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Education

Southern Methodist University, Dallas, Texas
Ph.D., Geophysics, 1993

University of Houston, Houston, Texas
M.S., Geophysics, 1988

Texas A & M University, College Station, Texas
B.S., Geophysics, 1985
B.S., Physics, 1985

Overview of Skills

Research - Using a variety of geological and geophysical techniques and data sets, I study planetary resurfacing histories and the impact cratering process. Techniques that I have used include spherical harmonic modeling of gravity and topography, photogeology, geologic field work, reflection seismology, photogrammetry, magnetic prospecting, experimental impacts, and finite-difference modeling. I have worked with topography, gravity, and imagery data from planetary missions that span the solar system.

Management - I managed the Education and Public Outreach Department at the Lunar and Planetary Institute for a year, and I have supervised professionals, technicians, research assistants, undergraduate interns, and graduate students at various times during my career. I am currently the advisor for one M.S. student and one Ph.D. student.

Outreach - In addition to planning and management, I have conducted teacher workshops, taught local students, created outreach products, and given guest lectures. I currently manage a statewide program that teaches space science with a digital portable planetarium.

Employment History

July, 2004 – present. Research Associate Professor, Geophysical Institute, University of Alaska Fairbanks. Maintain research program and supervise students and staff; supervise portable planetarium outreach program; occasionally teach graduate and undergraduate courses.

1993 - 2004. Staff Scientist, Lunar and Planetary Institute, Houston. Conducted research and helped develop, and then later managed, LPI's education and public outreach program.

2002 - 2003. Adjunct faculty, Rice University. Undergraduate course *The Planets*.

1994. Adjunct faculty, University of Houston - Clear Lake. Graduate *Planetary Geology* course.

1989 - 1992. Graduate Research Assistant and Graduate Teaching Assistant, Department of Geological Sciences, Southern Methodist University, Dallas.

1985 - 1988. Senior Geophysicist, Exploration Data Processing Center, Exxon, Houston. General marine and land seismic reflection data processing, managed processing for several 3-D marine surveys, tested new processing software.

1984 - 1985. Lab Instructor, Geophysics Department, Texas A & M University, College Station. Instructed lab for survey course in geophysical exploration.

1984. Field Hand, Party 7, Professional Geophysics, Inc., Lufkin, Texas.

Other Educational and Professional Activities

2010. Instructor at Network on Impact Research (NIR) short course for Scandinavia region students in Lappajärvi, Finland.
2007. Co-Convener of workshop "Bridging the Gap II: Effect of Target Properties on the Impact Cratering Process", September 22-26, 2007. Co-editor of *Meteoritics and Planetary Science* proceedings issue published in December, 2008.
2005. Scientific organizing committee for "Workshop on the Role of Volatiles and Atmospheres on Martian Impact Craters", July 11-14, 2005.
2003. Review panel for NASA ROSS educational outreach proposals.
2003. Scientific organizing committee for "Third International Conference on Large Meteorite Impacts", August 5-7, 2003.
2003. Co-Convener of workshop "Impact Cratering: Bridging the Gap Between Modeling and Observations". Co-editor of *Meteoritics and Planetary Science* proceedings issue published in February, 2004.
2002. Review panel for NASA Planetary Instrument Development and Design Program.
- 2002 - 2004, 2006 - 2007. Review panel for NASA Mars Data Analysis Program.
- 1996 - 2002. Editorial Advisory Board, *Earth in Space*, AGU educational outreach magazine for high school teachers.
- 1996, 1997, 2001, 2003. Program Committee, Lunar and Planetary Science Conference.
- 1996, 2004, 2006-2011. Student Award Committee, Lunar and Planetary Science Conference.
- August, 1995. Taught 2-week Planetary Geology course at invitation of Universidad Nacional Autonoma de Mexico, in Mexico City.
- 1992 - 1998. Corresponding Scientist, Science-by-Mail program. 4th-9th grade children do science activity packets and correspond with scientist about results. I designed a Planetary Science packet for them in 1995.
- 1990 - 1992. Math and Geology Tutor, Southern Methodist University.

Community Service

- 2005 – 2010. Chair, Board of Directors, Effective Resolution in Communication, Incorporated (ERiC, Inc.), Fairbanks area nonprofit servicing families of autistic children.
- 2008 - present. Discipline Hearing Committee, Alaska Bar Association.
- 2006 – present. Treasurer and faculty advisor, Fairbanks Masters Swim Team.

