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Education

B.S. Geophysics/Math, Brown University, Providence, RI, 1984.
Ph.D. Geophysics, Southern Methodist University, Dallas, TX, 1990.

Professional Experience

Deputy PI, InSight Mission, 2012-
Principal Research Scientist, Jet Propulsion Laboratory, NASA, Nov. 1992-present.
Mars '05 Mars Reconnaissance Orbiter, Deputy Project Scientist, 2001-2012.
Mars '09 Smart Lander Study Scientist, 2001.
New Millennium, Deep Space 2, Mars Microprobe Project Scientist, JPL, 1995-2000.
Co-I, Champollion Physical Properties Probe, 1995-1999.
Mars Micromission Study Scientist, 1998-1999.
Postdoctoral Associate, Dept. of Earth, Atmos., and Planet. Sci., MIT, 1990-1992.
Research Assistant, Dept. of Geological Sciences, Southern Methodist Univ., 1985-1990.
Teaching Assistant, Dept. of Geological Sciences, Southern Methodist Univ., 1988-1989.
Visiting Grad. Student, Research School of Earth Sciences, Australian National Univ., 1987.
Research Assistant, Lunar and Planetary Inst., Houston, 10/1984 - 3/1985.
Summer Intern, Lunar and Planetary Inst., Houston, 1984.
Research Assistant, Geological Sciences Department, Brown Univ., 1982-1984.
NASA Planetary Geology and Geophysics Undergrad. Intern, USGS, Flagstaff, AZ, Summer, 1983.
Teaching Assistant, Physics Department, Brown Univ., 1981-1983.

Awards

NASA Exceptional Scientific Achievement Medal, 2012.
NASA Exceptional Achievement Medal, for Mars Reconnaissance Orbiter Science Planning, 2007.
Presidential Early Career Award for Scientists and Engineers Nominee, 1996.
NASA Group Achievement Award: Magellan Science Group, 1993; Mars Reconnaissance Orbiter Project: Development Team and Flight Development Team, 2006.
Department of Geological Sciences Honors for Senior Thesis, Brown University, 1984.

Professional Activities

Venus Exploration and Analysis Group co-chair, 2009-2011.
AGU Hess Medal Nominating Committee.
International Lunar Network Science Definition Team, 2008.
NRC/Caltech-JPL Postdoctoral Advisor, 1998-2006, 2008-present
Mars '09 Smart Lander Science Advisory Group, 2002.
Mars '09 Smart Lander Science Definition Team Deputy Chairperson, 2001.
Mars Reconnaissance Orbiter Science Definition Team, 2001.
Associate Editor, Journal of Geophysical Research (Planets), 1997-2001.
NASA Campaign Strategies Working Group, Formation and Dynamics of Earth-like Planets, 1998-2002.
Planetary Geology and Geophysics Undergrad. Res. Program Advisor, 1995-2001.
Secretary for the Planetology Section of the American Geophysical Union, 1994-1996.

NASA Planetary Geology and Geophysics and Mars Data Analysis Review Panel
Executive Secretary for NASA's Mars Science Working Group, 1994-1996.

Committees

Scientific Organizing Committees:

7th International Conference on Mars, 2007.
2nd International Workshop: Exploring Mars and its Earth Analogues, 2007.
Lunar and Planetary Science Conf., 1994, 2007.
AGU Chapman Conference: Venus as a Terrestrial Planet, 2006.
Mars Exploration Program and Sample Return Missions, Paris, 2/1999.
Mars Micromissions Workshop, Paris, 2/1999.
Mars Micromissions Workshop, Pasadena, 5/1998.
Conference on Mars Polar Science and Exploration, Houston, 10/1998.
AGU Chapman Conference: Geodynamics of Venus, Aspen, 9/1997.
Digital Avionics System Conference, Micro-science: Instrument needs for the next generation of small spacecraft, Irvine, CA, 10/1997.
American Geophysical Union Fall Meeting, 1994, 1995, 1996.

