Dr. Karl L. Mitchell

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EDUCATION:

Ph. D., Environmental Science, Lancaster University, 2002 (Advisor: L.Wilson).
"The thermodynamics and fluid mechanics of near-vent processes in explosive volcanic eruptions on the Earth and Mars."
M. Sc./D.I.C., Remote Sensing (Land Applications option), University of London, 1996.
B. Sc. (hons), Physics with Space Science and Technology, Leicester University, 1995.

PROFESSIONAL EXPERIENCE:

Current Position:

2008-present: Scientist, Engineering and Science Directorate, JPL
Planetary Geology & Geophysics Group (3223)

Previous Positions:

2005-2008: NRC/NASA Postdoctoral Research Fellow (Advisor: R. M. C. Lopes)
Engineering and Science Directorate, JPL (administered by ORAU)

2001-2005: PPARC Postdoctoral Research Associate (Contact: L. Wilson)
Environmental Science Dept., Lancaster University, UK

1999-2001: Research Assistant (Remote Sensing) (Contact: J.-P. A. L. Muller)
Dept. of Geomatic Engineering, University Collgge London, London, UK.

GRANTS & AWARDS (SINCE 2008):

- **NASA Innovative Advanced Concepts 2015 Phase II:** Co-I, "PERISCOPE: PERIapsis Subsurface Cave Optical Explorer", 2015-2017 (PI: J. Nosanov).
- **NASA Planetary Science & Technology Through Analog Research 2014:** PI, "Robotic geometric characterization of subterranean voids", 2015-2017.
- **NASA Planetary Science & Technology Through Analog Research 2014:** Co-I, "FreeClimber: Analyzing Steep Terrain and Subsurface Habitability on Mars and Earth", 2015-2017 (PI. A. Parness).
- **NASA Planetary Data Archiving, Restoration & Tools 2014:** PI, "High resolution terrain models from rigorous stereo analysis of Venus Magellan SAR imagery", 2015-2018.
- **NASA Innovative Advanced Concepts 2014 Phase I:** Co-I, "PERISCOPE: PERIapsis Subsurface Cave OPtical Explorer", 2014-2015 (PI: J. Nosanov).
- **NASA Cassini Data Analysis and Participating Scientist Program 2012:** Co-Investigator (JPL Lead), "Evolution of the polar landscape of Titan", 2013-2016 (PI: A. Hayes).
- **NASA Innovative Advanced Concepts 2013 Phase I:** Co-I, "TransFormers for Extreme Environments", 2013-2014 (PI: A. Stoica).
- **Certificate of Achievement 2012:** Research Poster Conference Award Winner for "Understanding anomalously radar bright surfaces observed on Enceladus" (PI: K. Mitchell).
- **NASA Outer Planets Research Program 2009:** Co-I (JPL Lead), "The hydrology of Titan: An integrated topographic, geomorphic, and modeling approach" (PI. J. Andrews-Hanna), 2010-14.
- **NASA Outer Planets Research Program 2009:** Co-I, "Rheological and Thermal Property Measurements of Icy Satellite Analogs for Resurfacing Implications", 2010-15.
- **NASA Outer Planets Research Program 2009:** Co-I, "Cryogenic Dielectric Properties Relevant

to Radar and Radiometric Observations of Saturn's Icy Worlds", 2010-15.

- **NASA Planetary Missions Data Analysis Program 2009:** PI, "Rigorous Stereo Analysis of Venus Magellan SAR imagery: Application to studies of crustal evolution", 2010-13.
- **NASA Cassini Data Analysis Program 2008:** PI, "Liquid transport processes in Titan's arctic lake district", 2009-11.
- **JPL Research & Technology Development Program:** Co-I, "Thermophysical, Rheological and Optical Measurements on Icy Compositions with Application to Solar System Ices" (PI: C. Hays then M. Barmatz), 2007-9.