Grants

- 2009-2012. PI on Bringing NASA Science to America's Most Remote Communities With a Digital Portable Planetarium, NASA Education and Public Outreach for Earth and Space Science program.
- 2009-2013. PI on Generation and Use of Stereo-Derived Topographic Data on Venus and Studies of Impact Crater Excavation, NASA Planetary Geology and Geophysics Program.
- 2009-2011. PI on Analysis of Impact Craters on Mercury using MESSENGER Data, NASA Planetary Mission Data Analysis Program.
- 2007 - 2009. Co-I on Geologic investigations of Impact Crater Morphology, Topography, and Distribution on the Icy Saturnian Satellites: Insights from Cassini and the Galilean Satellites, NASA Cassini Data Analysis Program, PI Paul Schenk.
- 2006 – 2010. PI on Studies of Small Aypical Martian Impact Craters, NASA Mars Data and Analysis Program.

- 2006 – 2009. PI on Studies of the Resurfacing History of Venus, NASA Planetary Geology and Geophysics Program.
- 2002 - 2006. PI on Study of the Shape and Appearance of Craters on Mars Resulting from Oblique Impact, NASA Mars Data Analysis Program.
- 2002 - 2005. PI on Using Impact Craters to Study the Resurfacing History of Venus, NASA Planetary Geology and Geophysics Program.
- 2002 - 2006. A Broker/Facilitator Partnership to Serve Central, Southwest Region and Hawai'i, NASA OSS Education and Outreach Broker/Facilitator. PI 2002-2003, Co-I for remaining.
- 2002 – 2005. Forging Partnerships with Libraries: Explore! And Fun with Science, NSF Informal Science Education. PI until departure from LPI, then Co-I.
- 1998 - 1999. PI on What Do Scientists Do? A Short Workshop for Teachers, Space Telescope Science Institute IDEA Grant.
- 1998 - 2001. Co-I on A Broker/Facilitator Team for Space Sciences Education and Outreach in the South Central Region, NASA OSS Broker/Facilitator Program.
- 1996 - 1999. Co-I on Large Body Impact and its Planetary Implications: Venus, Moon, Earth, NASA Planetary Geology and Geophysics Program.
- 1993 - 1994. Co-I on Topography from Magellan Radar Image Pairs: Compilation and Analysis of a New Crater Morphometry Data Base, NASA VDAP.

Honors

1991. The Roy Huffington Scholarship, SMU
- 1981 - 1985. Undergraduate Scholarships: Westinghouse Foundation, SEG, TAMU Lechner, and Geophysics Department.
- 1981 - 1985. Dean's List and Distinguished Student, TAMU

Completed Theses and Dissertations

- Calef, F. J., *Investigating the Retention of Bright and Dark Ejecta from Small Rayed Craters on Mars*, Ph.D. Dissertation, University of Alaska Fairbanks, 2010 – Committee Chair
- Gleason, A., *Steep-sided Domes on Venus: Morphologies and Emplacement Mechanisms Reevaluated Using High-Resolution Topography Data*, M.S. Thesis, University of Alaska Fairbanks, 2008 – Committee Chair.
- Hessen, K. K., *Oblique Impact Cratering: A Comparison of Low-Velocity Experiments to High-Velocity Experiments*, M.S. Thesis, University of Alaska Fairbanks, 2008 – Committee Co-Chair.
- Chappelow, J. E., *Three Studies of Impact Phenomena in the Solar System*, Ph.D. Dissertation, University of Alaska Fairbanks, 2005 – Committee member.
- Mongraine, J., *Critical Parameters in Magmatic Degassing*, Ph.D. Dissertation, University of Alaska Fairbanks, 2008 – Committee member.
- Pitiss, S. E., *Constraints Upon the History of Meridiani Planum, Mars, Using Sub-Kilometer Crater Counting*, M.S. Thesis, University of Alaska Fairbanks, 2005 – Committee member.

