

## LISA R. GADDIS

### Director, Lunar and Planetary Institute

Universities Space Research Association, 3600 Bay Area Blvd, Houston, TX, 77058

E-mail: lgaddis@lpi.usra.edu

#### **QUALIFICATIONS**

- Strong research and technical background in geology and planetary science (Earth, the Moon, Mars, Venus), remote sensing, planetary cartography, data archiving, NASA mission science and operations.
- Goal-oriented decision maker, with more than two decades of experience in leading and developing a diverse scientific, technical, and administrative staff.
- Subject-matter expert with experience and leadership serving on NASA review and specialty panels, and advisory groups.
- Proven strategic thinker with a long record of winning funding from NASA and other federal sources.

#### **EDUCATION**

Ph.D., Geology and Geophysics, University of Hawaii, Honolulu, 1987

Sc.M., Geological Sciences, Brown University, Providence, RI, 1981

A.B. (General, Departmental Honors), Geology, Vassar College, Poughkeepsie, NY, 1979

#### **PROFESSIONAL EXPERIENCE**

**Oct 2020 to present: Director**, Lunar and Planetary Institute, Houston, TX. Responsible for directing the activities of ~50 scientific, technical, and administrative staff; strategic and workforce planning; service to NASA and the worldwide planetary science community. Staff activities include scientific research, education, community engagement, conference and meetings organization and facilitation, IT, contracts, and procurement.

**1990 to Oct, 2020: Research Geologist**, U.S. Geological Survey, Astrogeology, Flagstaff, AZ.

**Administration:** (2003-2007, 2008, 2011) Chief Scientist for USGS Astrogeology Research Program. Managed strategic planning, annual proposal preparation and in-person defense to NASA managers and review panel for NASA Planetary Cartography Research Program. Supervised ~22 science staff members. Responsible for personnel management of ~80 team members, financial oversight, workforce planning and staff development, IT 5-year plan, etc.

**Research:** Research experience in Planetary Surface Processes (volcanism, impact cratering, aeolian processes), Remote Sensing (quantitative analyses of multispectral and radar data for Earth, the Moon, Mars, and Venus), Lunar geologic studies (morphology, composition, mapping, physical properties) of volcanic terrains with multiwavelength remote sensing data (e.g., Moon Mineralogy Mapper, SELENE Kaguya Terrain Camera and Multiband Imager, Lunar Reconnaissance Orbiter Camera and Clementine data).

**NASA Mission Operations:** Science team collaborator, operations (uplink, downlink lead) for navigation, hazard mapping and science cameras on two Mars Exploration Rovers (2004). Participating Scientist on Lunar Reconnaissance Orbiter Cameras team.

**Cartography:** Radiometric, geometric and photometric data processing and analysis of data for the Earth, Moon, Mars, Venus. Digitization, cartographic processing, and archiving of Lunar Orbiter data. Geometric improvement of Kaguya image and magnetic data through orbital refinement, spatial restoration of Moon Mineralogy Mapper hyperspectral data.

**1987 to 1990: Faculty Research Associate**, Arizona State University, Tempe, AZ.

**1983 to 1987: Research Assistant**, University of Hawaii at Manoa, Honolulu, HI.

**1979 to 1982: Graduate Research Assistant**, Brown University, Providence, RI.

## **CAREER OVERVIEW**

### **NASA Principal Investigator (PI):**

- **1992 to present:** PI on >35 research projects funded by NASA programs such as Venus, Mars and Lunar Data Analysis, Planetary Geology & Geophysics, Lunar Advanced Science and Exploration Research and Planetary Data Archiving, Restoration and Tools.
- **2003 to 2007, 2011:** PI of the NASA Planetary Cartography Research Project proposal.
- **2004 to present:** PI of the Cartography and Imaging Sciences node of the NASA Planetary Data System, managing ~1.6 PB of planetary image data for users worldwide.