TEACHING/MENTORING EXPERIENCE:

- Co-Mentor & PI Mentor, JPL Planetary Science Summer School, 2013+.
- PI Mentor, JPL Planetary Science Summer School, 2011-2012 (3 sessions).
- NASA Postdoctoral Program Advisor: Carolyn Parcheta (Feb 2014+).
- Caltech Postdoc Co-Advisor: Uday Khankhoje (Summer 2012).
- JPL Summer Intern Advisor: Elise Wall (2009), Jonathan Reeves (2012), Heather Chilton (2014).
- Masters Degree Advisor, MSc/MRes Environmental Science, Lancaster University, 2003-2004. Supervised two students: Francois Leesch (distinction), Elisabeth Hunter.

PROFESSIONAL SOCIETIES AND AFFILIATIONS:

- **Member, American Geophysical Union.**
- **Affiliate Member, Division of Planetary Sciences of the American Astronomical Society.**
- **Member, Geological Society of America.**
- **Member, UK Planetary Forum.** Also, founder member and former organiser, 1996-1998.
- **Secretary, International Society of Photogrammetry and Remote Sensing** (Extra-Terrestrial Mapping Working Group), 11/96 – 10/00.

NASA/ESA MISSION EXPERIENCE/TRAINING:

- **Mission proposal:** NASA Lead Scientist, EnVision mission (Venus mission), ESA M-Class Proposals, PI: Richard Ghail (Imperial College London, UK), submitted 12/10 & 1/15; Contributor to ESA L-Class Mission White Paper, PI: Colin Wilson (Oxford University, UK), 5/13.
- **Instrument proposals:** JPL Science Lead, ExCITE Instrument (camera suite) on the Mars 2016 Trace Gas Orbiter. PI: Jack Mustard (Brown), submitted 04/10; Co-I, PLUMES THz spectrometer instrument for Europa Clipper, submitted 10/14; Co-I, MESH stereo camera instrument for Europa Clipper, submitted 10/14.
- **Mission design studies:** NASA/JPL Co-Mentor & PI Mentor for the JPL Summer School, 2013-present; NASA/JPL PI Mentor for the JPL Summer School, 2011-2012 (3 sessions); NASA/JPL Team-X mission design workshop, selected as science Team PI for a Europa Orbiter concept study, Jet Propusion Laboratory, 08/05.
- **Science teams:** Science Planner, Cassini; Associate (through Investigation Scientist R. Lopes) on Cassini RADAR, 03/05 – present; Cassini RADAR representative to SOST (science planning), 2009 – 2012; Co-I Associate (through Co-I Muller) on Mars Express HRSC, 03/03 – 03/05 (Lancaster Uni. Support); Co-I Associate (through Co-I Muller) on EOS-1 MISR instrument (10/99 – 03/01).

COMMUNITY REVIEW EXPERIENCE:

- **Review panels:** NASA Planetary Missions Data Analysis Program, 12/08; NASA Outer Planets Research, 08/05, 03/08; NASA Planetary Geology & Geophysics, 07/04. External reviewer for all of the above on various occasions, as well as NASA Cassini Data Analysis Program.
- **Reviewer:** Various papers for the Journal of Volcanological and Geothermal Research, the Journal of Geophysical Research, Geophysical Research Letters, Icarus, Geological Society of London and Planetary & Space Science.
- **Data product reviewer:** Cassini ISS Cartographic PDS volume, Mars Science Laboratory Camera Experimental Data Records PDS volume.
- **Mission proposal reviewer:** JPL's Discovery program proposals, STM specialist.

INVITED TALKS & OUTREACH ACTIVITIES:

- **Invited talks:** AGU Fall, San Francisco, 12/01; "Volcanic Eruption Mechanism Modeling Workshop", Durham, New Hampshire, 11/02 (supported by workshop organisers); American Museum of Natural History, 03/04; University of Arizona, Lunar and Planetary Laboratory 10/07; LA County Natural History Museum, 02/08; University of California at Los Angeles, 02/09; Europa Clipper Plumes Advisory Meeting, APL, 06/14; AGU Fall, San Francisco, 12/14.
- Presented a CHARM (Cassini-Huygens Analysis and Results of the Mission) Telecon: "The Lakes and Seas of Titan: Observations from Cassini RADAR", 11/07.
- Written articles for *Astronomy and Geophysics*, the Journal of the Royal Astronomical Society.
- Various radio and newspaper interviews.
- Worked for BBC/Science Line as a planetary science expert during Mars Weekend, 07/97, answering live, on-line questions relating to the Mars Pathfinder landing/mission.

