

Curriculum Vitae: Dr. Virginia C. Gulick

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EDUCATION

PhD (Geosciences); University of Arizona Ph.D. Thesis: *Magmatic Intrusions and Hydrothermal Systems: Implications for the Formation of Small Martian Valleys*

MS. (Geosciences), Minor in Hydrology, The University of Arizona, Tucson Master Thesis: *Origin and Evolution of Valleys on the Martian Volcanoes: The Hawaiian Analog.*

B.A. (Geosciences), Rutgers University (Rutgers College) New Brunswick, New Jersey Senior Thesis: *The Coral Sea Sediment Study.*

PRESENT POSITION

1996-pres.: Research Scientist (SETI Institute Principal Investigator) & Adjunct Professor, Astronomy Dept., NM State Univ.

- Mars Science Lab 2009 landing site selection steering group member.
- MRO'05 HiRISE instrument science team member (2002-2009): Lead on fluvial & hydrothermal processes, E/PO & web technologies. HiRISE E/PO website (<http://marsoweb.nas.nasa.gov/HiRISE>)
- Invited presentation to AGU's Session Using Planetary Data in Educational Settings. Presentation title: "MRO's High Resolution Imaging Science Experiment (HiRISE): Education And Public Outreach Plans",.
- Invited panelist for NASA's Learning from the Frontier: Getting Planetary Data into the Hands of Educators Workshop at LPI, March 14, 2004.
- Co-convener of the Volcano/Ice Interaction on Earth and Mars Conf., Reykjavik, Iceland, August 2000.
- Project science lead on Marsoweb: the Mars Landing Site Studies & Global Visualization web environment effort (<http://marsoweb.nas.nasa.gov/landingsites>). 1998-present.
- Science CoI for the Clickworkers Project; NASA's Experiment in distributed data analysis by the public web site (<http://clickworkers.arc.nasa.gov>) 2000-present.
- PI: Geologist's Field Assistant project: Developing an automated science analysis system for Mars exploration.
- Studies of potential Mars Surveyor Landing Sites, Hydrothermal & Fluvial Systems
- 1997- Invited formal debate: Was Early Martian Climate Warm or Cold? Early Mars Conf., LPI, Houston
- Science consultant for the Mars Surveyor Geodesy and Cartography working group, 1998-1999.
- Science lead for the CMEX landing site activities & facilitator for the Mars Surveyor site selection processes.
- Image analysis science lead for Onboard Sci. Understand. Proj, ARC Center of Excell. in IT. 1996-2001.
- Science lead for the Mars 3D visualization project with the Ames Biocomputations group, 1998-1999.
- Science team member: 1996-1999: ARC&CMU rover field tests in HI, AZ, Atacama, Silver Lake, CA.
- Organized 1998 Ames, 1999 SUNY-Buffalo Mars Surveyor, & 2001 Ames MER Landing Site workshops.

PREVIOUS RESEARCH POSITIONS

July, 1993-July, 1996.-- *National Research Council Post-Doctoral Research Fellowship* at the NASA-Ames Research Center, Mountain View, CA. Investigated the effects of ocean-induced CO₂ pulses on Mars and its implications for valley formation. Continued studies of Martian hydrothermal systems. Development and production of an educational Mac-based image processing tutorial CD-ROM for analysing planetary images and an interactive Mars Atlas CD-

ROM for the Center for Mars Exploration, NASA-Ames. Science team member of the NASA-Ames Marsokhod 95 rover tests. *Advisors:* Dr. C. P. McKay (NASA-Ames) and Dr. G. Briggs (NASA-Ames).

Fall 1990-Summer 1993 --*NASA Graduate Student Researcher's Program Fellow at the University of Arizona.* Hydrological/Hydrothermal modeling, geomorphic, and surface process studies on Mars, Earth, and Venus.