### **NASA Missions:**

- **2008 to 2010:** Participating Scientist, NASA Lunar Reconnaissance Orbiter Cameras team.
- **2003 to 2005:** Collaborator, Long-Term Planning Theme Lead, NASA Mars Exploration Rovers Athena Mission Science Team.
- **1995 to 1997:** Cartography consultant, NASA Mars Pathfinder Mission Science Team
- **1992 to 1995:** Cartography consultant, NASA Galileo Mission Science Team

### **Service, Expert Consultancy:**

- **2020:** Member of the Science Definition Team for the Artemis III lunar mission, NASA.
- **2020 to present:** Member of the Executive Committee of the Lunar Exploration Analysis Group, an advisory group to NASA on lunar exploration and research.
- **2014 to present:** Founding member of the Mapping and Planetary Spatial Infrastructure Team, an advisory group to NASA on matters of planetary data, mapping, and cartography
- **2000 to present:** Member of the Lunar Nomenclature Task Group of the Working Group for Planetary System Nomenclature of the International Astronomical Union
- **1997 to present:** Frequent participation as Chair, Group Chief, Panelist, External Reviewer of NASA review panels, extended mission reviews
- **2012 to 2020:** Primary organizer of the biennial Planetary Data Workshops, hosting ~150 visitors to discuss news and methods for finding and using planetary data
- **2015 to 2018:** Guest Editor, Three Special Issues, NASA Lunar Reconnaissance Orbiter mission results, Icarus
- **2012 to 2016:** Member of the Planetary Sciences Subcommittee of the NASA Advisory Council
- **2004 to 2009:** Member and Chair, Science Council of the Lunar and Planetary Institute of the Universities Space Research Association (USRA)

## **HONORS**

- **2015:** U.S. Department of the Interior Honor Award, Meritorious Service
- **2014:** NASA Group Achievement Award, PDS4 Development Team

- **2012:** Fellow of the Geological Society of America
- **2006:** USGS Western Region "Excellence in Financial Management" Award
- **2004, 2008:** NASA Group Achievement Award, Mars Exploration Rovers Mission
- **1998:** NASA Group Achievement Award, Mars Pathfinder Mission

***BIBLIOGRAPHY: Selected Professional Publications and Technical Presentations (Reverse Chronological)***

- Gaddis, L.R.**, K. Joy, J. Carpenter, I.A. Crawford, R. Elphic, J. Halekas, S. Lawrence, L. Xiao (2020, in revision) Recent Exploration of the Moon: Science from Lunar Missions Since 2006. In *New Views of the Moon 2*, Rev. Min. Geochem.), in progress for 2021 publication date.
- Crawford, I.A., M. Anand, S. Barber, A. Cowley, S. Crites, W. Fa, J. Flahaut, **L.R. Gaddis**, B. Greenhagen, J. Haruyama, D. Hurley, C.L. McLeod, A. Morse, C.R. Neal, H. Sargeant, E. Sefton-Nash, R. Tartèse (2020, in press) Lunar Resources. In *New Views of the Moon 2*, Rev. Min. Geochem.), in progress for 2021 publication date.
- Head, J.W. III, L. Wilson, H. Hiesinger, C. van der Bogert, Y. Chen, J.L. Dickson, **L. Gaddis**, J. Haruyama, L. Jozwiak, C. Li, J. Liu, T. Morota, D. Needham, L. Ostrach, C. Pieters, T. Prissel, Y. Qian, Le Qiao, M. Rutherford, D.R. Scott, J.L. Whitten, L. Xiao, F. Zhang, O. Ziyuan (2020, in revision) Lunar Volcanism: Volcanic Features and Processes. In *New Views of the Moon 2*, Rev. Min. Geochem., in progress for 2021 publication date.
- Shearer, C., C.R. Neal, T.D. Glotch, T.C. Prissel, A.S. Bell, V.A. Fernandes, **L.R. Gaddis**, B.L. Jolliff, M. Laneuville, T. Magna, J. Simon (2020, in press) Magmatic Evolution 2: A New View of Post-Differentiation Magmatism. In *New Views of the Moon 2*, Rev. Min. Geochem., in progress for 2021 publication date.
- Gustafson, J.O., **L.R. Gaddis**, J.F. Bell III and J.A. Gustafson (2020) An Investigation of Potential Pyroclastic Deposits on the Southeast Limb of the Moon, *Icarus*, Volume 349, 113828. doi: <https://doi.org/10.1016/j.icarus.2020.113828>.
- Goossens, S., Mazarico, E., Ishihara, Y., Archinal, B.A., **Gaddis, L.** (2020) Improving the geometry of Kaguya extended mission data through refined orbit determination using laser altimetry, *Icarus*, v. 336, doi: <https://doi.org/10.1016/j.icarus.2019.113454> .
- Gaddis, L.R.** and T.M. Hare (2019) Archiving GIS-type products in the PDS, 4th Planetary Data Workshop, abs. #7045.
- Gaddis, L.**, T.M. Hare, B. Archinal, S. Goossens, E. Mazarico, E. Speyerer, J. Haruyama, T. Iwata, N. Namiki (2019) New products and tools for working with Kaguya Terrain Camera data, 4th Planetary Data Workshop, abs. #7044.
- Radebaugh, J., B.J. Thomson, B. Archinal, R. Beyer, D. DellaGuistina, C. Fassett, **L. Gaddis**, J. Hagerty, T. Hare, J. Laura, S. Lawrence, E. Mazarico, A. Nass, A. Patthoff, S. Sutton and D. Williams (2019) A Community Roadmap for NASA Planetary Spatial Data Infrastructure, EPSC Abstracts, Vol. 13, EPSC-DPS2019-951-1, 2019, EPSC-DPS Joint Meeting 2019.
- Lemelin, M., Lucey, P.G., Miljkovic, K., **Gaddis, L.R.**, Hare, T., and Ohtake, M. (2019) The compositions of the lunar crust and upper mantle: Spectral analysis of the inner rings of lunar impact basins, *Planetary and Space Science*, 165, 230-243.
- Robbins, Stuart, J. Riggs, B. Weaver, E. Bierhaus, C. Chapman, M. Kirchoff, K. Singer, **L. Gaddis** (2018) Revised Recommended Methods for Analyzing Crater Size-Frequency Distributions, *Meteoritics and Planetary Science* 53. 10.1111/maps.12990.
- Gaddis, Lisa R**, Malaret, Erick, Weller, Lynn, Boardman, Joseph, Besse, Sebastien, Edmundson, Kenneth, Sides, Stuart, Archinal, Brent, and Kirk, Randolph (2018) Geometric restoration of Moon Mineralogy Mapper Data and Implications for Analysis of the Apollo 17 landing site, Paper #166-8, 6 Nov 2018, Geological Society of America Abstracts with Programs. Vol. 50, No. 6, doi: 10.1130/abs/2018AM-324022.