PEER-REVIEWED PUBLICATIONS (39):

Bridges, J. C., Seabrook, A. M., Rothery, D. A., Kim, J. R., Pillinger, C. T., Sims, M. R., Golombek, M. R., Duxbury, T., Head, J. W., Haldemann, A. F. C., Mitchell, K. L., Muller, J.-P., Lewis, S. R., Moncrieff, C., Wright, I. P., Grady, M. M. and Morley, J. G. (2003) Selection of the landing site in Isidis Planitia of Mars probe Beagle 2. *J. Geophys. Res.* 108(E1), 5001, doi:10.1029/2001JE001820.

Head, J. W., Wilson, L. and Mitchell, K. L. (2003) Generation of recent massive water floods at Cerberus Fossae, Mars by dike emplacement, cryospheric cracking, and confined aquifer groundwater release. *Geophys. Res. Lett.* 30(11), 1577, doi:10.1029/2003GL017135.

Wilson, L., Ghatan, G. J., Head, J. W. and Mitchell, K. L. (2004) Mars outflow channels: A reappraisal of the estimation of water flow velocities from water depths, regional slopes, and channel floor properties. *J. Geophys. Res.* 109, E09003, doi:10.1029/2004JE002281.

Murray, J. B., Muller, J.-P., Neukum, G., Hauber, E., Markiewicz, W. J., Head, J. W., Foing, B. H., Page, D., Mitchell, K. L., Portyankina, G. and the HRSC Co-Investigator Team (2005) Evidence from the Mars Express High Resolution Stereo Camera for a frozen sea close to Mars' equator. *Nature* 454, 352-356.

Hauber, E., van Gasselt, S., Ivanov, B., Werner, S., Head, J. W., Neukum, G., Jaumann, R., Greeley, R., Mitchell, K. L., Muller, P. and the HRSC Co-Investigator Team (2005) Discovery of a flank caldera and very young glacial activity at Hecates Tholus, Mars. *Nature* 454, 356-361.

Mitchell, K. L. (2005) Coupled conduit flow and shape in explosive volcanic eruptions. *J. Volcanol. Geotherm. Res.*, doi:10.1016/j.jvolgeores.2004.09.017.

Leask, H. J., Wilson, L. and Mitchell, K. L. (2006) Formation of Ravi Vallis outflow channel, Mars: Morphological development, and water discharge and duration estimates. J. Geophys. Res. 111, E08070, doi:10.1029/2005JE002550.

Leask, H. J., Wilson, L. and Mitchell, K. L. (2006) Formation of Aromatum Chaos, Mars: Morphological development as a result of volcano-ice interactions. *J. Geophys. Res.* 111, E08071, doi:10.1029/2005JE002549.

Lorenz, R. D., Wall, S., Radebaugh, J., Boubin, G., Reffet, E., Janssen, M., Stofan, E., Lopes, R., Kirk, R., Elachi, C., Lunine, J., Mitchell, K., Paganelli, F., Soderblom, L., Wood, C., Wye, L., Zebker, H., Anderson, Y., Ostro, S., Allison, M., Boehmer, R., Callahan, P., Encrenaz, P., Ori, G. G., Francescetti, G., Gim, Y., Hamilton, G., Hensley, S., Johnson, W., Kelleher, K., Muhleman, D., Picardi, G., Posa, F., Roth, L., Seu, R., Shaffer, S., Stiles, B., Vetrella, S., Flamini, E. and West, R. (2006) The sand seas of Titan: Cassini RADAR observations of longitudinal dunes. *Science* 312, 724-727.

Barnes, J. W. Radebaugh, J., Brown, R. H., Wall, S., Soderblom, L., Lunine, J., Burr, M., Sotin, C., Le Mouelic, S., Rodriguez, S., Buratti, B. J., Clark, R., Baines, K. H., Jaumann, R., Nicholson, P. D., Kirk, R. L., Lopes, R., Lorenz, R. D., Mitchell, K., Wood, C. A. (2007) Near-infrared spectral mapping of Titan's mountains and channels. *J. Geophys. Res.* **112**(E11), E11006, doi:10.1029/2007JE002932.