Invited Talks:

'Venus: Earth's Evil Twin or Just Misunderstood?' Griffith Observatory, 6/2012.
'Hotspot volcanism on Venus and implications for the interior, surface and atmosphere*', Univ*. Maryland, 6/2012.
'What's new on Venus?' Caltech, 5/2010; U. Colorado Boulder, 10/2010
'Rifts and the Role of Mantle Upwelling in a Stagnant Lid Regime: The Example of Parga Chasma, AGU Chapman Conf., Exploring Venus as a Terrestrial Planet, Feb., 2006.
'Plains Magnetism and Evolution of the Martian Dichotomy in the Ismenius Area of Mars', ULCA, 11/2003; Washington Univ., 12/2003; Caltech 4/2004.
'Venus as a Mantle Plume Laboratory', Penrose Iceland Plume Conference, 8/2003.
'Lithospheric Deformation and the Record of Planetary Evolution', CEPS/Smithsonian, 5/2000.
'Focusing Heat Flow Through the Lithospheric Lens', Univ. Pittsburgh, 4/2000.
'Tectonics on Venus: Where is the Heat?', Univ. Arizona, 1/1999.
'Corona as a Key to Lithospheric Thickness', Venus Chapman Conf., 9/1997.
'The Ups and Downs of Venusian Tectonics,' Univ. Colorado Boulder, 4/96.
'The Role of Large Volcanic Rises on Venus,' Fall AGU, 1995.
'Large volcanic rises, interior structure, and resurfacing', Venus II Conference, Tucson, 1/1995.
'Hot Spots on Venus: Old and Cold or Young and Hot?', Univ. Nevada Reno, 4/1994.
'Gravity of Hotspots on Venus,' Caltech Seismolab Seminar Series, 9/1993.
'Gravity and Interior Structure of Bell Regio,' UCLA Planetology Series, 10/1993.
'Interpretation of Magellan Gravity Data at Bell Regio,' Geophysics of Venus and Mars Workshop, Toulouse, France, 9/93.
'Mantle Upwelling Beneath a Depleted, Residuum Layer: Implications for the resurfacing History of Venus,' Spring AGU, 1993.
'Venus: Dead or Alive?' Frontiers of Science Conference, National Academy of Science, Irvine, CA, 11/1992.
'Gravity and Topography of Highlands on Venus', Scripps Ocean. Inst., 4/1991.
'Compensation of Venusian Highlands', Brown University, 10/1991.

Professional Societies

American Geophysical Union, 1987-present

Publications

Diniega, S., S.E. Smrekar, S.W. Anderson, and E.R. Stofan, The influence of temperature-dependent viscosity on lava flow dynamics, submitted, 2012.

Milbury, C., G. Schubert, C. A. Raymond, S. E. Smrekar, and B. Langlais, The History of Mars' Dynamo as Revealed by Modeling Magnetic Anomalies near Tyrrhenus Mons and Syrtis Major, accepted, JGR-Planets, 2012.

Smrekar, S.E. and Sotin, C., Constraints on mantle plumes on Venus: Implications for volcanism and volatile history, Icarus, doi:10.1016/j.icarus.2011.09.011, 2012.

Anderson, S.W., S.E. Smrekar, and E.R. Stofan, Tumulus development on lava flows: Insights from observations of active tumuli and analysis of formation models, Bull. Volc., doi:10.1007/s00445-012-0576-2, 2012.

Dehant, V., and 23 other authors, Future Mars geophysical observatories for understanding its internal structure, rotation, and evolution, Planet. Space Sci., doi:10.1016/j.pss.2011.10.016, 2012.

Phillips, R.J., and 17 authors, Massive CO_2 ice deposits sequestered in the south polar Layered deposits of Mars, Science 21 April DOI:10.1126/science.1203091, 2011.

Konopliv, A.S., S.W. Asmar, W. M. Folkner, O. Karatekin, D. C. Nunes, S. E. Smrekar, C. F. Yoder, and M. T. Zuber, Mars high resolution gravity fields from MRO, Mars seasonal gravity, and other dynamical parameters, Icarus, 211, 401-428, 2011.

Nunes, D.C., S.E. Smrekar, B. Fisher, J. Plaut, J.W. Holt, J. W. Head, and R.J. Phillips, SHARAD, pedestal craters, and the lost Martian layers: initial assessments, 116, E04006, doi:10.1029/2010JE003690, 2011.

Smrekar, S.E., E.R. Stofan, N. Mueller, A. Treiman, L. Elkins-Tanton, J. Helbert, G. Piccioni, and P. Drossart, Recent Hotspot Volcanism on Venus from VIRTIS emissivity data, Science, 328, p. 605-608, 2010.

Smrekar, S.E., T. Hoogenboom, E.R. Stofan, and P. Martin, Gravity analysis of Parga and Hecate Chasmata: Implications for rift and coronae formation, *J. Geophys. Res. Planets*, 115, E07010, doi:10.1029/2009JE003435, 2010.