Fall 1987-Fall 1990 --*Graduate Research Associate at the University of Arizona.* Geomorphic and Hydrologic studies of Earth and Mars

Fall 1984-Fall 1987 --*Graduate Research Assistant at the University of Arizona.* Geomorphic and Hydrologic studies of Earth and Mars

Summer 1983 --*NASA Planetary Geology Undergraduate Research Fellow at the Lunar and Planetary Laboratory University of Arizona, Tucson, Arizona.* Geomorphic studies of Mars.

Spring 1983 --*Senior Thesis at Lamont-Doherty Geological Observatory, Palisades, New York.* Classification, process studies, mapping of surface sediments and measurements of CO₂ concentrations of surface sediments in the Coral Sea, Australia, using surface sediment core samples from the Deep Sea Drilling Project.

COMMITTEES

- NASA-appointed Mars Landing Site Steering Group member (1998-present)
- Mars Surveyor Geodesy and Cartography working group member (1998-1999)
- Mars Data Analyses Program (MDAP) review panel member (2000-2001)
- Mars Technology Program review panel member (2002-present)

AWARDS and FELLOWSHIPS

- 2004: Certificate of Appreciation for an outstanding contribution toward the success of The NASA Ames Exploration Center.
- 1999 Group Achievement Award, Astronaut-Rover Interaction remote field test project team, NASA JSC.
- 1999 Cert. Of Appreciation, Mojave '99 ASRO field test, First Astronaut-Rover field experiment, NASA ARC and JSC
- 1998 -Certif. of Appreciation, Mars Virtual Exploration CD-ROM/Curric. Suppl., NASA ARC External Affairs Office.
- 1997 - Group achievement award for the Atacama Desert Trek Field Experiment, Robotics Inst., CMU.
- Certificate of Excellence in the NASA-Ames Space Science Division
- 1996 – 1998 NASA Potential Mars Surveyor Landing Sites Studies Program; \$55K
- 1993 – 1996 National Research Council Post-Doctoral Research Program Fellow
- 1990-1993 --NASA Graduate Student Researcher's Program Fellow at the University of Arizona
- 1983 --NASA Planetary Geology Undergraduate Research Fellow at the Lunar and Planetary Laboratory University of Arizona, Tucson, Arizona

COURSES TAUGHT

Spring 1997 The Planets (Astronomy 105G) at NMSU

Spring 1998 Planetary Exploration (Astronomy 330G) at NMSU

PROFESSIONAL AFFILIATIONS: AGU, GSA, Sigma Xi, AAS- DPS

PUBLICATIONS:

SELECTED REFEREED JOURNAL ARTICLES AND BOOK CHAPTERS

McEwen, A.S., Eliason, E. M., Bergstrom J.W., Bridges N.T., Hansen C. J., Delamere W.A. , Grant J.A. , **Gulick V.C.**, Herkenhoff K.E., Keszthelyi L., Kirk R. L., Mellon M.T., Squyres

