

Debra Marie Hurwitz

Curriculum Vitae

**Contact: Lunar and Planetary Institute
Universities Space Research Association
3600 Bay Area Boulevard
Houston, TX 77058**

**hurwitz@usra.lpi.edu
281-486-2116**

Education:

Ph.D.:	Geological Sciences (Dr. James Head), 2012	Brown University, Providence, RI
Sc.M.:	Geological Sciences (Dr. James Head), 2009	Brown University, Providence, RI
B.A.:	Geology (Dr. Eric Grosfils), 2007	Pomona College, Claremont, CA

Research Experience:

Post-Doctoral Position: Lunar and Planetary Institute, with Dr. David Kring, August 2012-present.
Summary: I am investigating the solidification of the lunar South Pole – Aitken basin impact melt sheet using a petrological model in order to determine if differentiation of the melt sheet could generate materials with the unique signatures observed within the basin interior. I am also identifying locations where SPA impact melt might be currently exposed on the lunar farside.

Desert Research and Technology Studies (RATS) Participant: Mission Control Center, Johnson Space Center, Houston, TX, with Dr. Dean Eppler, August – September, 2011.
Summary: I served as “Geosamples Lead” and “Scicom” in the Mission Control Center at the Johnson Space Center in Houston, TX supporting field operations conducted north of Flagstaff, AZ, simulating an actual human exploration mission to an asteroid.

PhD dissertation: Brown University, with Dr. Jim Head, August 2007 – 2012.
Summary: Preparation of my dissertation, focusing on the origin of lava channels on the terrestrial planets with an emphasis on distinguishing between mechanical and thermal erosion processes using analytical models.

Research Assistant: Investigating magma reservoir failure beneath an edifice, Pomona College, Claremont, CA, with Dr. Eric Grosfils, summer 2007.
Summary: This work served as my undergraduate senior thesis and has been published in a manuscript entitled “The characteristics of magma reservoir failure beneath a volcanic edifice.”

Research Intern: Modeling rupture angle and orientation of magma reservoirs beneath an edifice, Summer Undergraduate Research Program, Pomona College, Claremont, CA, with Dr. Eric Grosfils, summer 2006.
Summary: This work developed into my undergraduate senior thesis project.

Research Intern: Mapping surface features on Mars’ northern polar ice cap, LPI Summer Internship, Lunar Planetary Institute, Houston, TX, with Dr. Daniel Nunes, summer 2005.
Summary: I processed and analyzed images collected from the THEMIS instrument aboard Mars Odyssey in order to document structures and craters observed on the north polar ice cap of Mars.

Research Assistant: Determining tectonic trends in the Ganiki Planitia (V-14) Quadrant of Venus, Pomona College, Claremont, CA, with Dr. Eric Grosfils, 2004-2005 academic year.
Summary: I conducted quantitative analyses of tectonic structures mapped in the V-14 quadrangle using ArcMap to determine whether a regional or a local stress state influenced the deformation of this region. Results were presented at LPSC in 2005.

Research Assistant: Mapping the Ganiki Planitia (V14) Quadrant of Venus, Pomona College, Claremont, CA, with Dr. Eric Grosfils, 2003-2004 academic year.

Summary: I assisted with the finalization and publication of a geologic map of the V-14 quadrangle of Venus.

Field Experience:

Field Assistant: Geologic mapping of the San Francisco Volcanic Field (SFVF) north of Flagstaff, AZ, with Dr. Dean Eppler, June and November, 2013.

Summary: I assisted three field geologists and two other field assistants in geologically mapping a portion of the SFVF near SP Crater, north of Flagstaff, AZ. Our goals were to generate a geologic map of the area and to compare our product with an independently-derived map based on the Desert Research and Technology Studies (RATS) 2010 simulated lunar exploration mission.

Field Course Participant: Geologic mapping of Kleinwalsertal in the northernmost Alps, with Dr. Harold Hiesinger, July, 2010.

Summary: I mapped a portion of a sequence of sedimentary rocks in the German/Austrian Alps as a part of a field course through the University of Münster, Germany.

