style of weathering unique to Mars? *American Mineralogist*, 102, 233-234, 10.2138/am-2017-5955, 2017.

Bandfield, J.L., P. Christensen, G. Mehall, M. Smith, M. Wolff, Mars Atmospheric Monitoring with TES Bolometers for MRO Aerobraking Support, ASU Mars Space Flight Facility white paper, April 2005.  
Bandfield, J.L., TES Calibration Update, ASU Mars Space Flight Facility white paper, December 2004.  
Bandfield, J.L., Target Factor Analysis: Application to spectral endmember optimization using Thermal Infrared Multispectral Scanner (TIMS) data of the Western Buckskin Mountains, AZ, *Summaries of the 7th JPL Airborne Earth Science Workshop*, JPL publication 97-21, vol. 3 p 1-10, 1998.  
Kourtides, D.A., J.L. Bandfield, N. Pakrasi, W.C. Pitts, Effect of Ceramic Coatings on Thermal Performance of Flexible Insulations, *26th Int. SAMPE Technical Conference*, 1994.