- Laura, J.R., T.M. Hare, **L.R. Gaddis**, R.L. Fergason, J.A. Skinner, J.J. Hagerty and B. Archinal (2017) Towards a Planetary Spatial Data Infrastructure, *Int'l. J. of Geo-Information*, 6, 181, doi:10.3390/ijgi6060181.
- Weitz, C. M., Staid, M. I., **Gaddis, L. R.**, Besse, S., & Sunshine, J. M. (2017) Investigation of lunar spinels at Sinus Aestuum, *Journal of Geophysical Research: Planets*, 122, 2013–2033.
- Bennett, K.A., B.H.N. Horgan, **L.R. Gaddis**, B.T. Greenhagen, C.C. Allen, P.O. Hayne, J.F. Bell, III, D.A. Paige (2016) Complex explosive volcanic activity on the Moon within Oppenheimer crater, *Icarus* 273, pp. 296-314.
- Jawin, Erica R., Sebastien Besse, **Lisa R. Gaddis**, Jessica M. Sunshine, James W. Head, and Sara Mazrouei (2015) Examining spectral variations in localized lunar dark mantle deposits, *J. Geophys. Res. Planets*, 120, doi:10.1002/2014JE004759.
- Gaddis, L.** and T. Hare (2015) Status of tools and data for planetary research, *Eos, Earth and Space Science News*, 96, doi:10.1029/2015EO041125.
- Fergason, R.L., **L. Gaddis**, A.D. Rogers (2014) Hematite-bearing materials surrounding Candor Mensa in Candor Chasma, Mars: Implications for hematite origin and post-emplacment modification, *Icarus*, 237, pp. 350-365, doi:10.1016/j.icarus.2014.04.038.
- Gaddis, Lisa R.**, T. Hare, and R. Beyer (2014) Summary and Abstracts of the Planetary Data Workshop, June 2012, USGS Open-File Report 2014-1056 (see <http://pubs.usgs.gov/of/2014/1056/>).
- Besse, S., J.M. Sunshine and **L.R. Gaddis** (2014) Volcanic glass signatures in spectroscopic survey of newly proposed lunar pyroclastic deposits, *J. Geophys. Res. Planets*, 119, 355-372, doi:10.1002/2013JE004537.
- Gustafson, J.O., J.F. Bell III, **L.R. Gaddis**, B.R. Hawke, and T.A. Giguere, 2012, Characterization of previously unidentified lunar pyroclastic deposits using LROC data, *J. Geophys. Res.*, 117, E00H25, doi:10.1029/2011JE003893.
- Gaddis, Lisa R.**, T. Hare, and R. Beyer (2012) Progress on archiving, delivering and working with planetary, *Eos Transactions of the American Geophysical Union*, v. 93, Issue 45, <https://doi.org/10.1029/2012EO450008>.
- Hagerty, J.J., D.J. Lawrence, B.R. Hawke, and **L.R. Gaddis** (2009) Thorium abundances on the Aristarchus Plateau: Insight into the composition of the Aristarchus pyroclastic glass deposits, *JGR*, v. 114, E04002, doi: 10.1029/2008JE003262.
- Duke, M.B., **L. Gaddis**, G.J. Taylor and H.H. Schmitt (2006) Exploration, utilization, and development of the Moon, in B. Jolliff and M. Wieczorek (eds.), "New Views of the Moon", *Rev. Mineralogy and Geochemistry*, 60, 597-656.
- Giguere, T.A., B.R. Hawke, **L.R. Gaddis**, D.T. Blewett, J.J. Gillis-Davis, P.G. Lucey, G.A. Smith, P.D. Spudis, and G.J. Taylor (2006) Remote sensing studies of the Dionysius region of the Moon, *J. Geophys. Res.* 111, doi:10.1029/2005JE002639.
- Kirk, R.L., B.A. Archinal, **L.R. Gaddis**, and M.R. Rosiek (2006) Cartography for lunar exploration: 2006 status and planned missions, *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences (ISPRS)*, XXXVI, Part 4, "Geospatial Databases for Sustainable Development", Goa, India.
- Herkenhoff, K.E. and 41 others (including **Gaddis**) (2006) Overview of the Microscopic Imager Investigation during Spirit's first 450 sols in Gusev crater, *J. Geophys. Res.* 111, doi:10.1029/2005JE002574.
- Farrand, W.H., **L.R. Gaddis**, L. Keszthelyi (2005) Pitted cones and domes on Mars: Observations in Acidalia Planitia and Cydonia Mensae using MOC, THEMIS, and TES data, *J. Geophys. Res.*, 110, E05005 10.1029/2004JE002297.
- Herkenhoff, K.E. and 22 others (including **Gaddis**) (2004) Textures of the Soils and Rocks at Gusev Crater from Spirit's Microscopic Imager, *Science*, 305, 5685, 824-826.

