CURRICULUM VITAE

Brian Michael Hynek
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Education

Ph.D. in Earth and Planetary Sciences, Washington University, St. Louis, MO, *2003*
A.M. in Earth and Planetary Sciences, Washington University, St. Louis, MO, *2001*
B.A. in Earth Science, Earth Science Education, and All Sciences Education,
University of Northern Iowa, Cedar Falls, IA *1998*

Profile

Dr. Brian M. Hynek is an Assistant Professor in the Department of Geological Sciences and part of the Research Faculty at the Laboratory for Atmospheric and Space Physics (LASP), both at the University of Colorado. His recent research has focused on the geologic, geochemical, hydrologic, and climatic evolutions of the planet Mars. He has been studying the Meridiani hematite site and other regional layered deposits that contain sulfate minerals and their astrobiological potential. Brian conducts Mars analog work on acid-sulfate systems including within active Nicaraguan volcanoes. He also has research interests in Martian drainage morphometry, the thermophysical properties of Mars, and the physics of volcanic eruptions on other planets. Brian teaches undergraduate and graduate courses at the University of Colorado covering topics such as the geology of the solar system, astrobiology, and geographic information systems.

Research Experience

Planetary Science

Recent Research: Assistant Professor in Geological Sciences (2007-present) and Research Associate at the Laboratory for Atmospheric and Space Physics, University of Colorado, 2003-present

- Used a multi-disciplinary approach to investigate the history of Meridiani Planum, Mars.
- Studied global Martian valley network distribution and characteristics to infer the required climate conditions and history of water.
- Detailed the geology, chemistry and biology of a volcano analogous to early Mars.

Doctoral Research: Department of Earth and Planetary Sciences, Washington University (Research Advisor: Dr. Roger Phillips) *1999-2003*

- Thesis title: The surface evolution of Mars with emphasis on hydrologic and volcanic processes.

- Major Mars-related projects that resulted in first author papers include geological mapping of the Meridiani landing site, analysis of valley networks, detailing extensive regions of erosion, and examining layered deposits possibly emplaced by explosive volcanic eruptions.

Additional Planetary Science Research Experience

- Center for Earth and Planetary Studies, National Air and Space Museum, Smithsonian Institution, (mentor: Dr. James Zimbelman), *1998*
  - Mapped large sections of the Medusae Fossae Formation, Mars, to infer its origin.
- USGS Flagstaff Astrogeology Branch, (mentor: Dr. Ken Tanaka) *1997*
  - Used multiple data sets to study candidate landing sites in the Valles Marineris, Mars.

Astronomy/Physics

- McCollum Astronomical Observatory, University of Northern Iowa *1996-1997*
- Optics and Holography Lab, Physics Department, University of Northern Iowa *1997*
- Grout Museum of History and Science Planetarium, *1997*

Teaching Experience

University of Colorado Boulder, CO *2004-present*

- Teaching Faculty in the Department of Geological Sciences
  - Taught graduate and undergraduate courses on topics such as planetary surfaces and interiors, planetary field geology, and Geographic Information Systems.
- Lecturer in Astrophysical and Planetary Sciences
  - Instructor for large undergraduate core classes ASTR1010 and ASTR1110 (Solar System Astronomy) and co-taught a new graduate-level course on Mars.
- Supervision of graduate and undergraduate students
  - Formal supervisor of graduate students Monica Hoke (APS, *2006-present*), Stuart Robbins (APS, *2007-present*), Wendy Krauser (AERO, *2005*) and Kennda Lynch (AERO, 2008).
  - Supervisor of undergraduate Michael Beach (GEOL/APS, *2007-2008)*
  - Informal supervisor of undergraduates Rachel Haber (Scripps College, 2008), Matthew Chojnacki (APS, *2004*) and Kelsi Singer (APS, *2006*).
  - Mentor of high school student Trevor Bowen (*2006-2008)*.
  - Supervisor of staff researcher Matthew Chojnacki (*2005-2007*).
- Served on the dissertation committees of Nathanial Putzig (GEOL), Nate Murphy (APS) Daniel Feldkun (ECE) and the Master's thesis committees of Monica Hoke (APS), Stuart Robbins (APS), Margaret Mitter (APS), and Lindsay Link (GEOL).

Part-Time Faculty, St. Louis Community College, St. Louis, MO *2001-2003*

- Taught a newly-developed, lab-based Introductory Astronomy course for 4 semesters.

Instructor, John Jay High School, San Antonio, TX *1998-1999*

- Taught high school chemistry honors and physics courses in an inner-city school setting.