NASA Planetary Volcanology Field Workshop Participant: Volcanoes National Park, Hawaii, with Dr. Scott Rowland, summer 2008.

Summary: I spent one week observing and mapping lava flows, comparing the map I compiled in the field with one I compiled earlier from remotely sensed data in order to develop a better understanding of how field observations relate to remote observations.

Teaching Experience:

Mentor: Lunar and Planetary Institute High School Exchange Program, with H el ene Greenwood, a ~sophomore student at an Oxford, UK high school, June 24-27, 2013.

Summary: I guided H el ene for a week long exchange program during which she was introduced to work responsibilities for a NASA research scientist. H el ene identified, downloaded, and processed Lunar Reconnaissance Orbiter Narrow Angle Camera images, searching for possible landing sites in a designated area on the lunar farside.

Mentor: NASA Lunar Science Institute High School Competition, Langham Creek High School (two teams), with Deborah Fritz, fall 2012 – spring 2013.

Summary: I assisted two teams of high school students to formulate questions and hypotheses relevant to current lunar research and to make observations and interpretations of lunar data sets that addressed each question. Students presented their results in posters to a panel of NASA scientists in April, 2013.

Guest Instructor: 2nd grade, Herod Elementary School, Houston, TX, with Mr. Tesch, spring, 2013.

Summary: My presentation focused on the Moon, including activities that helped students visualize the relative sizes and distance between the Earth and Moon and that guided students through the scientific process to demonstrate the effects of an atmosphere on falling objects.

Guest Instructor: 2nd grade science class, Vartan Gregorian Elementary School, Providence, RI, with Ms. Honeyman, fall 2010.

Summary: As a guest instructor I used demonstrations to introduce advanced concepts like convection at a level accessible to second graders.

Teaching Assistant: Mars, Moon, and the Earth: Introduction to Planetary Geology, Brown University, Providence, RI, with Dr. Jim Head, fall 2008.

Summary: I introduced and led laboratory sessions where students looked at microscopic thin sections of Apollo lunar samples and analyzed three-dimensional images of Mars in a virtual reality center.

Teaching Assistant: Introduction to Planetary Geology, Planetary Geology, Pomona College, Claremont, CA, with Dr. Eric Grosfils, fall 2006.

Summary: I assisted with laboratory exercises and led review sessions for students.

Teaching Assistant: Introduction to Geology, Geohazards, Pomona College, Claremont, CA, with Dr. Linda Reinen, spring 2006.

Summary: I assisted with laboratory exercises and led review sessions for students.

Professional Development:

Sheridan Teaching Certificate I, 2010: Sheridan Teaching Seminar

Sheridan Teaching Certificate III, 2012: Professional Development Seminar

Invited Lectures and Presentations:

Pomona College, Claremont, CA, December 10, 2010: “Planetary Lava Channels: Morphology and origin of eroded volcanic channels on Mars and the Moon.”

University of Houston, Clear Lake, Clear Lake, TX, April 10, 2014: “Destination Moon: Selecting lunar landing sites that characterize the impact flux of the ancient Solar System.”

Awards/Honors:

Sigma Xi Outstanding Graduate Student Award, Brown University Chapter (2012).

Lunar Science Forum Student Poster Competition, First Place, Lunar Science Forum, Mountain View, CA, July 2011, for “Timing of lunar sinuous rille formation: Implications for lunar volcanic evolution.”

Dwornik Award, Honorable Mention for Best Graduate Oral Presentation, Lunar and Planetary Science Conference, Houston, TX, March 2011, for “Modeling effects of lunar surface slope, temperature, and material properties on the efficiency of erosion during the formation of Rima Prinz.”

Sigma Xi (inducted as an associate member to the Pomona College chapter 2007, to the Brown University chapter in 2010, and as a full member to the Brown University chapter in 2012).

Mason L. Hill Memorial Award in Geology (2007).

Isabel F. Smith Award Recipient (Pomona College Geology Department Award, 2005).

National Society of Collegiate Scholars member (2003).