- Herkenhoff, K.E. and 31 others (including **Gaddis**) (2004) Evidence from Opportunity's Microscopic Imager for Water on Meridiani Planum, *Science* 306, 1727-1730.
- Gaddis, L.R.** (2004) The Face of the Moon, in *Volcanic Worlds* (R.M.C. Lopes, T.K.P. Gregg, eds.), Springer, ISBN 978-3-540-00431-8.
- Gaddis, L.**, M.I. Staid, J.A. Tyburczy, B.R. Hawke, and N. Petro (2003) Compositions of Lunar Pyroclastic Deposits, *Icarus* 161/2, p. 262-280.
- Pieters, C.M., J.W. Head III, **L. Gaddis**, B. Jolliff, and M. Duke (2001) Rock Types of South Pole-Aitken Basin and Extent of Basaltic Volcanism, *J. Geophys. Res.*, 106, 28001-28022.
- Shepard, M.K., B.A. Campbell, M.H. Bulmer, T.G. Farr, **L.R. Gaddis**, and J.J. Plaut (2001) The Roughness of Natural Terrain. A Planetary and Remote Sensing Perspective. *Journal of Geophysical Research - Planets*, 106, p. 32,777.
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- Gaddis, L.R.**, and 19 others (1999) Digital Mapping of the Mars Pathfinder Landing Site: Design, Acquisition, and Derivation of a Cartographic Product for Science Applications, *Journal of Geophysical Research—Planets*, 104, 8853-8868.
- Kirk, R.L., E. Howington-Kraus, T. Hare, E. Dorrer, D. Cook, M. Gordon, K. Becker, R. Redding, J. Blue, E.M. Lee, **L.R. Gaddis**, J.R. Johnson, L.A. Soderblom, and A.W. Ward (1999) Digital photogrammetric analysis of the IMP camera images: Mapping the Mars Pathfinder landing site in three dimensions, *Journal of Geophysical Research—Planets*, 104, 8869-8887.
- Ward, A.W., **L.R. Gaddis**, R.L. Kirk, L.A. Soderblom, K.L. Tanaka, M.P. Golombek, T.J. Parker, R. Greeley, and R.O. Kuzmin (1999) General geology and geomorphology of the Mars Pathfinder landing site, *Journal of Geophysical Research Planets*, 104, 8555-8571.
- Smith, P.H. and 25 others (including **Gaddis**) (1997) Results from the Mars Pathfinder Camera, *Science*, 278, 1758-1764.
- Johnson, J.R. and **Gaddis, L.** (1996) Modeling of fluidized ejecta emplacement over digital topography on Venus, *J. Geophys. Res.*, 101, #E2, 4673-4682.
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- Gaddis, L.R.**, A.S. McEwen, and T. Becker (1995) Recalibration of Galileo EM1 SSI data for the lunar limb and far side: The effects of scattered light removal, *J. Geophys. Res.-Planets*, 100, 26345-26355.
- Gaddis, Lisa R.** (1994) Evaluation of an empirical radar backscatter model for predicting backscatter characteristics of geologic units at Pisgah volcanic field, California: *Geophysical Research Letters*, v. 21, #17, pp. 1803-1806.
- McEwen, A.S., **L.R. Gaddis**, G. Neukum, H. Hoffmann, C.M. Pieters and J.W. Head, III (1993) Galileo observations of Post-Imbrium lunar craters during the first Earth-Moon flyby, *Journal of Geophysical Research Planets*, v. 98, pp. 17207-17231.
- Gaddis, L.R.** (1992) Lava-flow characterization at Pisgah volcanic field, California, with multiparameter imaging radar, *Geol. Soc. Am. Bull.*, 104, 695-703.
- Gaddis, L.R.** and R. Greeley (1990) Volcanism in NW Ishtar Terra, Venus: *Icarus*, v. 87, p. 327-338.
- Gaddis, L.R.**, P. Mouginis-Mark and J.N. Hayashi (1990) Lava flow surface textures: SIR-B radar image texture, field observations, and terrain measurements, *Photogramm. Eng. Rem. Sens.*, 56, 211-224.
- Gaddis, L.R.**, P. Mouginis-Mark, R. Singer and V. Kaupp (1989) Geologic analyses of Shuttle Imaging Radar (SIR-B) data of Kilauea Volcano, *Geol. Soc. Am. Bull.*, 101, 317-332.