- S.W., Thomas N., Weitz C. (2007) MRO's High Resolution Imaging Science Experiment (HiRISE), Submitted to JGR-Planets 112, 5..
- D. G. Deardorff, **V. C. Gulick**, "Marsoweb: a collaborative web facility for Mars landing site and global data studies", Proceedings of Electronic Imaging, Science and Technology 2003, Visualization and Data Analysis 2003, SPIE Volume 5009, pp. 248-259, 2003.
- Young L.A., Aiken E.W., **Gulick V.C.**, Mancinelli R., and Briggs G.A., *Rotorcraft as Mars Scouts*, (2002) IEEE Aerospace Conference, Montana, March 19 – 16, 2002 .
- Gulick, V.C., et al. (2001). Autonomous Image Analysis during the 1999 Marsokhod field test. *JGR* **106**, 7745-7763.
- Gulick V.C. (2001) Origin of the valley networks on Mars: A hydrological perspective. *Geomorph.* **37**, 241-268.
- Komatsu G., **Gulick V.C.**, Baker V.R. (2001) Channels and valleys on Venus. *Geomorph.* **37**, 225-240.
- DeHon, R., Barlow, N., Reagan M., Bettis, E., Foster, C., **Gulick V.**, +4 add'l authors.(2001). Geol. & Geomorph. Observations. at the 1999 Marsokhod Test Site, **JGR** **106**,7665-7682.
- Cabrol, N. A.; Chong-Diaz, G.; Stoker, C. R.; Gulick, V. C.; Landheim, R.; Lee, P.; Roush, T. L.; Zent, A. P.; Herrera Lameli, C.; Jensen Iglesia, A.; and 6 coauthors. Nomad rover field experiment, Atacama Desert, Chile 1. Science results overview. Journal of Geophysical Research, Volume 106, Issue E4, April 25, 2001, pp.7785-7806
- Chapman M., Lucchitta B., Gudmundsson M., **Gulick V.**, +3 add'l authors (2000). Subice volc. on Earth & Mars. in From Deep Oceans to Deep Space: Environ'l Effects of Volc. Eruptions, Zimbleman & Gregg, eds, Plenum Press, New York, 39-74.
- Gulick V.C.(1998).Magmatic Intrusions & a hydrotherm. origin for fluv. valleys on Mars, *JGR* **103**, 19,365-19,388
- Gulick V.C., et al. (1997). Effects & lifetimes of ocean-induced CO₂ pulses on Mars: Implications for fluvial valley formation, *Icarus*, **130**,68-86.
- Moore J.M, Clow G.D., Davis W.L., **Gulick V.C.**, Janke D.R., McKay C.P., Stoker C.R., and Zent A.P. (1995). The Circum-Chryse region as an example of a hydrologic cycle on Mars: Geologic evidence and theoretical evaluation, *J. Geophys. Res.* **100**, 5433-5448.
- Baker V.R., **Gulick V.C.**, Kargel J.S. (1993), Hydrology & water resources of Mars. in Resources of Near-Earth Space. Lewis & Matthews, eds. Univ. of AZ Press, Tucson, 765-798.
- Komatsu G., Baker V.R., **Gulick V.C.** and Parker T.J. (1993), Venusian channels and valleys: Distribution and volcanological implications. *Icarus* **102**, 1-25.
- Baker V.R., Komatsu G., Parker T.J., **Gulick V.C.**, Kargel J.S., and Lewis J.S. (1992) Channels and valleys on Venus: Preliminary analysis of Magellan data. *J. Geophys. Res.* **97**, 13421-13444.
- Baker V.R., Carr M.H., **Gulick V.C.**, +2add'l authors (1992). Channels & valley networks. in *Mars*. Kieffer, et al., eds. U. of AZ Press, Tucson, 493-522.
- Baker V.R., Strom R.G., **Gulick V.C.**, +3 add'l authors (1991) Ancient oceans, ice sheets & the hydrological cycle on Mars. *Nature* **352**, 589-584.
- Gulick, V.C. & Baker V.R. (1990) Origin and evolution of valleys on Martian volcanoes. *JGR* **95**, 14325-14344.
- Gulick V.C. & Baker V.R. (1989) Fluvial valleys and Martian paleoclimates. *Nature* **341**, 514-516.

ENCYCLOPEDIA ARTICLES AND WORKSHOP VOLUMES

- Gulick, V.C. and M.T. Gudmundsson. (editors) (2000) Volcano/Ice Interaction on Earth and Mars Conference, Reykjavik, Iceland, August 13-18, 2000, 62p.
- Gulick, V.C. (editor) (1999) Second Mars Surveyor Landing Site Workshop, SUNY-Buffalo, June 22-23, 1999, 105p.

- Gulick V.C (editor) (1998) Mars Surveyor 2001 Landing Site Workshop. NASA-Ames Research Center, January 26-27, 1998, 95p.
- Gulick, V.C. (editor) (1997) Mars 2005 Sample Return Workshop. NASA-Ames Research Center, March 25-26, 1996., (Lunar and Planetary Inst., Houston), LPI Technical Report Number 97-01, 91p.
- Gulick, V.C. (1996) John Playfair (invited article). *Encyclopedia of Earth Science*, Macmillan Reference USA, Simon and Schuster Macmillan, New York, pp. 868-869.