Publications:

Hurwitz, D.M., and Kring, D.A. DIFFERENTIATION OF THE SOUTH POLE – AITKEN BASIN IMPACT MELT SHEET: IMPLICATIONS FOR LUNAR EXPLORATION. Accepted to Journal of Geophysical Research – Planets on April 30, 2014.

- Grosfils, E.B., McGovern, P.J., Gregg, P.M., Galgana, G.A., **Hurwitz, D.M.**, Long, S.M., Chestler, S.R. **ELASTIC MODELS OF MAGMA RESERVOIR MECHANICS: A KEY TOOL FOR INVESTIGATING PLANETARY VOLCANISM.** Accepted to Geological Society of London Special Publication Volcanism and Tectonism Across the Inner Solar System, September, 2013.
- Byrne, P., Klimczak, C., Williams, D., **Hurwitz, D. M.**, Solomon, S., Head, J., Preusker, F., Oberst, J. **AN ASSEMBLAGE OF LAVA FLOW FEATURES ON MERCURY.** Journal of Geophysical Research – Planets, vol. 118, no. 6, p. 1303-1322, doi: 10.1002/jgre.20052, 2013.
- Hurwitz, D.M.**, Head, J.W., Byrne, P.K., Xiao, Z., Solomon, S.C., Zuber, M.T., Smith, D.E., and Neumann, G.A. **INVESTIGATING THE ORIGIN OF POTENTIAL LAVA CHANNELS ON MERCURY OBSERVED IN MESSENGER DATA: THEORY AND OBSERVATIONS.** Journal of Geophysical Research – Planets, vol. 118, no. 3, p. 471-486, doi: 10.1029/2012JE004103, 2013.
- Hurwitz, D.M.**, Head, J.W., and Hiesinger, H. **LUNAR SINUOUS RILLES: DISTRIBUTION, CHARACTERISTICS, AND IMPLICATIONS FOR THEIR ORIGIN.** Planetary and Space Science, vol. 79-80, p. 1-38, doi: <http://dx.doi.org/10.1016/j.pss.2012.10.019>, 2013.
- Hurwitz, D.M.**, Head, J.W., Wilson, L., and Hiesinger, H. **ORIGIN OF LUNAR SINUOUS RILLES: MODELING EFFECTS OF GRAVITY, SURFACE SLOPE, AND LAVA COMPOSITION ON EROSION RATES DURING THE FORMATION OF RIMA PRINZ.** Journal of Geophysical Research – Planets, vol. 117 (E00H14), doi: 10.1029/2011JE004000, 2012.
- Hurwitz, D.M.**, Head, J.W. **GEOLOGIC MAP OF THE SNEGUROCHKA PLANITIA QUADRANGLE (V-1), VENUS SIM 3178.** U. S. Geological Survey, scale 1:5,000,000, 2012.
- Blewett, D.T., Chabot, N.L., Denevi, B.W., Ernst, C.M., Head, J.W., Izenberg, N.R., Murchie, S.L., Solomon, S.C., Nittler, L.R., McCoy, T.J., Xiao, Z., Baker, D.M.H., Fassett, C.I., Braden, S., Oberst, J., Scholten, F., Preusker, F., **Hurwitz, D.M.** **HOLLOWES ON MERCURY: MESSENGER EVIDENCE FOR GEOLOGICALLY RECENT VOLATILE-RELATED ACTIVITY.** Science, vol. 333, pg. 1856, 2012. My contributions involved initial observations of examples of “hollows” features and analogs observed on other planetary surfaces including Mars, Earth, and Venus.
- Head, J.W., Chapman, C.R., Strom, R.G., Fassett, C.I., Denevi, B.W., Blewett, D.T., Ernst, C.M., Watters, T.R., Solomon, S.C., Murchie, S.L., Prockter, L.M., Chabot, N.L., Gillis-Davis, J.J., Whitten, J.L., Goudge, T.A., Baker, D.M.H., **Hurwitz, D.M.**, Ostrach, L.R., Xiao, Z., Merline, W.J., Kerber, L., Dickson, J.L., Oberst, J., Byrne, P.K., Klimczak, C., Nittler, L.R. **FLOOD VOLCANISM IN THE NORTHERN HIGH LATITUDES OF MERCURY REVEALED BY MESSENGER.** Science, vol. 333, pg. 1853, 2012. My contributions involved observations of vents adjacent to the volcanic plains and observations and analysis of flow features in the plains.
- Hurwitz, D.M.**, Fassett, C., Head, J.W., and Wilson, L. **FORMATION OF AN ERODED LAVA CHANNEL WITHIN AN ELYSIUM PLANITIA IMPACT CRATER: DISTINGUISHING BETWEEN A MECHANICAL AND THERMAL ORIGIN.** Icarus, vol. 210, pg. 626-634, 2010.