Nunes, D. C., S. E. Smrekar, A. Safaeinili, J. Holt, R. J. Phillips, R. Seu, and B. Campbell, Examination Of Gully Sites On Mars With The Shallow Radar, *J. Geophys. Res., J. Geophys. Res*., doi:10.1029/2009JE003509, 2010.

Tamppari, L. K., and 25 authors, Phoenix and MRO coordinated atmospheric measurements, *J. Geophys. Res.,* 115, E00E17, doi:10.1029/2009JE003415, 2010.

Duan, XY, M. Moghaddam, D. Wenkert, R.L. Jordan, and S.E. Smrekar, X-band model of Venus atmosphere permittivity, Radio Sci., , 45, RS2003, doi:10.1029/2009RS004169, 2010.

Cohen, B., J. Veverka, B. Banerdt, A. Dombard, L. Elkins-Tanton, R. Grimm, Y. Nakamura, C. Neal, J. Plescia, S. Smrekar, and B. Weiss, *Final Report of the ILN Anchor Nodes Science Definition Team*, NASA, 2009.

McGill, G. E., E.R. Stofan, S.E. Smrekar, Venus Tectonics, In *Planetary Tectonics*, *eds. T. A. Watters and R.S. Schultz,* Cambridge Univ. Press, pp. 585, 2009.

Phillips, R.J., M.T. Zuber, S.E. Smrekar, and 24 other authors, Mars North Polar Deposits: Stratigraphy, Age, and Geodynamical Response, Science, DOI: 10.1126/science.1157546, 2008.

Smrekar, S.E., L. Elkins-Tanton, J. Leitner, A. Lenardic, S. Mackwell, L. Moresi, C. Sotin, and E.R. Stofan, Tectonic and thermal evolution of Venus and the role of volatiles: Implications for understanding the

terrestrial planets, in *Exploring Venus as a Terrestrial Planet*, eds. L.W. Esposito, E.R. Stofan, and T.E. Cravens, Geophys. Mono. 176, Am. Geophys. Un., Washington D.C, pp.43-72, 2007.

Elkins-Tanton, L.T., S.E. Smrekar, P.C. Hess, and E.M. Parmentier, Volcanism and volatile recycling on a one-plate planet: Applications to Venus, J. Geophys. Res., 112, E04S06, doi:10.1029/2006JE002793*,* 2007.

Guest, A. and S.E. Smrekar, New constraints on the thermal and volatile evolution of Mars, Phys. Earth Planet. Int., 164, 161-176, 2007.

Martin, P., E.R. Stofan, L.S. Glaze, and S.E. Smrekar, Corona of Parga Chasma, Venus, J. Geophys. Res. Planets, 112, E04S03, doi:10.1029/2006JE002758, 2007.

Milbury, C.A.E., S.E. Smrekar, C.A. Raymond, and G. Schubert, Lithospheric structure in the eastern region of Mars' dichotomy boundary, Planet. Space Sci., 55 (3), 280-288, *10.1016*/j.pss.2006.03.009, 2007.

Seu, R., R.J. Phillips, D. Biccari, R. Oresei, A. Masdea, G. Picardi, A. Safaeinilli, B.A. Campbell, J.J. Plaut, L. Marinangeli, S.E. Smrekar, and D.C. Nunes, The SHARAD Sounding Radar on the Mars Reconnaissance Orbiter, J. Geophys. Res., 112, E5, doi: 10.1029/2006JE002745, 2007.

Seu, *R*., and 51 other authors, Accumulation and erosion of Mars' south polar layered deposits, Science, 317, 1715-1718, 2007.

Zuber, *M*.T., R.J. Phillips, J.C. Andrews-Hanna, S.W. Asmar, A.S. Konopliv, F.G. Lemoine, J.J. Plaut, D.E. Smith, and S.E. Smrekar, Density of Mars' south polar layered deposits, Science, 317, 1718-17-19, 2007.

Zuber, M.T., F.G. Lemoine, D.E. Smith, A.S. Konopliv, S.E. Smrekar, S.W. Asmar, The Mars Reconnaissance Orbiter Radio Science Gravity Investigation, J. Geophys. Res. Planets, 112, E5, doi:10.1029/2006JE002833*,* 2007.

Zurek, R.W. and S.E. Smrekar, An Overview of the Mars Reconnaissance Orbiter (MRO) Science Mission, J. Geophys. Res. Planets, 112, E5, doi: 10.1029/2006JE002701*,* 2007.

Smrekar, S.E. and E.R. Stofan, Venus Surface and Interior, In *Encyclopedia of the Solar System,* eds. L.A. McFadden, P. Weissman, and T. Johnson, Academic Press/Elsevier, 2006.