SELECTED ABSTRACTS

- Gulick, V.~C., Davatzes, A., Kolb, K., Keszthelyi, L., McEwen, A., HiRISE Team 2007. A Closer Look at Gully Morphology and Formation on Mars with HiRISE. AGU Fall Meeting Abstracts 439.
- Davatzes, A., Gulick, V., Keszthelyi, L., HiRISE Team 2007. Evidence of multiple flooding events or pulses from erosional features in Martian outflow channels. AGU Fall Meeting Abstracts 434.
- Gulick, V.~C. 2007. From Gullies to Outflow Channels: HiRISE's Perspective on Fluvial Activity on Mars. AGU Fall Meeting Abstracts 8.
- McEwen, A.~S., and 32 colleagues 2007. A Closer Look at Water-Related Geologic Activity on Mars. *Science* 317, 1706.
- Gulick, V.~C., Davatzes, A., Kolb, K., Hirise Team 2007. Some Insights on Gully Morphology and Formation on Mars from HiRISE. LPI Contributions 1353, 3371.
- Bishop, J.~L., Murchie, S.~L., Tornabene, L.~L., Pelkey, S.~M., Gulick, V.~C., Ehlmann, B.~L., Mustard, J.~F., Brown, A.~J., Mro Crism Team 2007. Characterization of Phyllosilicates in Libya Montes and the Southern Isidis Planitia Region Using CRISM and HiRISE Images. LPI Contributions 1353, 3294.
- Kolb, K.~J., McEwen, A.~S., Gulick, V.~C., Hirise Team 2007. Bright Gully Deposits: Geological and Topographical Settings. LPI Contributions 1353, 3245.
- Davatzes, A.~E.~K., Gulick, V.~C., Hirise Team 2007. New Insight into Cataracts in Outflow Channel Systems from HiRISE Images. LPI Contributions 1353, 3202.
- Gulick, V.~C., McEwen, A.~S. 2007. Early HiRISE Observations of Fluvial and Hydrothermal Features. Lunar and Planetary Institute Conference Abstracts 38, 2300.
- Gulick, V.~C., Deardorff, G., Kanefsky, B., Davatzes, A. 2007. Student and Public Participation in Acquiring and Analyzing HiRISE Images. Lunar and Planetary Institute Conference Abstracts 38, 2248.
- Banks, M.~E., McEwen, A.~S., Mellon, M.~T., Kargel, J.~S., Gulick, V.~C., Jaeger, W.~L., Keszthelyi, L., Herkenhoff, K.~E., Hirise Team 2007. Glacial Morphologies in the Western Charitum Montes, Argyre Basin Rim. Lunar and Planetary Institute Conference Abstracts 38, 2164.
- Hansen, C.~J., and 10 colleagues 2007. HiRISE Observations of Mars' Southern Seasonal Frost Sublimation. Lunar and Planetary Institute Conference Abstracts 38, 1906.
- Davatzes, A.~E.~K., Gulick, V.~C. 2007. Evidence for Tectonically Controlled Hydrothermal Fluid Flow in Relay Zones on Mars from Early HiRISE Images. Lunar and Planetary Institute Conference Abstracts 38, 1788.
- Chuang, F.~C., McEwen, A.~S., Gulick, V.~C. 2007. Early HiRISE Observations of Slope Streaks and Avalanche Scars. Lunar and Planetary Institute Conference Abstracts 38, 1783.
- McKay, C.~P., and 11 colleagues 2007. Science Goals for Deep Drilling in Ice-rich Permafrost on Mars. Lunar and Planetary Institute Conference Abstracts 38, 1468.
- Kolb, K.~J., McEwen, A.~S., Gulick, V.~C., Hirise Team 2007. Gullies Potentially Formed by Water from the Subsurface. Lunar and Planetary Institute Conference Abstracts 38, 1391.
- Davatzes, A., Gulick, V. 2006. Relationship of Fault Geometry to Catastrophic Outflow on Mars. AGU Fall Meeting Abstracts 63.
- Gulick, V.~C., Davatzes, A., McEwen, A. 2006. MRO's High Resolution Imaging Science Experiment (HiRISE) Education And Public Outreach program. AGU Fall Meeting Abstracts 62.