Additional Teaching Experience

- Observatory Assistant, McCollum Astronomical Observatory, Cedar Falls, IA *1995-1998*

- Planetarium Lecturer, Einstein Planetarium, National Air and Space Museum, Smithsonian Institution, Washington DC, *1998*

Recent Invited Lectures

- American Geophysical Union's Fall Meeting (Whipple Session), *2008*
- Pomona College, CA, *2008*
- Hamilton College, NY, *2008*
- Caltech Planetary Sciences Colloquium, *2007*
- LASP, Public Lecture Series Kick-Off Lecture, *2006*
- The Lunar and Planetary Institute, *2006*
- Discoveries from Mars: Using a Planetary Perspective to Enhance Undergraduate Geoscience Courses, hosted by Arizona State University, *2006*
- Department of Earth Sciences, University of Northern Iowa, *2006*
- Center for Earth and Planetary Studies, Smithsonian Institution, *2005*
- Department of Geological Sciences, Case Western University, *2005*

External Funding as the Principal Investigator

- Cerro Negro, Nicaragua: An analog for Assessing the Potential for Life on Early Mars, NASA-Exobiology, 6/1/08-5/31/11, $451,986.
- Geologic, Stratigraphic, and Thermophysical Analyses of Bedrocks in and Around Terra Meridiani, Mars, NASA-Planetary Geology &Geophysics, 1/2007-12/2009, $244,850.
- Global Analysis of Martian Valley Network Systems Using THEMIS Data, NASA-Mars Data Analysis Program, 7/2006-6/2009, $371,061.
- Evaluating the Geologic History of Meridiani Planum on Mars through Laboratory Experiments and Modeling, CU Innovative Seed Grant Program, 7/1/07-6/30/09, $44,900.
- Formation of Lobate Craters on Mars; Hynek, B.M. (PI) and Robbins, S.J. (Co-I), NASA Earth and Space Sciences Fellowship 5/2008-4/2010, $84,000.
- Developing a Complete Mars Crater Database Down to 2.5 km Diameter, NASA-Mars Data Analysis Program, 7/2009-6/2011, $254,303 (pending).
- Evolution of Enigmatic Arabia Terra, Mars and the Global Consequences, NASA-Mars Data Analysis Program, 5/2004-4/2008, $173,738 (expired).
- Mars' Astrobiologic Potential from Cerro Negro Volcano, Nicaragua, Lewis and Clark Seed Grant for Exploration and Field Work in Astrobiology, NASA-American Philosophical Society, 6/2006-5/2007, $3,700 (expired).

External Funding as a Co-Investigator

- Wagner K. et al., Structured Light Imaging Module, NASA-Planetary Instrument Development Program, 3/2008-2/2011, $453,015.
- Emery W. et al., Image Information Mining Methods for Earth and Mars Data, NASA-Applied Information Systems Research, 1/2009-12/2012, $249,224 (pending).

Recent and Ongoing Service

- Planetary Science Subcommittee Member of the NASA Advisory Committee (NAC).
- Member of the NAC's Ad Hoc Lunar Science Education and Public Outreach Committee

- External Advisory Board member for the Department of Earth Sciences, University of Northern Iowa.
- Peer-reviewer of manuscripts submitted to *Nature, Nature Geosciences, Geophysical Research Letters, Icarus,* and *Journal of Geophysical Research*.
- Peer-reviewer of NASA proposals submitted to the Mars Data Analysis, Mars Fundamental Research, Planetary Geology and Geophysics, and Exobiology Programs.
- Review panel member for the 2006 NASA Mars Fundamental Research Program.
- Review panel member for CU's Innovative Seed Grant program.
- CU Department of Geological Sciences Graduate Admissions Committee.
- Presented roughly half a dozen public lectures per year for various audiences.

Professional Awards and Honors

- NASA Early Career Fellowship, 2007.
- Selected for the 2008 National Academy of Sciences Kavli Frontiers of Science Symposium.
- Received the 2008 American Institute of Aeronautics and Astronautics (AIAA) Abe M. Zarem Educator Award for excellence in student advising.

Selected Affiliations

- Member of the American Geophysical Union
- Member of the Geological Society of America (Planetary Geology Division)
- Member of the Geochemical Society
- Participant in the MOLA and THEMIS Science Team Meetings

Selected Peer-Reviewed Publications

Hynek, B. M., M.R.T. Hoke, and M. Beach, Updated Global Map of Martian Valley Networks and Implications for Climate and Hydrologic Processes, *Journal of Geophysical Research*, (in prep), 2009.

Di Achille, G. and **B. M. Hynek**, Chapter 10: Deltas and Valley Networks on Mars: Implications for a Global Hydrosphere, in Lakes on Mars, Nathalie Cabrol ed., (in prep), 2009.

Di Achille, G., **B. M. Hynek**, and M. L. Searls, Lake strandlines observed by the High Resolution Imaging Science Experiment (HiRISE) in Shalbatana Vallis, Mars, *Geophysical Research Letters*, (in review), 2009.