Keszthelyi, L., Jaeger, W., Milazzo, M., Radebaugh, J., Davies, A. G. and Mitchell, K. L. (2007) New estimates for Io eruption temperatures: Implications for the interior. *Icarus* 192, 491-502.

Leask, H. J., Wilson, L. and Mitchell, K. L. (2007) Formation of Mangala Valles outflow channel, Mars: Morphological development, and water discharge and duration estimates. *J. Geophys. Res.* 112, E02011, doi:10.1029/2005JE002644.

Leask, H. J., Wilson, L. and Mitchell, K. L. (2007) Formation of Memnonia Fossa, the source of the Mangala Valles, Mars: Morphological development as a result of volcano-ice interactions. *J. Geophys. Res.*, 112, E02011, doi:10.1029/2005JE002644.

Lopes, R. M. C., Mitchell, K. L., Stofan, E. R., Lunine, J. I., Lorenz, R., Kirk, R. L., Wood, C. A., Wall, S. D., Robshaw, L. E., Fortes, A. D., Neish, C. D., Radebaugh, J., Reffet, E., Ostro, S. J., Elachi, C., Allison, M. D., Anderson, Y., Boehmer, R., Boubin, G., Callahan, P., Encrenaz, P., Flamini, E., Francescetti, G., Gim, Y., Hamilton, G., Hensley, S., Janssen, M. A., Johnson, W. T. K., Kelleher, K., Muhleman, D. O., Ori, G., Orosei, R., Picardi, G., Posa, F., Roth, L. E., Seu, R., Shaffer, S., Soderblom, L. A., Stiles, B., Vetrella, S., West, R. D., Wye, L. and Zebker, H. A. (2007) Cryovolcanic features on Titan's surface as revealed by the Cassini Radar. *Icarus* 186, 395-412.

Lopes, R. M., Mitchell, K. L., Wall, S. D., Mitri, G., Janssen, M., Ostro, S., Kirk, R. L., Hayes, A. G., Stofan, E. R., Lunine, J. I., Lorenz, R. D., Wood, C., Radebaugh, J., Paillou, P., Zebker, H. and Paganelli, F. (2007) The lakes and seas of Titan. *EOS Trans. Am. Geophys. Union* 88(51), 569-570.

Lorenz, R. D., Wood, C. A., Lunine, J. I., Wall, S. D., Lopes, R. M., Mitchell, K. L., Paganelli, F., Anderson, Y. Z., Wye, L., Tsai, C., Zebker, H. and Stofan, E. R. (2007) Titan's young surface: Initial impact crater survey by Cassini RADAR and model comparison. *Geophys. Res. Lett.* 34, L07204, doi:10.1029/2006GL028971.

Muller, J.-P., Denis, M.-A., Dundas, R. D., Mitchell, K. L., Naud, C. and Mannstein, H. (2007) Stereo cloud-top heights and cloud fraction retrieval from ATSR2. *Int. J. Remote Sens.* 28(9), 1921-1938.

Naud, C., Mitchell, K. L., Muller, J.-P., Clothiaux, E. E., Albert, P., Preusker, R., Fischer, J. and Hogan, R. J. (2007) Comparison between ATSR2 stereo, MOS O2-A band and ground-based cloud top heights. *Int. J. Remote Sens.* 28(9), 1969-1987.

Stofan, E. R., Elachi, C., Lunine, J. I., Stiles, B., Mitchell, K. L., Ostro, S., Soderblom, L., Wood, C., Zebker, H., Wall, S., Janssen, M., Kirk, R., Lopes, R., Paganelli, F., Radebaugh, J., Wye, L., Anderson, Y., Allison, M., Boehmer, R., Callahan, P., Encrenaz, P., Flamini, E., Francescetti, G., Gim, Y., Hamilton, G., Hensley, S., Johnson, W. T. K., Kelleher, K., Muhleman, D., Paillou, P., Picardi, G., Posa, F., Roth, L., Seu, R., Shaffer, S., Vetrella, S. and West, R. (2007) The lakes of Titan. Nature 445, 61-64.