- Herkenhoff, K., Byrne, S., Hansen, C., Gulick, V., McEwen, A. 2006. Imaging the Polar Regions of Mars with HiRISE. LPI Contributions 1323, 8009.
- Gulick, V.~C., McEwen, A. 2005. Education And Public Outreach With MRO's High Resolution Imaging Science Experiment (HiRISE).. AGU Fall Meeting Abstracts A172.
- McEwen, A., and 14 colleagues 2005. MRO's High Resolution Imaging Science Experiment (HiRISE). AGU Fall Meeting Abstracts A171.
- Gulick, V.~C., HiRISE Science Team 2005. MRO's High Resolution Imaging Science Experiment (HiRISE): Education and Public Outreach. Bulletin of the American Astronomical Society 37, 634.
- Gulick, V.~C. 2005. Revisiting Valley Development on Martian Volcanoes Using MGS and Odyssey Data. 36th Annual Lunar and Planetary Science Conference 36, 2345.
- Gulick, V.C., McEwen, A.S., and the HiRISE Science team, 2005. Education and Public Outreach with MRO's High Resolution Imaging Science Experiment (**HiRISE**). AGU Fall Mtg., Paper # P23A-0172
- Gulick, V.C. and the HiRISE science team, 2005. "MRO's High Resolution Imaging Science Experiment (HiRISE): Education And Public Outreach". Bulletin of the AAS (BAAS) volume 37 #3, September 2005, abstract #12.03, (AAS DPS 2005 Meeting, Cambridge, England".
- Gulick, V.C. 2005. "Another Look At Valley Development On Martian Volcanoes Using MGS and Odyssey Data". LPSC XXXVI.
- Gulick, V.C. et al, 2004. "MRO's High Resolution Imaging Science Experiment (HiRISE): Education And Public Outreach Plans", AGU Fall meeting. *Invited presentation*.
- Gulick, V.C. (2004) Another Look at Valley Development on Martian Volcanoes, Martian Valley Workshop., Kohala Cost, HI.
- Gulick, V.C.,et al. (2004) Developing an Automated Science Analysis System for Mars Surface Exploration for MSL & Beyond. *LPSC XXXV*, 2121.
- Gulick, V.C., Hart, S., Shi, X., & Siegel, V. (2004) Developing an Automated Science Analysis System for Mars Surface Exploration for MSL and Beyond. *LPSC XXXV*, 2121.
- Gulick, V.C., Shi, X., Hart, S., Horton, A. (2003) Towards Developing an Automated Science Analysis System for Mars Surface Exploration. *Eos Trans. AGU*, 84(46), Fall Meet. Suppl., Abstract P41B-0407.
- Gulick, V. , A. McEwen, W.A. Delamere, E. Eliason, J. Grant, C. Hansen, K. Herkenhoff, L. Keszthelyi, R. Kirk, M. Mellon, P. Smith, S. Squyres, N. Thomas, and C. Weitz.(2003). MRO's High Resolution Imaging Science Experiment (HiRISE): Education And Public Outreach Plans. Sixth International Conference on Mars, July 20-25 2003, Pasadena, California, abstract no.3260.
- Eliason E., C. J. Hansen, A. McEwen, W.A. Delamere, N. Bridges, J. Grant, **V. Gulick**, K. Herkenhoff, L. Keszthelyi, R. Kirk, M. Mellon, P. Smith, S. Squyres, N. Thomas, and C. Weitz, (2003). Operation Of MRO's High Resolution Imaging Science Experiment (HiRISE): Maximizing Science Participation. Sixth International Conference on Mars, July 20-25 2003, Pasadena, California, abstract no.3212.
- McEwen A., C. Hansen, N. Bridges, W.A. Delamere, E. Eliason, J. Grant, **V. Gulick**, K. Herkenhoff, L. Keszthelyi, R. Kirk, M. Mellon, P. Smith, S. Squyres, N. Thomas, and C. Weitz, (2003). MRO's High Resolution Imaging Science Experiment (HiRISE): Science Expectations. Sixth International Conference on Mars, July 20-25 2003, Pasadena, California, abstract no.3217.
- Gulick, V.C., et al. (2003). Automated Rock Identification for Future Mars Exploration Missions, *LPSC XXXIV*, 2103, 2003.
- Gulick, V.C. & D.G. Deardorff, (2003). Mars Data Visualization and E/PO with Marsoweb, *LPSC XXXIV*, 2081.
- Gulick, V. C. The Valley Networks on Mars (2002). American Geophysical Union, Fall Meeting 2002, abstract #P51B-0344

