

Period: 8/96-5/00
Position: Graduate Research Associate
Supervisor: Dr. Philip Christensen (480) 965-7105

Marine Science Institute

University of California, Santa Barbara

Period: 4/96-6/96
Position: Student Worker
Supervisor: Dr. Rachel Haymon (805) 893-3718

Mars Global Surveyor (TES) Space Flight Facility

Arizona State University Department of Geology

Period: 6/95-2/96
Position: Student Intern/Temporary Staff
Supervisor: Dr. Philip Christensen (480) 965-7105

NASA Ames Research Center, Thermal Protection Systems Branch

Foothill-DeAnza College District

NASA Ames Internship Program Office

Period: 6/93-8/94
Position: Student Intern
Supervisor: Demetrius Kourtides (415) 604-4784

Fellowships and Awards:

- NASA Carl Sagan and Larry Haskin Early Career Fellowship, 2007
- Honorable mention, Stephen E. Dwornik student paper award 31st Lunar and Planetary Science conference, 3/00
- Graduate Academic Scholarship, Arizona State University, 8/99-5/00
- University Graduate Scholars Award, Arizona State University, 8/96-8/99
- High Honors, UC Santa Barbara, 6/96
- Douglas Woodhouse Award, Department of Geological Sciences, UC Santa Barbara, 6/96
- NASA Planetary Geology and Geophysics Undergraduate Research Program internship, 6/95-8/95
- De Anza College Outstanding Science and Engineering Student, 6/94
- NASA Ames-Foothill/De Anza Internship Program, 6/93-8/94
- San Jose State University Chemistry Scholarship, 1990

Guest Lectures, Invited Presentations, and Workgroups:

- Seminar, University of Washington Astrobiology Institute Seminar Series, 2008.
- Invited Presentation, Geological Society of America Annual Meeting, 2007
- Mars Scout Phoenix Landing Site Working Group, 2006-2007
- Invited Presentation, American Geophysical Union, Fall Meeting, 2006
- Mars Reconnaissance Orbiter Aerobraking Atmospheric Advisory Group, 2006
- Invited Presentation, American Geophysical Union, Spring Meeting, 2004
- Seminar, Berkeley Department of Astronomy Special Lecture, 2004
- Guest Lecture, TES Data Users Workshop, 2001

Education/ Public Outreach Activities:

- Instructor and Curriculum Development, Mars Student Imaging Project, 2003-2009
- 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

Review Panels:

- Mars Data Analysis Program, 2002 (Group Chief), 2003, 2005 (Group Chief), 2007, 2008 (Group Chief)
- Lunar Sortie Science Opportunity Program, 2007
- Planetary Instrument Definition and Development Program, 2007
- Lunar Reconnaissance Orbiter, Instrument Review Panel, 2004
- Mars Fundamental Research Program, 2004
- Mars Global Surveyor Data Analysis Program, 2001

Current and Past Funding:

Team Associate, Thermal Emission Imaging System Phase E, 67K, 2008-2010.

Principal Investigator, Lunar Reconnaissance Orbiter Participating Scientist Program, Characterization of lunar thermophysical and spectral properties with the Diviner radiometer, 265K, 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, 154K, FY 2008-2009

Co-Investigator, Mars Data Analysis Program
Geologic Characterization of Likely Chloride Salt Deposits on Mars, 44K, FY 2008-2011

Principal Investigator, Mars Data Analysis Program
Investigation of spectral diversity in Thermal Emission Imaging System data
133K, FY 2007-2009

Principal Investigator, Mars Reconnaissance Orbiter Participating Scientist
Mars Climate Sounder: Ensuring continuity with previous thermal infrared measurements
145K, FY 2007-2009

Science PI, Mars Scout Phoenix Lander Critical Data Product Initiative (CDP III)
Surface Slope Characteristics from Thermal Emission Spectrometer Phase Function Observations
121K, FY 2006-2008 (PI: Philip Christensen)

National Research Council Postdoctoral Associate
Separation and retrieval of Martian surface and atmosphere spectral components
2001-2002

Refereed Publications:

- Bandfield, J.L., Effects of surface roughness and graybody emissivity on martian thermal infrared spectra, *Icarus*, in press, 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.
- Bandfield, J.L., High Resolution Subsurface Water Ice Distributions on Mars, *Nature*, 0.1038/nature05781, 2007.
- Bandfield, J.L., Extended surface exposures of granitoid compositions in Syrtis Major, Mars, *Geophysical Research Letters*, 10.1029/2005GL025559, 2006.
- 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.
- 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.
- 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.
- 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, 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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*, in press, 2003.
- 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.

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.

Non-Refereed Manuscripts:

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.