Lorenz, R. D., Lopes, R. M., Paganelli, F., Lunine, J. I., Kirk, R. L., Mitchell, K. L., Soderblom, L. A., Stofan, E. R., Ori, G., Myers, M., Miyamoto, H., Radebaugh, J., Stiles, B., Wall, S. D., Wood, C. A. and the Cassini RADAR Team (2008) Fluvial channels on Titan: Initial Cassini RADAR observations. *Planet. Space Sci.*, 56(8), 1132-1144.

Hayes, A., Aharonson, O., Lewis, K., Mitchell, K. L., Lorenz, R., Callahan, P., Lunine, J., Lopes, R., Wall, S., Elachi, C., Mitri, G., Kirk, R., Gim, Y., Stofan, E. and the Cassini RADAR Team (2008) Hydrocarbon lakes on Titan: Distribution and interaction with a porous regolith. *Geophys. Res. Lett.*, 35, L09204, doi:10.1029/2008GL033409.

Lorenz, R. D., Mitchell, K. L., Kirk, R. L., Hayes, A. G., Aharonson, O., Zebker, H. A., Paillou, P., Radebaugh, J., Lunine, J. I., Janssen, M. A., Wall, S. D., Lopes, R. M., Stiles, B., Ostro, S., Mitri, G. and Stofan, E. R. (2008) Titan's inventory of organic surface materials. *Geophys. Res. Lett.* 35, L02206, doi:10.1029/2007GL032118.

Paillou, P., Mitchell, K., Wall, S., Ruffié, G., Wood, C., Lorenz, R., Stofan, E., Lunine, J., Lopes, R. and Encrenaz, P. (2008) Microwave dielectric constant of liquid hydrocarbons: Application to the depth estimation of Titan's lakes. *Geophys. Res. Lett.*, 35, L05202, doi:10.1029/2007GL032515.

Burr, D. M., Jacobsen, R. E., Roth, D. L., Phillips, C. B., Mitchell, K. L. and Viola, D. (2009) Fluvial network analysis on Titan: Evidence for subsurface structures and west-to-east wind flow, southwestern Xanadu. *Geophys. Res. Lett.* 36, L22203, doi:10.1029/2009GL040909.

Nelson, R. M., Kamp, L. W., Lopes, R. M. C., Matson, D. L., Kirk, R. L., Hapke, B. W., Wall, S. D., Boryta, M. D., Leader, F. E., Smythe, W. D., Mitchell, K. L., Baines, K. H., Jaumann, R., Sotin, C., Clark, R. N., Cruikshank, D. P., Drossart, P., Lunine, J. I., Combes, M., Bellucci, G., Bibring, J.-P., Capaccioni, F., Cerroni, P., Coradini, A., Formisiano, V., Filacchione, G., Langevin, Y., McCord, T. B., Mennella, V., Nicholson, P. D., Sicardy, B., Irwin, P. G. J. and Pearl, J. C. (2009) Photometric changes on Saturn's Titan: Evidence for active cryovolcanism. *Geophys. Res. Lett.*, 36, L04202, doi:10.1029/2008GL036206.

Wall, S. D., Lopes, R. M., Stofan, E. R., Wood, C. A., Radebaugh, J. L., Hörst, S. M., Stiles, B. W., Nelson, R. M., Kamp, L. W., Janssen, M. A., Lorenz, R. D., Lunine, J. I., Farr, T. G., Mitri, G., Paillou, P., Paganelli, F. and Mitchell, K. L. (2009) Cassini RADAR images at Hotei Arcus and western Xanadu, Titan: Evidence for geologically recent cryovolcanic activity. *Geophys. Res. Lett.*, 36, L04203, doi:10.1029/2008GL036415.

Stiles, B. W., Hensley, S., Gim, Y., Bates, D. M., Kirk, R. L., Hayes, A., Radebaugh, J., Lorenz, R. D., Mitchell, K. L., Callahan, P. S., Zebker, H., Johnson, W. T. K., Wall, S. D., Lunine, J. I., Wood, C. A., Janssen, M., Pelletier, F., West, R. D., Veeramacheneni, C. and the Cassini RADAR Team (2009) Determining Titan surface topography from Cassini SAR data. *Icarus* 202, 584-598.