Refereed Publications

- Herrick, R. R., D. L. Stahlke, M. S. Gilmore, P. J. McGovern, G. A. Galgana, P. G. Resor, K. R. Verner, and V. L. Sharpton, Stereo-derived topography brings Venusian tectonic terrains into focus, *Submitted to Nature Geoscience*.
- Herrick, R. R., L. L. Curran, and A. T. Baer, A Mariner/MESSENGER global catalog of Mercurian craters, *Icarus*, *in press*.
- Herrick, R. R., and M. E. Rumpf, The resurfacing histories of Venusian impact craters, *J. Geophys. Res.* *116*, E02004, doi:10.1029/2010JE003722, 2011.
- Gleason, A. L., R. R. Herrick, and J. M. Byrnes, Analysis of Venusian steep-sided domes utilizing stereo-derived topography, *J. Geophys. Res.*, *115*, E06004, doi:10.1029/2009JE003431, 2010.
- Calef, F. J. III, R. R. Herrick, and V. L. Sharpton, Geomorphic analysis of small rayed craters on Mars: Examining primary versus distant secondary impacts, *J. Geophys. Res.*, *114*, E10007, doi:10.1029/2008JE003283, 2009.
- Chappelow, J. E., and R. R. Herrick, On the origin of a double, oblique impact on Mars, *Icarus*, *197*, 452-457, 2008.
- Herrick, R. R., and K. K. Hessen, The Planforms of low-angle impact craters in the northern hemisphere of Mars, *Meteoritics and Planetary Science*, *41*, 1483-1495, 2006.
- Herrick, R. R., J. Dufek, and P. J. McGovern, Evolution of large shield volcanoes on Venus, *J. Geophys. Res.*, *110*, E01002, doi:10.1029/2004JE002283, 2005.
- Herrick, R. R., and N. K. Forsberg, The shape and appearance of craters formed by oblique impact on the Moon and Venus, *Meteoritics and Planetary Science*, *38*, 1551-1578, 2003.
- Herrick, R. R., and V. L. Sharpton, Implications from stereo-derived topography of Venusian impact craters, *J. Geophys. Res.*, *105*, 20,245-20,262, 2000.
- Herrick, R. R., and P. J. McGovern, Kunhild and Ereshkigal, an extinct hot-spot region on Venus, *Geophys. Res. Lett.*, *27*, 839-842, 2000.
- Herrick, R. R., Small mantle upwellings are pervasive on Venus and Earth, *Geophys. Res. Lett.*, *26*, 803-806, 1999.
- Herrick, R. R., and S. N. Lyons, Inversion of crater morphometric data to gain insight on the cratering process, *Meteoritics and Planetary Science*, *33*, 131-143, 1998.
- Herrick, R. R., V. L. Sharpton, M. C. Malin, S. N. Lyons, and K. Feely, Morphology and morphometry of impact craters, in *Venus II*, eds. S. W. Bougher, D. M. Hunten, and R. J. Phillips, U. of Arizona Press, Tucson, 1015-1046, 1997.
- Herrick, R. R., and M. H. Price, *It's a Dry Heat: The Geology of Venus from Magellan*, LPI Slide Set, 40 slides w/ 18-page booklet, 1997.
- Sharpton, V. L., B. O. Dressler, R. R. Herrick, J. Scott, and B. Schneiders, New constraints on the Slate Islands impact structure, Lake Superior, Ontario, *Geology*, *24*, 851-854, 1996.
- Herrick, R. R., and V. L. Sharpton, Geologic history of Mead impact basin, Venus, *Geology*, *24*, 11-14, 1996.
- Herrick, R. R., N. Izenberg, and R. J. Phillips, Comment on "The global resurfacing of Venus" by R.G. Strom, G.G. Schaber, and D.D. Dawson, *J. Geophys. Res.*, *100*, 23,355-23,359, 1995.
- Herrick, R. R., and R. J. Phillips, Effects of the Venusian atmosphere on incoming meteoroids and the impact crater population, *Icarus*, *112*, 253-281, 1994.