Hynek, B. M., Ancient Equatorial Ice on Mars?, *Nature Geosciences (News and Views), 2,* 169-170, 2009.

Hynek, B. M., Extraterrestrial Digital Elevation Models: Constraints on Planetary Evolution, with Focus on Mars, *International Journal of Remote Sensing*, (in press), 2009.

Hoke, M. R. T. and **B. M. Hynek** Roaming Zones of Precipitation on Ancient Mars as Recorded in Valley Networks, *Journal of Geophysical Research*, (in press), 2009.

Hynek, B. M., and R. J. Phillips, The Stratigraphy of Meridiani Planum, Mars, and Implications for the Layered Deposits' Origin, *Earth and Planetary Science Letters*, 274, 214–220, 2008.

Chojnacki, M., and **B. M. Hynek** The Geological Context of Water-Altered Minerals in the Valles Marineris, Mars, *Journal of Geophysical Research, 113*, doi:10.1029/2007JE003070, 2008.

Des Marais, D. J., B. M. Jakosky, and **B. M. Hynek,** Chapter 26: Astrobiological Implications of Mars Surface Composition and Properties, in Mars Surface Composition, Mineralogy, and Physical Properties, Jim Bell ed., Cambridge University Press, 2008.

Hynek, B. M., and K. Singer, Ground Truth from the Opportunity Rover for Mars Thermal Inertia Data, *Geophysical Research Letters, 34*, L11201, doi:10.1029/2007GL029687, 2007.

McCollom, T. M., and **B. M. Hynek,** Planetary Science: Bedrock Formation at Meridiani Planum (Reply), *Nature, 443*, doi:10.1038/nature05213, 2006.

Jakosky B. M., **B. M. Hynek**, S. M. Pelkey, M. T. Mellon, S. Martínez-Alonso, N. E. Putzig, N. Murphy, P. R. Christensen, Thermophysical properties of the MER and Beagle II landing site regions on Mars, *Journal of Geophysical Research, 111*, doi:10.1029/2004JE002320, 2006.

McCollom, T. M., and **B. M. Hynek**, A Volcanic Environment for Bedrock Diagenesis at Meridiani Planum on Mars, *Nature, 438*, doi:10.1038/nature04390, 2005.

Hynek, B. M., Extensive Bedrock Throughout Terra Meridiani, Mars: Implications for Hydrologic Processes, *Nature, 431*, doi:10.1038/nature02902, 2004.

Chojnacki, M., B. M. Jakosky, and **B. M. Hynek**, Surficial Properties of Landslides and Surrounding Units in Ophir Chasma, Mars, *Journal of Geophysical Research, 111*, doi:10.1029/2005JE002601, 2006.

Hynek, B. M., R. J. Phillips, and R. E. Arvidson, Explosive Volcanism in the Tharsis Region: Global Evidence in the Martian Geologic Record, *Journal of Geophysical Research, 108*, doi:10.1029/2003JE002062, 2003.

Hynek, B. M., and R. J. Phillips, New Data Reveal Mature, Integrated Drainage Systems on Mars Indicative of Past Precipitation, *Geology, 31*, 757-760, 2003.

Hynek, B. M., R. E. Arvidson, and R. J. Phillips, Geologic Setting and Origin of Terra Meridiani Hematite Deposit on Mars, *Journal of Geophysical Research, 107*, doi:10.1029/2002JE001891, 2002.

Hynek, B. M., and R. J. Phillips, Evidence for Extensive Denudation of the Martian Highlands, *Geology, 29*, 407-410, 2001.

Phillips, R. J., M. T. Zuber, M. P. Golombek, B. M. Jakosky, W. B. Banerdt, D. E. Smith, R. M. E. Williams, **B. M. Hynek**, *et al*., Ancient Geodynamics and Global-Scale Hydrology of Mars, *Science, 291*, 2587-2591, 2001.

Sanger, M. J., D. M. Brecheisen, and **B. M. Hynek**, Can Computer Animations Affect College Biology Students' Conceptions About Diffusion & Osmosis?, *American Biology Teacher*, *63*, 104–109, 2001.

Selected First-Author Conference Abstracts

Hynek, B. M., K L. Rogers, and T. M. McCollom, Cerro Negro, Nicaragua: A Key Mars Analog Environment for Acid-Sulfate Weathering, *Eos Trans. AGU, 89(53)*, abs. P53B-1457, 2008.

Hynek, B. M. Assessing the History of Water on Mars through Global Analysis of Valley Networks, *Eos Trans. AGU, 89(53)*, Whipple Session (invited), abs. P44C-05, 2008.

Hynek, B. M., The Potential for Life on Ancient Mars, *National Academy of Sciences Kavli Symposium*, Newport Beach, CA, 2008.