Zhong, F., Mitchell, K. L., Hays, C. C., Choukroun, M., Barmatz, M., and Kargel, J. S. (2009) The rheology of cryovolcanic slurries: motivation and phenomenology of methanol-water slurries with implications for Titan. *Icarus* 202, 607-619.

Lopes, R. M. C., Stofan, E. R., Peckyno, R., Radebaugh, J., Mitchell, K. L., Mitri, H. Wood, C. A., Kirk, R. L., Wall, S. D., Lunine, J. I., Hayes, A., Farr, T., Wye, L., Craig, J., Ollerenshaw, R. J., Janssen, M., LeGall, A., Paganelli, F., West, R., Stiles, B., Callahan, P., Anderson, Y., Valora, P. and Soderblom, L. (2010) Distribution and interplay of geologic processes on Titan from Cassini RADAR data. *Icarus* 205, 540-558.

Lopes, R. M. C., Mitchell, K. L., Williams, D. A. and Mitri, G. (2010) Beyond Earth: How extraterrestrial volcanism has changed our definition of a volcano. *Geol. Soc. Am. Spec. Paper 420*, 11-30.

Wall, S. D., Hayes, A., Bristow, C., Lorenz, R. D., Stofan, E., Lunine, J. LeGall, A., Janssen, M. W., Wye, L., Soderblom, L. A., Paillou, P., Aharonson, O., Zebker, H. A., Farr, T., Mitri, G., Kirk, R., Mitchell, K., Notarnicola, C. Casarano, D., Venturo, B. (2010) Active shoreline of Ontario Lacus,

Titan: a morphological study of the lake and its surroundings. *Geophys. Res. Lett.* 37, L05202, doi:10.1029/2009GL041821.

Wood, C. A., Lorenz, R., Kirk, R., Lopes, R., Mitchell, K. and Stofan, E. (2010) Impact craters on Titan. *Icarus*, 206, 334-344.

Ghail, R. C., Wilson, C., Galand, M., Hall, D., Cochrane, C., Mason, P., Helbert, J., Montmessin, F., Limaye, S., Patel, M., Wahlund, J.-E., Rocca, F., Mather, T., Waltham, D., Genge, M., Paillou, P. and Mitchell, K. (2011) EnVision: taking the pulse of our twin planet. *Experimental Astronomy*, doi:10.1007/s10686- 011 -9244-3.

Hayes, A. G., Aharonson, O., Lunine, J. I., Kirk, R. L., Zebker, H. A., Wye, L. C., Lorenz, R. D., Turtle, E. P., Paillou, P., Mitri, G., Wall, S. D., Stofan, E. R., Mitchell, K. L., Elachi, C. and the Cassini RADAR Team (2011) Transient surface liquid in Titan's polar regions from Cassini. *Icarus* 211, 655-671.

Radebaugh, J., Lorenz, R. D., Wall, S. D., Kirk, R. L., Wood, C. A., Lunine, J. I., Stofan, E. R., Lopes, R. M. C., Valora, P., Farr, T. G., Hayes, A., Stiles, B., Mitri, G., Zebker, H., Janssen, M., Wye, L., LeGall, A., Mitchell, K. L., Paganelli, F., West, R. D., Schaller, E. L. and the Cassini Radar Team (2011) Regional geomorphology and history of Titan's Xanadu province. *Icarus* 211, 672-685.

Lopes, R. M. C., Kirk, R. L., Mitchell, K. L., LeGall, A., Barnes, J. W., Hayes, A., Kargel, J., Wye, L., Radebaugh, J., Stofan, E. R., Janssen, M., Neish, C., Wall, S., Wood, C. A. and Lunine, J. I. (2013) Cryovolcanism on Titan: New results from Cassini RADAR and VIMS. *J. Geophys. Res.* 118, 1-20, doi:10.1002/jgre.20062.

