David E. Stillman, Ph.D.

Senior Research Scientist
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EDUCATION

2000 – 2006 **Colorado School of Mines** Golden, CO
Ph. D. in Geophysics with a minor in Hydrology
Advisor: Dr. Gary R. Olhoeft
Thesis: Frequency and Temperature Dependence in Electromagnetic Properties of Martian Analog Minerals.

1996 – 2000 **Colorado School of Mines** Golden, CO
BS in Geophysical Engineering with high scholastic honors
The Phillip R. Romig Award – the graduate in Geophysics who best exemplifies excellence in the acquisition of field geophysical observations
Outstanding Graduating Senior Award in Geophysics
Geophysics E-Days' Engineer
President of Society of Student Geophysicists (1999 – 2000)

PROFESSIONAL EXPERIENCE

June 2006 – Present **Southwest Research Institute** Boulder, CO
Senior Research Scientist (2010 – Present)
Research Scientist (2006-2010)
Department of Space Studies
Supervisor: Robert Grimm, Ph.D.
- Interpreted 100s of HiRISE images to determine that southern mid-latitude Recurring Slope Lineae were likely caused by freshwater.
- Measure the electrical properties of Moon and Mars analogs, ices, silicates, clays, and mixtures of the previous materials as a function of temperature (180 – 300 K) and frequency (1 Mhz – 1 mHz) in the Planetary Electrical Properties and Geophysics Lab.
- Helped plan, collect, process, and interpret Ground Penetrating Radar (GPR) data and DC resistivity data collected on the Bishop tuff in Bishop, CA, the permafrost tunnel in Fox, AK, and Kobuk Valley sand dunes, AK to better understand the broadband performance of GPR and the electrical properties of permafrost.
- Processed and interpreted 1000s of radargrams of SHARAD radar data to determine that only the youngest most pristine flows are transparent enough to return reflections from them.
- Assisted in the development of an airborne magneto-telluric acquisition system.
- Assisted in determining the best way to use radar image the subsurface of an asteroid or comet.
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Aug 2000 – May 2006 **Colorado School of Mines** Golden, CO
Teaching & Research Assistant

Department of Geophysics
Advisor: Gary Olhoeft, Ph.D.

- Measured the electromagnetic properties of Martian analogs as a function of frequency (1 Ghz – 0.1 MHz) and temperature (180 – 300 K).
- Co-advised with Gary Olhoeft three senior design projects. One project concentrated on measuring the EM properties of concrete as it cures to estimate if borehole GPR could be used to estimate the extent of grout injection. Another project was a case study on the potential of EM methods (3D GPR, Magnetometer, EM-31, and EM-38) to find Anasazi Ruins NW of Cortez, CO. The third project investigated how magnetic properties change as a function of grain size.
- Operated the PulseEkko 1000 for a number of teaching exercises and field labs.
- Taught 3 weeks of the GPR portion of Advanced Electrical and EM methods to geophysics seniors and graduate students.
- Researched the field of remote sensing to help design an introductory geophysics module. The module focused on remote sensing as a tool for space exploration, volcano prediction, mineral and petroleum exploration.
- Learned process and method of conducting a well logging job including how to fish tools out of the hole.

Private Geophysical Consulting

March 2005 — *Colorado Springs Wastewater Treatment Plant* — Colorado Springs, CO
Client: Bill Stoner, HDR Inc, Denver office
-Collected a GPR grid above an open channel conduit and interpreted concrete thickness.

Sept. 2004 — *Denver Chatfield Reservoir* — Littleton, CO
Client: Gary Fuller, HDR Inc. Denver office
-Collected magnetic and EM-31 data over a rectangular area of about 2 acres to locate a 48" diameter reinforced concrete pipe.

Aug. 2004 — *Denver Metro Wastewater Central Plant* — Commerce City, CO
Client: Bob Rogers, Denver office, HDR Inc
-Collected a GPR grid above an open channel conduit and interpreted concrete thickness.

May – Aug 2002 — **Mundell & Associates Inc.** — Indianapolis, IN
May – July 2001 — *Summer Intern*
Supervisor: Greg Byer, PE, LPG

- Collected data using many geophysical tools (Sting/Swift, EM-31, EM-34, EM-38, EM-61 MK2, Noggin 250, Noggin 1000, Conquest, and OhmMapper).
- Worked on many projects including groundwater mapping, locating underground storage tanks under rebar, locating archeological artifacts, and locating groundwater drains.
- Supervised drilling and geologically interpreted the core.
- Processed and interpreted GPR data.