Hynek, B. M., M. Beach, and M.R.T. Hoke, Updated Global Map of Martian Valley Networks: Implications for Hydrologic Processes, *2nd Martian Valley Network Workshop,* Moab, UT, 2008.

Hynek, B. M., and T. M. McCollom, Evaluating the Geologic History of Meridiani Planum on Mars through Laboratory Experiments and Modeling, *CU Vice Chancellor's Innovative Seed Grant Program,* Boulder, CO, 2008.

Hynek, B. M., M. Beach, and M.R.T. Hoke, Updated Global Map of Martian Valley Networks and Implications for Hydrologic Processes, *Lunar Planet. Sci. Conf., XXXIX*, abs. 2353, 2008.

Hynek, B. M., K L. Rogers, and T. M. McCollom, Cerro Negro, Nicaragua: A Key Mars Analog Environment for Acid-Sulfate Weathering, *7th Intl. Conf. on Mars*, abs. 3213.pdf, 2007.

Hynek, B. M., K. L. Rogers, and T. M. McCollom, Cerro Negro Volcano, Nicaragua: An Analog for Geochemical Processes on Early Mars and Assessment of their Potential for Life, *Geological Society of America's Annual Meeting,* abs. T91-013-4, 2007.

Hynek, B. M., East Meridiani, *Paper presented at the 2nd Mars Science Laboratory Landing Site Workshop*, Pasadena, CA, 2007.

Hynek, B. M., East of Eden: A Return to the Meridiani Region, *Paper presented at the 1st Mars Science Laboratory Landing Site Workshop,* Pasadena, CA, 2006.

Hynek, B. M., and T. M. McCollom, A Volcanic Environment for Bedrock Diagenesis at Meridiani Planum, Mars, *Eos Trans. AGU, 86(52)*, P12A-08, 2005.

Hynek, B. M., Ground Truth for Remotely-Sensed Thermal Infrared Data of Mars, *GSA Abs. Prog. 37(7)*, 94200, 2005.

Hynek, B. M., and T. M. McCollom, The Past Geochemical Environment of Meridiani Planum, Mars, and its Implications for Astrobiology, *15th Goldschmidt Conf.*, #1172, 2005.

Hynek, B. M., and R. J. Phillips, The Etched Terrain of Arabia Terra is Tilted, *Lunar Planet. Sci. Conf., XXXVI*, abs. 1222, 2005.

Hynek, B. M., *et al*., Extensive Bedrock Throughout Terra Meridiani, Mars: Implications for regional Hydrologic Processes, *2nd Conf. on Early Mars*, #8058, 2004.

Hynek, B. M., *et al*., Thermophysical Properties of Meridiani Planum, Mars, *Lunar Planet. Sci. Conf., XXXV*, abs. 1899, 2004.

Hynek, B. M., The Nature and Origin of Hematite Deposits on Mars, *Paper presented at the 11th Annual Missouri Space Grant Consortium Meeting*, St. Louis, MO, 2002.

Hynek, B. M., R. E. Arvidson, and R. J. Phillips, Explosive Volcanism from Tharsis: Global Evidence in the Martian Geologic Record, *Lunar Planet. Sci. Conf., XXXIII*, #1408, 2002.

Hynek, B. M., R. J. Phillips, D. C. Nunes, and R. E. Williams, Wide-Scale Denudation of Western Arabia Terra, Mars, *Lunar Planet. Sci. Conf., XXXII*, #1178, 2001.

Hynek, B. M., and R. J. Phillips, The Role of Water in the Evolution of the Enigmatic Arabia Terra, Mars, *Eos Trans. AGU, 82(47)*, P22A-0538, 2001.

Hynek, B. M., R. E. Arvidson, R. J. Phillips, and F. P. Seelos, Stratigraphy of Terra Meridiani, Mars, *Paper presented at Planetary Mappers Meeting,* Albuquerque, NM, 2001.

Hynek, B. M., R. E. Arvidson, R. J. Phillips, F. P. Seelos, Terra Meridiani Landing Site Rationale, *Paper presented at First Landing Site Workshop for MER 2003*, San Francisco, CA, 2001.

Hynek, B. M., and R. J. Phillips, The Enigmatic Arabia Terra, Mars, *Paper presented at Workshop on the Martian Highlands and Mojave Desert Analogs,* Barstow, CA, #4017, 2001.

Hynek, B. M., R. E. Arvidson, and R. J. Phillips, Preliminary Stratigraphy of Terra Meridiani, Mars, *Lunar Planet. Sci. Conf., XXXII*, #1179, 2001.

Hynek, B. M., and R. J. Phillips, Evidence for Extensive Denudation of the Martian Highlands, *GSA Abs. Prog. 32(7),* A403, 2000.