- Gulick, V.C., R.L. Morris, J. Bishop, P. Gazis, R. Alena, M. Sierhuis (2002). "Geologist's Field Assistant: Developing Image & Spectral Analyses Algorithms For Remote Science Exploration" *LPSC XXXIII*, abstract #1961.
- McEwen, A. S. ;Delamere, W. A. ;Eliason, E. M. ;Grant, J. A. ;Gulick, V. C. ;Hansen, C. J. ;Herkenhoff, K. E. ;Keszthelyi, L. ;Kirk, R. L. ;Mellon, M. T. ;Squyres, S. W. ;Thomas, N. ;Weitz, C. (2002). HiRISE: The High Resolution Imaging Science Experiment for Mars Reconnaissance Orbiter. *LPSC XXXI*, Houston, Texas, abstract no.1163.
- Urquhart, M. L.; Gulick, V. C. (2002). Heat Flow, Thermal Conductivity, and the Plausibility of the "White Mars" Hypothesis. 33rd Annual Lunar and Planetary Science Conference, March 11-15, 2002, Houston, Texas, abstract no.1680
- Deardorff, D. G.; Gulick, V. C.; Briggs, G. A. (2002). Marsoweb: A Collaborative Web Facility for Mars Landing Site and Global Data Studies. 33rd Annual Lunar and Planetary Science Conference, March 11-15, 2002, Houston, Texas, abstract no.1980.
- Eliason, E. M. ;McEwen, A. S. ;Delamere, W. A. ;Grant, J. A. ;Gulick, V. C. ;Hansen, C. J. ;Herkenhoff, K. E. ;Keszthelyi, L. ;Kirk, R. L. ;Mellon, M. T. ;Squyres, S. W. ;Thomas, N. ;Weitz, C. (2002). A Vision for the MRO/HiRISE Operations Center -- Getting the Data to the People. 33rd Annual Lunar and Planetary Science Conference, March 11-15, 2002, Houston, Texas, abstract no.1960.
- Kanefsky, B.; Barlow, N. G.; Gulick, V. C. (2001). Can Distributed Volunteers Accomplish Massive Data Analysis Tasks? 32nd Annual Lunar and Planetary Science Conference, March 12-16, 2001, Houston, Texas, abstract no.1272.
- Gulick, V.C. (2001) Some ground water considerations regarding the formation of small martian gullies. *LPSC XXXII*, abstract # 2193, CD-ROM.
- Gulick, V.C., (2001). Potential Mars exploration rover landing sites west and southwest of Apollinaris Patera, 2003 Mars Exploration Rovers landing site workshop, Jan 24-24, 2001, LPI Contribution No. 1079, pp. 29-30.
- Gulick, V.C., Deardorff, D.G., G.A. Briggs, (2001). A virtual web environment for Mars landing site studies. , 2003 Mars Exploration Rovers landing site workshop, Jan 24-24, 2001, LPI Contribution No. 1079 Pp. 31-32.
- Urquhart, M.L. and V.C. Gulick, (2001). Lander detection and identification of hydrothermal deposits. 2003 Mars Exploration Rovers landing site workshop, Jan 24-24, 2001, LPI Contribution No. 1079 pp. 69-70.
- Gulick, V.C., D. G. Deardorff, G. A. Briggs, and T. A. Sandstrom, Y. Hung, K. P. Hand, (2000) A Virtual Collaborative Web Environment For Mars Landing Site Studies, Astrobiology Conf., April 2000, NASA Ames Research Center, Moffett Field, CA.
- Gulick, V.C. 2000. Fluvial valleys and Ocean Formation on Mars: Insights from MGS. *LPSC XXXI* (Lunar and Planetary Institute, Houston), CD-ROM.
- Gulick, V.C., R.L. Morris, E.B. Bandari, 2000. Maximizing Science Return from Future Mars Missions with Onboard Image Analyses. *LPSC XXXI* (Lunar and Planetary Institute, Houston).
- Gulick, V.C., D. G. Deardorff, G. A. Briggs, and T. A. Sandstrom, Y. Hung, K. P. Hand, A Virtual Collaborative Web Environment For Mars Landing Site Studies, . *LPSC XXXI* (Lunar and Planetary Institute, Houston), CD-ROM.
- Gulick, V.C., R.L.Morris, M.A. Ruzon, E. Bandari 1999. Autonomous Image Analysis for Future Mars Missions, AGU meeting, San Francisco, CA, Dec. 13-17, 1999.
- Gulick, V.C., R.L.Morris, M.A. Ruzon, 1999. Autonomous Onboard Science Image Analysis for Future Mars rover missions, DPS meeting, Padova, Italy, October 10-15, 1999.
- Gulick V., et al. (1999), "Autonomous science analyses of digital images for Mars sample return and beyond", *LPSC XXX*. Abstract #1994, Houston, Texas.
- Gulick, V.C. 1999. Candidate Mars Surveyor Landing Sites Near Apollinaris Patera. Second Mars Surveyor Landing Site Workshop, pp. 45-46, (V.C. Gulick, ed.), SUNY-Buffalo, Buffalo, NY, June 22-23, 1999, 105p.