June – Aug 1999 — **Spirit Energy 76 (Unocal)** — Sugar Land, TX
Summer Intern
Gulf of Mexico Shelf Exploration

Mentors: Michael Gibson and Stephen Witt
- Interpreted 3D seismic data using Landmark's SeisWorks in the exploration for shallow gas reservoirs in the Gulf of Mexico Shelf.

June - July 1998 **United States Geological Survey** Flagstaff, AZ
Summer Intern
Astrogeology Group
Mentor: Dr. Wendy Calvin
- Utilized IDL to create 3D pictures of Mars. Used 2D pictures taken by the Viking orbiters and meshed them with topographic maps of Mars.
- Preformed initial analysis of Mariner 7 Infrared Spectroscopy data set.

May, Aug 1998 **Los Alamos National Laboratory** Los Alamos, NM
Dec 1997 *Intern*
May – Aug 1997 Space and Atmospheric Sciences
Dec 1996 Mentor: Dr. Herbert Funsten
May – Aug 1996
- Conducted thermal, UV light, and ion tests on gold and nickel space gratings. These will be used in the TWINS mission to measure ions being reflected off the Earth's atmosphere while blocking all UV light.
- Experimented, designed, and assisted in the assembly of a state-of-the-art Biological and Chemical Warfare Detector.
- Analyzed test results from an Ion Time-of-Flight Mass Spectrometer, which is one of the instruments onboard NASA's Cassini mission to Saturn.

GRANTS AWARDED

2015-2018 Electromagnetic laboratory investigations of the microphysical structure of planetary ice (PI) *NASA Solar System Workings* ($477 k).

2014-2017 Imaging and Thermal Constraints on the Source and Flow Mechanisms of Recurring Slope Lineae (RSL) (PI) *NASA Mars Data Analysis Program* ($300 k).

2014-2017 Next-Generation Ground Penetrating Radar for Mars, the Moon, and Asteroids (PI) *NASA Planetary Instrument Concepts for the Advancement of Solar System Observations* ($899 k).

2014-2016 Partitioning of soluble impurities in ice: A foundation for planetary radar exploration (PI) *NASA Planetary Geology & Geophysics* ($226 k).

2012-2015 Detection of Adsorbed Water on Mars using Dielectric Spectroscopy (PI) *NASA Mars Fundamental Research* ($301 k).

2010-2012 New Broadband Measurements of the Dielectric Properties of Ice Core: A Foundation for Planetary Radar Sounding (PI) *NASA Planetary Geology & Geophysics* ($160 k).

2009-2013 Scientific and Resource Characterization of Lunar Regolith Using Dielectric Spectroscopy (PI) *NASA Lunar Advanced Science & Exploration Research* ($312 k).

2012-2014 High-Altitude Electromagnetic Surveying for Earth Science (CoI - PI Grimm) *NASA Earth Surface and Interior*.

2011-2014 Foundations of Radar and Seismic Imaging of Asteroids and Comets (CoI - PI Grimm) *NASA Planetary Instrument Definition & Development Program.*

2009-2012 Ground-Penetrating Radar Investigations of Mars Analog Permafrost Sites in Alaska (CoI - PI Dinwiddie) *NASA Mars Fundamental Research.*

2009-2012 Cryohydrological Transport and Deposition of Salts on Mars (CoI - PI Grimm) *NASA Mars Fundamental Research.*

2008-2011 Measurement and Geological Interpretation of Attenuation in Surface-Penetrating Radar (CoI - PI Grimm) *NASA Mars Data Analysis Program.*

2008-2011 Broadband Electrical Properties of Ice Mixtures for Planetary Subsurface Geoelectrical and Radar Exploration (CoI - PI Grimm) *NASA Planetary Geology & Geophysics.*

2007-2011 Capacitively Coupled Induced-Polarization Subsurface Investigation (CoI - PI Grimm) *NASA Planetary Instrument Definition & Development Program.*

RESEARCH EXPERTISE

Laboratory: Measurement of dielectric permittivity versus frequency (1 mHz – 1 GHz) and temperature (180 – 330 K) of minerals, simulants, ices, silicates, and clays.
Modeling allows these relaxations to be fit to their Cole-Cole relaxation parameters.
Relaxations can then be matched to what is causing them.
Results can be used to uniquely identify them remotely and also to calculate a radar attenuation rate.

Field: Conducted and planned multiple GPR and EM induction surveys with varied targets such as permafrost, aquifers, lava tubes, drugs, bodies, archeological structures, pipes, underground storage tanks, groundwater drains.