- Herrick, R. R., and R. J. Phillips, Implications of a global survey of Venusian impact craters, *Icarus*, *111*, 387-416, 1994.
- Herrick, R. R., The resurfacing history of Venus, *Geology*, *22*, 703-706, 1994.
- Herrick, R. R., Analysis of the impact cratering record on Venus, Ph.D. Thesis, Southern Methodist University, 1993.
- Herrick, R. R., and R. J. Phillips, Geological correlations with the interior density structure of Venus, *J. Geophys. Res.*, *97*, 16,017-16,034, 1992.
- Phillips, R. J., R. F. Raubertas, R. E. Arvidson, I. C. Sarkar, R. R. Herrick, N. Izenberg, and R. E. Grimm, Impact craters and Venus resurfacing history, *J. Geophys. Res.*, *97*, 15,923-15,948, 1992.
- Herrick, R. R., and R. E. Grimm, Comment on "Terrestrial spreading centers under Venus conditions: evaluation of a crustal spreading model for Western Aphrodite Terra" by C. Sotin, D.A. Senske, J.W. Head, and E.M. Parmentier, *EPSL.*, *104*, 114-115, 1991.
- Herrick, R. R., and R. J. Phillips, Blob tectonics: A prediction for Western Aphrodite Terra, Venus, *Geophys. Res. Lett.*, *17*, 2129-2132, 1990.
- Herrick, R. R., B. G. Bills, and S. A. Hall, Variations in effective compensation depth across Aphrodite Terra, Venus, *Geophys. Res. Lett.*, *16*, 543-546, 1989.
- Herrick, R. R., Analysis of gravity data over Aphrodite Terra, Venus, M.S. Thesis, University of Houston, 1988.

Other Publications

- Herrick, R., G. Osinski, and E. Pierazzo, Proceedings of the workshop, Bridging the Gap II: Effect of target properties on the impact cratering process, *Meteoritics and Planetary Science*, *43*, 1915-1916, 2008.
- Osinski, G., E. Pierazzo, and R. Herrick, eds., *Bridging the Gap II: Effect of Target Properties on the Impact Process, abstract volume*, LPI Contribution 1360, 2007. [Co-editor of abstract volume and special issue of *Meteoritics and Planetary Science* for this workshop].
- Herrick, R. R., Meteorite crater, *Encyclopedia Britannica*, 2007.
- Pierazzo, E., and R. Herrick, Proceedings of the workshop, Impact cratering: Bridging the gap between modeling and observations, *Meteoritics and Planetary Science*, *39*, 167-168, 2004.
- Herrick, R. R., and E. Pierazzo, Improving knowledge of impact cratering: Bringing together "modelers" and "observationalists", *EOS*, *84*, 291, 2003.
- Herrick, R. R., and E. Pierazzo, eds., *Results of the Workshop on Impact Cratering: Bridging the Gap Between Modeling and Observations*, LPI Contribution 1162. [Co-editor of abstract volume, technical report, and special issue of *Meteoritics and Planetary Science* for this workshop].
- Crisp, D., and 61 others (including me), Divergent evolution among Earth-like planets: The case for Venus exploration, in *The Future of Solar System Exploration (2003-2013)*, *ASP Conference Proceedings*, vol. 272, ed. Mark Sykes, Astronomical Society of the Pacific, San Francisco, 5-34, 2002.
- Herrick, R. R., Corona (Venus), pp. 163-164; Hot spot tectonics, p. 310; and Tesserae, pp. 807-808; articles for *Encyclopedia of Planetary Sciences*, eds. J. H. Shirley and R. W. Fairbridge, Chapman and Hall, London, 1997.
- Herrick, R. R., JGR-Planets should be ended, *Eos, Trans. AGU*, *77*(41), 395, 1996.