Hoogenboom, T., and S.E. Smrekar, Elastic thickness estimates for the northern lowlands of Mars, Earth Planet. Sci. Lett., 248, 830-839, 2006.

Anderson, F. S. and S.E. Smrekar, Global mapping of crustal and lithospheric thickness on Venus, J. Geophys. Res. Planets, *J. Geophys. Res. Planets*, 111, E8, E08006, doi: 10.1029/2004JE002395, 2006.

Guest, A., and S. E. Smrekar, Relaxation of the Martian dichotomy boundary: Faulting in the Ismenius region and constraints on the early evolution of Mars, *J. Geophys. Res. Planets*, 110, E12S25, doi:10.1029/2005JE002504, 2005.

Stofan, E.R., and S.E. Smrekar, Large topographic rises, coronae, large flow fields and large volcanoes on Venus: Evidence for mantle plumes? In *Plates, Plumes, and Paradigms,* eds. G.R. Foulger, J.H. Natland, D.C. Presnall, and D.L. Anderson, Geol. Soc. Am. Special Vol. 388, pp. 861, 2005.

Glaze, L.S., S. W. Anderson, E.R. Stofan, S. Baloga and S.E. Smrekar, Statistical distribution of tumuli on pahoehoe flows surfaces: Analysis of examples in Hawaii and Iceland and potential applications to lava flows on Mars, *J. Geophys. Res. Solid Earth*, 110 (B8), Art. No. B08202, 2005.

Smrekar, S.E. G.E. McGill, C.A. Raymond, and A.M. Dimitriou, Geologic evolution of the Martian Dichotomy in the Ismenius area of Mars and implications for plains magnetization, J. Geophys. Res. Planets, 109, doi: 10.1029/2004JE002260 , 2004.

Brian, A. W., E.R. Stofan, J.E. Guest, and S.E. Smrekar, Laufey Regio: A newly discovered topographic rise on Venus, *J. Geophys. Res. Planets 109, No. E7, E07002,10.1029/2002JE002010*, 2004.

Hoogenboom, T., Smrekar, S.E., Anderson, F.S., and G. Houseman, Admittance survey of Type 1 Coronae on Venus, *J. Geophys. Res. Planets,109, E3, doi:* 10.1029/2003JE002171*,* 2004.

Smrekar, S.E., R. L. Comstock, and F.S. Anderson, A gravity survey of Type 2 coronae on Venus, *J. Geophys. Res. Planets,* 108, (E8), doi: 10.1029/2002JE001935, 2003.

Smrekar, S.E., and E.R. Stofan, Effects of lithospheric properties on the formation of Type 2 Corona on Venus, *J. Geophys. Res. Planets,* 108, (E8), doi: 10.1029/2002JE001930, 2003.

Moreels, P., and S.E. Smrekar, Identification of polygonal patterns on Venus using mathematical morphology, *IEEE, Trans. Image Proc.,12, doi:10.1109/TIP.2003.814254*, 2003.

Smrekar, S.E., P. Moreels, B.J. Franklin, Characterization and origin of polygonal fractures on Venus, *J. Geophys. Res. 107 (E11)*, doi: 10.1029/2001JE001808, 2002.

Glaze, L.S., E.R. Stofan, S.E. Smrekar, S.M. Bologa, Insights into corona formation through statistical analyses, *J. Geophys. Res., 107* (E12), doi:10.1029/2002JE001904, 2002.

Chassefierre, E., and 68 other authors, Scientific objectives of the Dynamo mission, Adv. Space Res., 27, 1851-1860, 2001.

Stofan, E.R., S.W. Tapper, J.E. Guest, P. Grinrod, and S. E. Smrekar, Preliminary analysis of an expanded corona database for Venus, *Geophys. Res. Lett.,* 28,4267-4270, 2001.

Smrekar, S.E., R. Lorenz, and M. Urquhart, The Deep Space 2 penetrator design and use for accelerometry and estimation of thermal conductivity, In *Planetary Penetrometry*, N. I. Kömle, G. Kargl, A. J. Ball, R. D. Lorenz (Eds.), Austrian National Academy, pp. 264, 2001.

Clifford, S.M., D. Crisp, D.A. Fisher, K.E. Herkenoff, S. E. Smrekar and 43 other authors, The state and future of Mars polar science and exploration, *Icarus, 144*, 210-242, 2000.

Lorenz, R. D., J. E. Moersch, J. A. Stone, A. R. Morgan, and S. E. Smrekar, Penetration tests on the DS-2 mars microprobes: Penetration depth and impact accelerometry, *Planetary and Space Science*, *48*, 419-436, 2000.