Data Analysis: MatLab to interpret anything from publicly released SHARAD and TECP data, to GPR data, to dielectric permittivity laboratory data.

PEER-REVIEWED PUBLICATIONS

Stillman, D.E., T.I. Michaels, R.E. Grimm, and J. Hanley, Recharge and formation mechanisms of northern mid-latitude recurring slope lineae, 2015, *Icarus*, submitted.

MacGregor, J.A., J. Li, J.D. Paden, G.A. Catania, G.D. Clow, M.A. Fahnestock, S.P. Gogineni, R.E. Grimm, M. Morlighem, S. Nandi, H. Seroussi and **D.E. Stillman**, 2015, Radar attenuation and temperature within the Greenland Ice Sheet, *Journal of Geophysical Research: Earth Surface*, 120, doi:10.1002/2014JF003418.

Grimm, R.E., and **D.E. Stillman**, 2015, Field Test of Detection and Characterization of Subsurface Ice Using Broadband Spectral Induced Polarization, *Permafrost and Periglacial Processes*, *26*, 28-38.

Sava, P.C., D. Ittharat, R.E. Grimm, and **D.E. Stillman**, 2014, Radio Reflection Imaging of Asteroid and Comet Interiors I: Acquisition and Imaging Theory, *Advances in Space Research, 55*, 2149-2165.

Grimm, R.E., **D.E. Stillman**, P.C. Sava, and D. Ittharat, 2014, Radio Reflection Imaging of Asteroid and Comet Interiors II: Results and Recommendations, *Advances in Space Research, 55*, 2166-2176.

Stillman, D.E., T.I. Michaels, R.E. Grimm, and K.P. Harrison, 2014, New Observations of Southern Mid-Latitude Martian Recurring Slope Lineae (RSL) Imply Formation by Freshwater Discharge of Melted Cold Traps, *Icarus, 233*, 328-341.

Grimm, R.E., K.P. Harrison, and **D.E. Stillman,** 2014, Water Budgets of Martian Recurring Slope Lineae, *Icarus, 233*, 316-327.

Stillman, D.E., J.A. MacGregor and R.E. Grimm, 2013, Electrical response of ammonium-rich water ice, *Ann. Glaciol., 54(64)*, 21-26, doi:10.3189/2013AoG64A204.

Stillman, D.E., J.A. MacGregor and R.E. Grimm, 2013, The role of acids in electrical conduction through ice, *J. Geophys. Res., 118*, 1-16, doi:10.1029/2012JF002603.

Dinwiddie, C.L., K. K. Bradbury, R.N. McGinnis, **D.E. Stillman**, and D.A. Ferrill, 2012, Hydrogeologic heterogeneity of faulted and fractured Glass Mountain bedded tuffaceous sediments and ash-fall deposits: The Crucifix site near Bishop, California, *Lithosphere, 4*, 40-62, doi: 10.1130/L179.1.

Grimm, R.E., A.C. Barr, K.P. Harrison, **D.E. Stillman**, K.L. Neal, M.A. Vincent, and G.T. Delory, 2011, Measurement of Thermal Lithospheric Thickness of Venus using Aerial Electromagnetic Sounding, *Icarus, 217*, 462-473, doi: 10.1016/j.icarus.2011.07.021.

Stillman, D.E., and R.E. Grimm, 2011, Dielectric Signatures of Adsorbed and Salty Liquid Water at the Phoenix Landing Site, Mars, *J. Geophys. Res., 116*, E09005, doi: 10.1029/2011JE003838.

Barr, A.C., and **Stillman, D.E.**, 2011, Strain History of Ice Shells of the Galilean Satellites from Radar Detection of Crystal Orientation Fabric, *Geophys. Res. Lett., 38*, L06203, doi: 10.1029/2010GL046616.

Stillman, D.E., and R.E. Grimm, 2011, Radar Penetrates Only the Youngest Geological Units on Mars, *J. Geophys. Res., 116*, E03001, doi: 10.1029/2010JE003661.

Stillman, D.E., R.E. Grimm, and S.F. Dec, 2010, Low-Frequency Electrical Properties of Ice-Silicate Mixtures, *J. Phys. Chem. B, 114*, 6065-6073.

Grimm, R.E., and **D.E. Stillman**, 2009, Comment on "Subsurface water detection on Mars by astronauts using a seismic refraction method: Tests during a manned Mars simulation," by V. Pletser et al., *Acta Astronautica, 64*, 654-655.