- Gulick, V.C., D. G. Deardorff, G. A. Briggs, K. P. Hand, and T. A. Sandstrom 1999. A Virtual Collaborative Environment For Mars Surveyor Landing Site Studies. Second Mars Surveyor Landing Site Workshop, pp. 47-48, (V.C. Gulick, ed.), SUNY-Buffalo, Buffalo, NY, June 22-23, 1999, 105p.
- Gulick V. C., G. Briggs, R. S. Saunders, M. Gilmore, and L. Soderblom (1999). Mars Surveyor project landing site activities. LPSC XXX (Lunar and Planetary Institute, Houston).
- Roush T.L., V. **Gulick**, R. Morris, P. Gazis, G. Benedix, C. Glymour, J. Ramsey, L. Pedersen, M. Ruzon, W. Buntine, and J. Oliver (1999). Autonomous science decision making for Mars sample return, LPSC XXX (Lunar and Planetary Institute, Houston).
- Stoker C., N. Cabrol, T. Roush, V. **Gulick**, G. Hovde, J. Moersch and the Marsokhod Rover Team, (1999). 1999 Marsokhod field experiment: a Simulation of a Mars rover science mission LPSC XXX, Lunar and Planetary Institute, Houston.
- Gulick, V.C. G. Briggs, R.S. Saunders, M. Gilmore, And L. Soderblom, 1999. Mars Surveyor Project Landing Site Activities, abstract #127, Mars Exploration program and sample return missions Conference, Paris, France, February 1-5, 1999.
- Roush T.L., V. **Gulick**, R. Morris, P. Gazis, G. Benedix, C. Glymour, J. Ramsey, L. Pedersen, M. Ruzon, W. Buntine, and J. Oliver (1999). Autonomous science decision making related to Mars sample return, abstract# 018, Mars Exploration program and sample return missions Conference, Paris, France, February 1-5, 1999.
- Gulick, V.C., Dohm, J., Tanaka, K. and Hare, T. (1998) The origin of Warrego Valles: a case study for fluvial valley formation on early Mars. LPSC XXIX (Lunar and Planetary Institute, Houston).
- Dohm, J.M., K.L. Tanaka, J.H. Lias, T.M. Hare, R.C. Anderson and V. C. **Gulick**. Warrego Valles And Other Candidate Sites Of Local Hydrothermal Activity Within The Thaumasia Region, Mars. LPSC XXX (Lunar and Planetary Institute, Houston).
- Gulick, V.C. (1998) Potential Mars Surveyor 2001 landing sites near Apollinaris Patera. Mars 2001 Landing Site Workshop, (January 27-28, 1998, NASA-Ames Research Center, Moffett Field).
- Gulick, V.C. R.M. Haberle, and C.P. McKay (1997). Episodic greenhouse climates on Mars. *Lunar and Planetary Science Conference XXVIII*, (Lunar and Planetary Institute, Houston),