Neish, C. D., Kirk, R. L., Lorenz, R. D., Bray, V. J., Schenk, P., Stiles, B., Turtle, E., Mitchell, K., Hayes, A. and the Cassini RADAR Team (2013) Crater topography on Titan: Implications for landscape evolution. *Icarus* 223, 82-90.

Hofgartner, J., D., Hayes, A., Lunine, J., Zebker, H., Stiles, B., Sotin, C, Barnes, J. W., Turtle, E., Baines, K., Brown, R., Buratti, B., Clark, R., Encrenaz, P., Kirk, R., Le Gall, A., Lopes, R., Lorenz, R., Malaska, M., Mitchell, K., Nicholson, P., Paillou, Ph., Radebaugh, J., Wall, S. and Wood, C. (2014) The discovery of transient features in a Titan sea. *Nature Geoscience* **7**, 493-496.

Mitchell, K. L., Barmatz, M., Jamieson, C. S., Lorenz, R. D. and Lunine, J. I. (2015) Laboratory measurements of cryogenic liquid alkane microwave absorptivity and implications for the composition of Ligeia Mare, Titan. *Geophys. Res. Lett.* 42, 1340-1345.

Janssen, M. A., Le Gall, A., Lopes, R. M., Lorenz, R. D., Malaska, M. J., Hayes, A. G., Neish, C. D., Solomonidou, A., Mitchell, K. L., Radebaugh, J., Keihm, S. K., Choukroun, M., Leyrat, C., Encrenaz, P. J. and Mastrogiuseppe, M. (in review) Titan's Surface at 2.18-cm Wavelength Imaged by the Cassini RADAR Radiometer: Results and Interpretations through the First Ten Years of Observation. Accepted by *Icarus*.

PUBLICATIONS IN REVIEW (3):

Kirk, R. L., Howington-Kraus, E., Redding, B. L., Lee, E. M., Stiles, B. W., Hensley, S., Hayes, A. G., Lopes, R. M. C., Lorenz, R. D., Mitchell, K. L., Radebaugh, J., Paganelli, F., Soderblom, L. A., Stofan, E. R., Wall, S. D., Wood, C. A., Elachi, C. and the Cassini RADAR Team (in review) High resolution topographic models of Titan's surface derived by RADAR stereogrammetry using a rigorous sensor model. Submitted to *Icarus*.

Parcheta, C. E., Pavlov, C. A., Wiltsie, N., Carpenter, K., Nash, J., Parness, A., Mitchell, K. (in review) A Robotic Approach to Mapping Volcanic Fissure Conduits. Submitted to *Mechatronics*.

PAPERS IN ADVANCED PREPARATION:

Mitchell, K. L., Vance, S., Chilton, H., Parcheta, C. (in prep.) A bi-modal cryovolcanic and sublimation origin for Enceladus' plumes. To be submitted.

Malaska, M. J. and Mitchell, K. L. (in prep.) Planetary karst. To be submitted.

Mitchell, K. L., Malaska, M. J., Hayes, A. G., Wall, S. D. and the Cassini RADAR Team (in prep.) Dissolving Titan: The case for organic karst on Saturn's largest moon. To be submitted.

Mitchell, K. L., Khankhoje, U. K., Janssen, M. A., West, R., Castillo, J. C., Wall, S. D. and the Cassini RADAR Team (in prep.) Enceladus' brilliant surface revealed by Cassini RADAR. To be submitted.

Khankhoje, U. K., Mitchell, K. L., Castillo-Rogez, J. C., Janssen, M. A. and van Zyl, J. J. (in prep.) Radar modeling of Enceladus' surface using the finite element method. To be submitted.

BOOK CHAPTERS:

Lopes, R. M. C., Fagents, S. A., Mitchell, K. L. and Gregg, T. K. P. (2013) Planetary Volcanism. In *Modeling volcanic processes: The physics and mathematics of volcanism*, (Eds.) Fagents, S. A., Gregg, T. K. P. and Lopes, R. M. C., Cambridge Univ. Press, Cambridge, U.K.

Mitchell, K. L. (2013) Exotic Seas. In *Alien Seas*, (Eds.) Carroll, M. and Lopes, R. M. C., Springer.

CONFERENCE ABSTRACTS/PRESENTATIONS:

Numerous. Contact for details.