- Grosfils, E.B., Long, S.M., Venechuk, E.M., **Hurwitz, D.M.**, Richards, J.W., Kastl, B., Drury, D.E., and Hardin, J. **GEOLOGIC MAP OF THE GANIKI PLANITIA QUADRANGLE (V-14), VENUS**: U.S. Geological Survey Scientific Investigations Map 3121, scale 1:5,000,000, 1 sheet, includes pamphlet [<http://pubs.usgs.gov/sim/3121/>], 2010.
- Head, J.W., Murchie, S.L., Prockter, L.M., Solomon, S.C., Strom, R.G., Chapman, C.R., Watters, T.R., Blewett, D.T., Gillis-Davis, J.J., Fassett, C.I., Dickson, J.L., **Hurwitz, D.M.**, Ostrach, L.R. **EVIDENCE FOR INTRUSIVE ACTIVITY ON MERCURY FROM THE FIRST MESSENGER FLYBY**. *Earth and Planetary Science Letters*, 285(3-4), 251-262, 2009.
- Hurwitz, D.M.**, Long, S.M., Grosfils, E.B. **THE CHARACTERISTICS OF MAGMA RESERVOIR FAILURE BENEATH A VOLCANIC EDIFICE**. *Journal of Volcanology and Geothermal Research*, 188, 379-394, 2009.

Meeting Contributions:

- Hurwitz, D.M.**, and Kring, D.A. **DESTINATIONS FOR SAMPLING IMPACT MELT PRODUCED BY THE SOUTH POLE – AITKEN BASIN IMPACT EVENT**. 45th Lunar and Planetary Science Conference, oral presentation, abstract #1398, Houston, TX, March 2013.
- W.S. Kiefer, P.J. McGovern, R.W.K. Potter, J.C. Andrews-Hanna, J. Besserer, G.S. Collins, J.W. Head III, **D.M. Hurwitz**, K. Miljkovic, F. Nimmo, R.J. Phillips, D.E. Smith, J.M. Soderblom, G.J. Taylor, M.A. Wieczorek, and M.T. Zuber. **THE CONTRIBUTION OF IMPACT MELT SHEETS TO LUNAR IMPACT BASIN GRAVITY ANOMALIES**. 45th Lunar and Planetary Science Conference, poster presentation, abstract #2831, Houston, TX, March 2013.
- Eppler, D.B., Bleacher, J.E., Evans, C.A., Feng, W., Gruener, J., **Hurwitz, D.M.**, Janoiko, B. Skinner, J.A., and Whitson, P. **COMPARING GEOLOGIC DATA SETS COLLECTED BY PLANETARY ANALOG TRAVERSES AND BY STANDARD GEOLOGIC FIELD MAPPING: IMPLICATIONS FOR PLANETARY EXPLORATION PLANNING**. 45th Lunar and Planetary Science Conference, poster presentation, abstract #2078, Houston, TX, March 2013.
- Bleacher, J.E., Eppler, D. B., Skinner, J.A., Evans, C., Feng, W., Gruener, J., **Hurwitz, D.M.**, Whitson, P., Janoiko, B. **MAPPING PLANETARY VOLCANIC DEPOSITS: IDENTIFYING VENTS AND DISTINGUISHING BETWEEN EFFECTS OF ERUPTION CONDITIONS AND LOCAL LAVA STORAGE AND RELEASE ON FLOW FIELD MORPHOLOGY**. 45th Lunar and Planetary Science Conference, poster presentation, abstract #2504, Houston, TX, March 2013.
- J.A. Skinner, Jr., D.B. Eppler, C.A. Evans, W. Feng, J. Gruener, **D.M. Hurwitz**, B. Janoiko, and P. Whitson. **COMPARING AND RECONCILING TRADITIONAL FIELD AND PHOTOGEOLOGIC MAPPING TECHNIQUES: LESSONS FROM THE SAN FRANCISCO VOLCANIC FIELD, ARIZONA**. 45th Lunar and Planetary Science Conference, poster presentation, abstract #2913, Houston, TX, March 2013.
- Eppler, D.B., Bleacher, J.E., Evans, C.A., Feng, W., Gruener, J., **Hurwitz, D.M.**, Skinner, J.A., Whitson, P., and Janoiko, B. **GEOLOGIC INTERPRETATION OF DATA SETS COLLECTED BY PLANETARY ANALOG GEOLOGY TRAVERSES AND BY STANDARD GEOLOGIC FIELD MAPPING: A COMPARISON STUDY (PART 1)**. 125th Geological Society of America, oral presentation #163-3, Denver, CO, 2013.