Smrekar, S.E., and E. R. Stofan, Origin of corona-dominated topographic rises on Venus, *Icarus,139*, 100-116, 1999.

Smrekar, S., D. Catling, R. Lorenz, J. Magalhães, M. Meyer, J. Moersch, P. Morgan, B. Murray, M. Presley-Holloway, A. Yen, and A. Zent, Deep Space 2: The Mars Microprobe Mission, *J. Geophys. Res. Planets, 104*, 27,013-27,030, 1999.

Anderson, F. S., and S. E. Smrekar, Tectonic effects of climate change on Venus*, J. Geophys. Res. Planets, 104*, 30,743-30,756, 1999.

Anderson, S.W., E. R. Stofan, S.E. Smrekar, J.E. Guest, and B. Wood, Evidence for pulsed inflation of pahoehoe sheet flows from surface fractures: Implications for the emplacement of continental flood basalts , *Earth Planet. Sci. Lett.*, *168*, 7-18,1999.

Smrekar, S.E., and E.R. Stofan, Coupled upwelling and delamination: A new mechanism for coronae formation and heat loss on Venus, *Science, 277*, 1289-1294, 1997.

Smrekar, S.E., E.R. Stofan, W.S. Kiefer, Large volcanic rises on Venus, in *Venus II*, eds. S.W. Brougher, D.M. Hunten, and R.J. Phillips, Univ. of Arizona Press, Tucson, pp. 845-878, 1997.

Stofan, E.R., D.L. Bindschadler, V.E. Hamilton, D.M. Janes, and S.E. Smrekar, Coronae on Venus: Morphology and origin, in *Venus II*, eds. S.W. Brougher, D.M. Hunten, and R.J. Phillips, Univ. of Arizona Press, Tucson, pp. 931-965*,* 1997.

Smrekar, S.E., and E.M. Parmentier, Interactions of mantle plumes with thermal and chemical boundary layers: Application to hotspots on Venus, *J. Geophys. Res.*, *101*, 5397-5410, 1996.

Stofan, E.R., S.E. Smrekar, D.L. Bindschadler, and D. Senske, Large topographic rises on Venus: Implications for mantle upwellings, *J. Geophys. Res.*, 23, 317-23,327, 1995.

Smrekar, S.E., Evidence for active hotspots on Venus from analysis of Magellan gravity data, *Icarus, 112,* 2-26, 1994.

McCleese, D.J., S.W. Squyres, S.E. Smrekar, and J.B. Plescia, eds., Mars Surveyor Science Objectives and Measurements Workshop, JPL Tech. Rpt. D12017, pp. 181, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 1994.

Smrekar, S.E., and S.C. Solomon, Gravitational spreading of high terrain in Ishtar Terra, Venus, *J. Geophys. Res.*, *97*, 16,121-16,148, 1992.

Solomon, S.C., S.E. Smrekar, D.L. Bindschadler, R.E. Grimm, W.M. Kaula, G.E. McGill, R.J. Phillips, R.S. Saunders, G. Schubert, S.W. Squyres, and E.R. Stofan, Venus tectonics: An overview of Magellan observations, *J. Geophys. Res.*, *97*, 13,199-13,256, 1992.

Bindschadler, D.L., A. deCharon, K.K. Beratan, S.E. Smrekar, and J.W. Head, Magellan observations of Alpha Regio: Implications for formations of complex ridged terrains on Venus, *J. Geophys. Res.*, *97*, 13, 563-13,578, 1992.

Kaula, W.M., D.L. Bindschadler, R.E. Grimm, V.L. Hansen, K.M. Roberts, S.E. Smrekar, Styles of deformation in Ishtar Terra and their implications, *J. Geophys. Res.*, *97*, 16,085-16,120, 1992.

Smrekar, S., and R.J. Phillips, Venusian highlands: Geoid to topography ratios and their implications, *Earth Planet. Sci. Lett.*, *107*, 582-597, 1991.

Smrekar, S., and R.J. Phillips, Gravity-driven deformation of the crust on Venus, *Geophys. Res. Lett., 15*, 693-696, 1988.

Smrekar, S., M.J. Cintala, and F. Horz, Small-scale impacts into rock: An evaluation of the effects of target temperature on experimental results, *Geophys. Res. Lett., 13*, 745-748, 1986.

Smrekar, S., and C.M. Pieters, Near-infrared spectroscopy of probable impact melt from three large lunar highland craters, *Icarus, 63*, 442-452, 1985.