Grimm, R.E., **D.E. Stillman**, S.F. Dec, and M.A. Bullock, 2008, Low-frequency electrical properties of polycrystalline saline ice and salt hydrates, *J. Phys. Chem., B, 112*, 15382-15390.

Stillman, D.E., and G.R. Olhoeft, 2008, Frequency and Temperature Dependence in Electromagnetic Properties of Martian Analog Minerals, *J. Geophys. Res., 113*, E09005, doi:10.1029/2007JE002977.

Stillman, D.E., 2006, Frequency and Temperature Dependence in Electromagnetic Properties of Martian Analog Minerals., *PhD thesis, Dept. of Geophysics, Colorado School of Mines*, Golden, 199 p. + DVD.

UNREFEREED PUBLICATIONS AND CONFERENCE ABSTRACTS

Stillman, D.E., K.L. Wagstaff, T.I. Michaels, and R.E. Grimm, 2015, Seasonal Water Budget Suggests that a Valles Marineris Recurring Slope Lineae (RSL) Site Must be Recharged by an Aquifer, 44th Lunar and Planetary Science Conf., 16-20 March, The Woodlands, TX, 2669.pdf.

Stillman, D.E., Grimm, R.E., and McGinnis, R.N., 2014, Subsurface Ice Detection via Low Frequency Surface Electromagnetic Methods, Eos Trans. AGU, 94(52), Fall Meet. Suppl., Abstract NS34A-03.

J.A. MacGregor, M.A. Fahnestock, G.A. Catania, J.D. Paden, S. Gogineni, M. Morlighem, W. Colgan, J. Li, **D.E. Stillman**, R. E. Grimm, S.K. Young, S.C. Rybarski, A.N. Mabrey, B.M. Wagman, 2014, The Greenland Ice Sheet in three dimensions, Eos Trans. AGU, 94(52), Fall Meet. Suppl., Abstract C24B-03.

Grimm, R.E., **Stillman, D.E**., D. Kowalewski, Transient Meltwater in Mullins Valley Glacier, McMurdo Dry Valleys, Antarctica, 2014, Eos Trans. AGU, 94(52), Fall Meet. Suppl., Abstract C53A-0280.

Smith, I.B., **Stillman, D.E**., Phillips, R.J., Forget, F., Mellon, M.T., Spiga, A., Putzig, N.E., 2014, SHARAD detections of subsurface reflectors near RSL sites on the Tharsis Plateau immediately adjacent to the canyon rim of Valles Marineris, Eos Trans. AGU, 94(52), Fall Meet. Suppl., Abstract P31D-4011.

Mushkin, A., **Stillman, D.E**., Gillespie, A.R., Montgomery, D.R., Schreiber, B.C., and Hibbitts, C.A., 2014, The dynamic nature and spectral characteristics of low-albedo slope streaks on Mars and their possible hydrologic implications, Eos Trans. AGU, 94(52), Fall Meet. Suppl., Abstract P31D-4012.

Grimm, R.E., **Stillman, D.E**., and McGinnis, R.N., 2014, Characterization of Ground ice using Complex Resistivity, Geologic Society of America Conference, Vancouver, Canada: Oct 19-22, 84-1.

Mushkin, A., **Stillman, D.E**., Gillespie, A.R., Montgomery, D.R., Schreiber, B.C., and Hibbitts, C.A., 2014, New Constraints on the Recurrence, Growth and Fading Characteristics of Low-Albedo Streaks on Martian Slopes and their Possible Hydrologic Implications, Geologic Society of America Conference, Vancouver, Canada: Oct 19-22, 329-7.

Stillman, D.E., T.I. Michaels, and R.E. Grimm, 2014, Source and Temperature Controls on Recurring Slope Lineae (RSL) at three Latitude Bands, 8th International Conference on Mars, Pasadena, CA: July 14–18, 1396.pdf.

Grimm, R.E. and **Stillman, D.E.**, 2014, Characterization of Shallow Subsurface ice, water, and biosignatures on Mars using Spectral Induced Polarization, 8th International Conference on Mars, Pasadena, CA: July 14–18, 1372.pdf.

Stillman, D.E., and R.E. Grimm, 2013, Optimal Electromagnetic (EM) Geophysical Techniques to Map the Concentration of Subsurface Ice and Adsorbed Water on Mars and the Moon, Eos Trans. AGU, 93(52), Fall Meet. Suppl., Abstract P51B-1736.

Grimm, R.E. and **D.E. Stillman**, 2013, Advances in Complex-Resistivity Mapping and Characterization of Permafrost, Eos Trans. AGU, 93(52), Fall Meet. Suppl., Abstract C53C-03.