**Gaddis, L.R.,** C.M. Pieters and B.R. Hawke (1985) Remote sensing of lunar pyroclastic mantling deposits, *Icarus*, 61, 461-489.

### **COMPUTING SKILLS**

- Extensive knowledge of and experience with PC, Macintosh, Linux operating systems, and a variety of image processing and/or data analysis tools (ISIS2, 3; ENVI; ArcMap, QGIS, PyHAT and other python tools, etc.).
- Proficient in Microsoft Office and its applications.

### **LANGUAGE SKILLS**

- Fluent in American English.
- Studied Russian (6 yrs), Spanish (3 yrs), Latin (1 yr), and French (1 yr) languages (but have not tried to speak any of these in many years).

### **ORGANIZATIONS/AFFILIATIONS**

- American Geophysical Union, 1982 to present
  - Editorial Board, *Eos*, Transactions of the American Geophysical Union, 1/00 to 2/03
  - Editor, Planetary Sciences Section, *Eos*, Transactions of the American Geophysical Union, 1/00 to 2/03
  - Executive Committee, Planetary Sciences Section, 12/97 to 2/03
  - Member, Editorial Search Committee (to select next Editor of *JGR-Planets*), 1-12/98
- American Society for Photogrammetry and Remote Sensing, 1983 to 1992
- Geological Society of America, 1988 to present (Elected Fellow in 2012)
- IEEE Geoscience and Remote Sensing Society, 1986 to 1992
- Society of Sigma Xi (Scientific Honor Society), nominated by Dr. Sue Kieffer in 1990, active until 2004; currently inactive