- Gulick V.C. (1996). Hydrogeological interpretation of candidate origin sites for Martian meteorite ALH84001. *28th Annual Meeting of the Division for Planetary Sciences*, Tucson, AZ.
- Gulick V.C. (1995) Geological observations and numerical modeling of hydrothermal systems on Mars, 1995 Fall meeting of the American Geophysical Union, San Francisco, (Dec. 11-15, 1995).
- Gulick V.C. (1995) Low-temperature hydrothermal systems on Mars, *27th Annual Meeting of the Division for Planetary Sciences*, Kona , HI, (Oct. 9-13, 1995).
- Gulick V.C., Tyler D., Haberle R.M., and McKay C.P. (1995) Effects and lifetime of ocean-induced CO₂ pulses on Mars: Implications for fluvial valley formation.. *Lunar and Planetary Science Conference XXVI*, (Lunar and Planetary Institute, Houston), 531-532.
- Gulick V.C. and McKay C.P. 1994 (1994) Origin of the fluvial valleys on Alba Patera: A possible atmospheric source. *Lunar and Planetary Science Conference XXV*, (Lunar and Planetary Institute, Houston), 491-492.
- Gulick V.C. and Baker V.R. (1993) Fluvial erosion on Mars: Implications for paleoclimatic change. *Lunar and Planetary Science Conference XXIV*, (Lunar and Planetary Institute, Houston), 587-588.
- Gulick V.C. and Baker V.R. (1992) Hydrothermal circulation and valley formation on Mars. *Bull. Amer. Astron. Soc.* **24**, 976.

- Gulick V.C. and Baker V.R. (1992) Martian hydrothermal systems: Some physical considerations. *Lunar and Planetary Science Conference XXIII*, (Lunar and Planetary Institute, Houston), 463-464.
- Gulick V.C., Baker V.R., and Komatsu G. (1992) Channel and valley morphology on Venus: An updated classification. *Lunar and Planetary Science Conference XXIII*, (Lunar and Planetary Institute, Houston), 465-466.
- Gulick V.C., Komatsu G., and Baker V.R. (1992) Integrated valley systems on Venus: A comparative morphologic study. *Lunar and Planetary Science Conference XXIII*, (Lunar and Planetary Institute, Houston), 467-468.
- Komatsu G., **Gulick V.C.**, Kargel J.S., and Baker V.R. (1992) Venus lava sapping valleys. *Lunar and Planetary Science Conference XXIII*, (Lunar and Planetary Institute, Houston), 719-720.
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