- Bleacher, J.E., Eppler, D. B., Evans, C., Feng, W., Gruener, J., **Hurwitz, D.M.**, Skinner, J.A., Whitson, P., Janoiko, B. **GEOLOGIC INTERPRETATION OF DATA SETS COLLECTED BY PLANETARY ANALOG GEOLOGY TRAVERSES AND BY STANDARD GEOLOGIC FIELD MAPPING: A COMPARISON STUDY (PART 2).** 125th Geological Society of America, poster presentation #225-1, Denver, CO, 2013.
- Grosfils, E.B., McGovern, P.J., Gregg, P.M., Galgana, G.A., **Hurwitz, D.M.**, Long, S.M., Chestler, S.R. **IMPROVING MECHANICAL INSIGHT INTO RING FAULT INITIATION AND CALDERA FORMATION VIA ELASTIC MODELS OF MAGMA RESERVOIR INFLATION.** 46th American Geophysical Union Fall Meeting, San Francisco, CA, 2013.
- Hurwitz, D.M.**, Zanetti, M., Lucas, M.P., Anders, D., Kramer, G., Thomson, O., Kring, D.A., and Osinski, G.R. **A NESTED OR COMPOSITE SHATTER CONE STRUCTURE IN THE SOUTH RANGE OF SUDBURY.** Large Meteorite Impacts and Planetary Evolution V, abstract# 3111, Sudbury, Canada, 2013.
- Hurwitz, D.M.**, Kring, D.A. **DIFFERENTIATION OF THE SOUTH POLE – AITKEN BASIN IMPACT MELT SHEET.** Lunar Science Virtual Forum, 2013.
- Hurwitz, D.M.**, Kring, D.A. **COMPOSITION AND STRUCTURE OF THE SOUTH POLE – AITKEN BASIN MELT SHEET.** 44th Lunar and Planetary Science Conference, oral presentation, abstract #2224, Houston, TX, March 2013.
- Hurwitz, D.M.**, Head, J.W., Byrne, P.K., Xiao, Z. **POTENTIAL FOR LAVA EROSION ON MERCURY: MODELING THE FORMATION OF BOTH SMALL AND LARGE LAVA CHANNELS.** 43rd Lunar and Planetary Science Conference, poster presentation, abstract #1055, Houston, TX, March 2012.
- Hurwitz, D.M.**, Head, J.W., **TESTING THE LATE-STAGE OUTFLOW CHANNEL ORIGIN HYPOTHESIS: INVESTIGATING BOTH WATER EROSION AND LAVA EROSION ORIGINS FOR ATHABASCA VALLES, MARS.** 43rd Lunar and Planetary Science Conference, oral presentation, abstract #1056, Houston, TX, March 2012.
- Hurwitz, D.M.**, Head, J.W., Hiesinger, H., and Wilson, L., **TIMING OF LUNAR SINUOUS RILLE FORMATION: IMPLICATIONS FOR LUNAR VOLCANIC EVOLUTION.** Lunar Science Forum, Mountain View, CA, July, 2011.
- Hurwitz, D.M.** and Head, J.W., **IMPLICATIONS OF VOLATILES WITHIN LUNAR BASALTS FOR THE ORIGIN OF SINUOUS RILLE SOURCE DEPRESSIONS.** Wet vs. Dry Moon Workshop, poster presentation, Houston, TX, June, 2011.
- Hurwitz, D.M.**, Head, J.W., Hiesinger, H., and Wilson, L., **MODELING EFFECTS OF LUNAR SURFACE SLOPE, TEMPERATURE, AND MATERIAL PROPERTIES ON THE EFFICIENCY OF EROSION DURING THE FORMATION OF RIMA PRINZ.** 42nd Lunar and Planetary Science Conference, oral presentation, abstract #1176, Houston TX, March 2011.
- Hurwitz, D.M.**, Head, J.W., Hiesinger, H., and Wilson, L., **IDENTIFYING THE EROSION REGIME PRESENT DURING FORMATION OF LUNAR SINUOUS RILLES.** American Geophysical Union Fall Meeting, San Francisco, CA, December, 2010.
- Hurwitz, D.M.**, Fassett, C.I., Head, J.W., and Wilson, L. **ANALYSIS OF THE ORIGIN OF AN ERODED LAVA CHANNEL IN AN ELYSIUM PLANITIA CRATER.** 1st Moscow Solar System Symposium, Moscow, Russia, October 2010.