Recently Published Abstracts

- Herrick, R. R., L. L. Curran, and A. T. Baer, A Mariner/MESSENGER global catalog of Mercurian craters, *42nd Lunar and Planet. Sci. Conf.*, Abstract #1706, 2011.
- Calef, F. J. III, R. R. Herrick, and V. L. Sharpton, Global distribution of small rayed craters on Mars: Sequences of ejecta retention, *42nd Lunar and Planet. Sci. Conf.*, Abstract #2555, 2011.
- Calef, F. J. III, R. R. Herrick, and V. L. Sharpton, Small rayed crater ejecta retention age calculated from current crater production rates on Mars, *42nd Lunar and Planet. Sci. Conf.*, Abstract #2717, 2011.
- Gilmore, M. S., P. G. Resor, R. Ghent, D. A. Senske, and R. R. Herrick, Constraints on tessera composition from modeling of Tellus Regio, Venus, *42nd Lunar and Planet. Sci. Conf.*, Abstract #2053, 2011.
- Verner, K. R., G. A. Galgana, P. J. McGovern, and R. R. Herrick, Insights into the structure and evolution of large volcanoes on Venus from high-resolution stereo-derived topography, *42nd Lunar and Planet. Sci. Conf.*, Abstract #2712, 2011.
- Herrick, R. R., D. L. Stahlke, and V. L. Sharpton, A new data set for Venus: Stereo-derived topography for 20% of the planet at km-scale horizontal resolution, *41st Lunar and Planet. Sci. Conf.*, Abstract #1622, 2010.
- Gilmore, M. S., P. G. Resor, R. Ghent, D. A. Senske, and R. R. Herrick, Mapping and modeling of a tessera collision zone, Tellus Regio, Venus, *41st Lunar and Planet. Sci. Conf.*, Abstract #1769, 2010.
- Herrick, R. R., and 14 others, The rationale for a new high-resolution imaging radar mission to Venus, *Eos Trans. AGU*, 90(53), Fall Mtg. Suppl., Abstract P33A-1281, 2009.
- Sharpton, V. L., R. R. Herrick, F. Rogers, and S. Waterman, RAVEN – High-resolution mapping of Venus within a Discovery mission budget, *Eos Trans. AGU*, 90(53), Fall Mtg. Suppl., Abstract P31-D04, 2009.
- Herrick, R. R., and P. M. Schenk, Surveys of elliptical crater populations on the Saturnian satellites and Mercury, *Lunar and Planet. Sci. Conf. XL*, Abstract #2352, 2009.
- Gleason, A. L., L. S. Glaze, R. R. Herrick, and J. B. Garvin, Stereo-derived topography from the Venus Magellan dataset: and assessment of the quantitative scientific value of sub-km DEM products, *Lunar and Planet. Sci. Conf. XL*, Abstract #1253, 2009.
- Herman, M. W., J. E. Chappelow, and R. R. Herrick, New crater depth data for Mercury derived from MESSENGER Flyby 1 imagery, *Eos Trans. AGU*, 89(53), Fall Mtg. Suppl., Abstract U21A-0013, 2008.
- Herrick, R. R., S. Yamamoto, O. S. Barnouin-Jha, S. Sugita, and T. Matsui, Constraints from laboratory experiments on crater excavation and formation of an uprange forbidden zone in an oblique impact, *Lunar and Planet. Sci. Conf. XXXIX*, Abstract #2305, 2008.
- Gleason, A. L., R. R. Herrick, and J. M. Byrnes, Steep-sided domes on Venus: A re-evaluation of morphologies and emplacement mechanisms, *Lunar and Planet. Sci. Conf. XXXIX*, Abstract #1863, 2008.
- A. R. Wille, and R. R. Herrick, Categorization of small northern-hemisphere Martian impact craters and their ejecta, *Lunar and Planet. Sci. Conf. XXXIX*, Abstract #1511, 2008.
- Gleason, A. L., and R. R. Herrick, Steep-sided domes on Venus: A re-evaluation of morphologies and emplacement mechanisms, *Eos Trans. AGU*, 88(52), Fall Mtg. Suppl., Abstract. P33B-1305, 2007.

- Calef, F. J., R. Herrick, V. L. Sharpton, Development of a small rayed crater database for Mars: Initial results, *Bridging the Gap II: Effect of Target Properties on the Impact Cratering Process*, Abs. #8070, 2007.
- Herrick, R. R., Details of the most oblique Martian impact craters, *Lunar and Planet. Sci. Conf. XXXVIII*, Abs. #1415, 2007.
- Calef, F. J. III, V. L. Sharpton, and R. Herrick, Investigating the spatial distribution of small rayed craters on Mars: How long do they retain their rays?, *Lunar and Planet. Sci. Conf. XXXVIII*, Abs. #1483, 2007.
- Chappelow, J. E. and R. R. Herrick, A double, oblique impact on Mars: Asteroid or moonlet? *Lunar and Planet. Sci. Conf. XXXVIII*, Abs. #1419, 2007.
- Hessen, K. K., R. R. Herrick, S. Yamamoto, O. S. Barnouin-Jha, S. Sugita, and M. Matsui, Low-velocity oblique impact experiments in a vacuum, *Lunar and Planet. Sci. Conf. XXXVIII*, Abs. #1338, 2007.
- Herrick, R. R., Updates on Martian oblique impact craters, *Mars Crater Consortium*, Abs. #0904, 2006.
- Herrick, R. R., Updates regarding the resurfacing of Venusian impact craters, *Lunar and Planet. Sci. Conf. XXXVII*, Abs. #1588, 2006.