- Hurwitz, D.M., Head, J.W., Wilson, L., and Hiesinger, H., MORPHOLOGIC AND TOPOGRAPHIC ANALYSIS OF THE ORIGIN OF LUNAR SINUOUS RILLES: DISTINGUISHING THE RELATIVE ROLES OF THERMAL AND MECHANICAL EROSION.** Lunar Science Forum, Mountain View, CA, July, 2010.
- Hurwitz, D.M., Fassett, C.I., Head, J.W., and Wilson, L. A LAVA CHANNEL WITHIN AN ELYSIUM PLANITIA IMPACT CRATER: MECHANICS OF FLOW AND ORIGIN.** 41st Lunar and Planetary Science Conference, oral presentation, abstract #1021, Houston, TX, March 2010.
- Hurwitz, D.M., Head, J.W., Wilson, L., and Hiesinger, H. LUNAR SINUOUS RILLES: ANALYSIS OF MORPHOLOGY, TOPOGRAPHY, AND MINERALOGY, AND IMPLICATIONS FOR A THERMAL EROSION ORIGIN.** 41st Lunar and Planetary Science Conference, abstract #1056, Houston TX, March 2010.
- Hurwitz, D.M., Head, J.W., and Wilson, L. LUNAR SINUOUS RILLES: ANALYSIS OF MORPHOLOGY, TOPOGRAPHY, AND MINERALOGY, AND IMPLICATIONS FOR A THERMAL EROSION ORIGIN.** American Geophysical Union Fall Meeting, San Francisco, CA, December, 2009.
- Hurwitz, D.M., Head, J.W., and Wilson, L. LUNAR SINUOUS RILLES: ANALYSIS OF MORPHOLOGY, TOPOGRAPHY, AND MINERALOGY, AND IMPLICATIONS FOR A THERMAL EROSION ORIGIN.** 50th Brown-Vernadsky Microsymposium, Moscow, Russia, October, 2009.
- Hurwitz, D.M., Head, J.W. GEOLOGIC MAP OF THE SNEGUROCHKA PLANITIA QUADRANGLE (V1): IMPLICATIONS FOR TECTONIC AND VOLCANIC HISTORY OF THE NORTH POLAR REGION OF VENUS.** 40th Lunar and Planetary Science Conference, abstract #1174, Houston, TX, March, 2009.
- Hurwitz, D.M., Head, J.W. GEOLOGY OF THE NORTH POLAR REGION OF VENUS: SNEGUROCHKA PLANITIA (V-1) QUADRANGLE.** 3rd European Planetary Science Congress, contribution 00401, Münster, Germany, October, 2008.