Stillman, D.E., and R.E. Grimm, 2013, Scientific and Resource Characterization of Lunar Regolith with Dielectric Spectroscopy, NLSI Workshop Without Walls, 21-23 May, virtual meeting, http://lunarscience.nasa.gov/workshop/lunar-volatiles/files/pdf/DavidStillman.pdf.

Stillman, D.E., Grimm, R.E., T.I. Michaels, and K.P. Harrison, 2013, Formation of Recurring Slope Lineae (RSL) by Freshwater Discharge of Melted Cold Traps, 44th Lunar and Planetary Science Conf., 18-22 March, The Woodlands, TX, 1737.pdf.

Grimm, R.E., K.P. Harrison, **D.E. Stillman**, and T.I. Michaels, 2013, Water Budgets of Martian Recurring Slope Lineae, 44th Lunar and Planetary Science Conf., 18-22 March, The Woodlands, TX, 1146.pdf.

Sava, P., R.E. Grimm, D. Ittharat, and **D.E. Stillman**, 2013, Radar Imaging the Interiors of Small Bodies: Initial Migration Studies, 44th Lunar and Planetary Science Conf., 18-22 March, The Woodlands, TX, 1350.pdf.

Stillman, D.E., R.E. Grimm, T.I. Michaels, and K.P. Harrison, 2013, Formation of Recurrent Slope Lineae (RSL) by Freshwater Discharge of Melted Cold Traps, The Present-Day Habitability of Mars, 4-6 February, Los Angeles, CA, 49-Stillman_Habit_2012.pdf

Stillman, D.E., R.N. McGinnis, C.L. Dinwiddie, R.E. Grimm and K.L. Bjella, 2013, Interpretations of the state and abundance of water in polar dunes from in situ and laboratory electrical property measurements, Cryosphere Geophysics: Understanding a Changing Climate with Subsurface Imaging, 6-8 January, Boise, ID, 1-4.

MacGregor, J.A., **D.E. Stillman**, and R.E. Grimm, 2013, A revised model of low- and high-frequency conduction in polar ice, Cryosphere Geophysics: Understanding a Changing Climate with Subsurface Imaging, 6-8 January, Boise, ID, 1-4.

Dinwiddie, C.L., R.N. McGinnis, **D.E. Stillman**, K.L. Bjella, and R.E. Grimm, 2013, Satellite Data Constrain Interpretations of Geophysical Data from the Great Kobuk Sand Dunes, Alaska, Cryosphere Geophysics: Understanding a Changing Climate with Subsurface Imaging, 6-8 January, Boise, ID, 1-4.

Stillman, D.E., J.A. MacGregor, R.E. Grimm, 2011, Insights into the nature of radar attenuation through impure ice from broadband dielectric spectroscopy of polar ice cores, Eos Trans. AGU, 92(52), Fall Meet. Suppl., Abstract P13G-03.

Durda, D.D., and **D.E. Stillman,** 2011, Remote Sensing of Unexposed Fossil Stumps at Florissant Fossil Beds National Monument, Colorado, Eos Trans. AGU, 92(52), Fall Meet. Suppl., Abstract B31C-0333.

Stillman, D.E., and R.E. Grimm, 2011, Low-Frequency Electrical Properties of Ice-Silicate Mixtures, 2nd International Workshop on Induced Polarization in Near-Surface Geophysics, 31 Oct-2 Nov, Golden, CO, p. 27.

Stillman, D.E., and R.E. Grimm, 2011, Dielectric Signatures of Adsorbed and Salty Liquid Water at the Phoenix Landing Site, Mars, 5th Conf. Mars Polar Science and Exploration, 12-16 September, Fairbanks, AK, 6045.pdf.

Dinwiddie, C.L., R.N. Mcginnis, **D.E. Stillman**, K.L. Bjella, R.E. Grimm, 2011, Late-Winter Phase State of Water in the Great Kobuk Sand Dunes, Alaska, and Testable Hypotheses for a Perching Mechanism, 5th Conf. Mars Polar Science and Exploration, 12-16 September, Fairbanks, AK, 6035.pdf.

Stillman, D.E., J. A. MacGregor, A. C. Barr, R. E. Grimm, D. D. Blankenship, D. P. Winebrenner, 2011, A Foundation for Orbital Radar Sounding of Europa from new Measurements of the Broadband Dielectric Properties of Terrestrial Polar Ice Cores, 42nd Lunar and Planetary Science Conf., 7-11 March, The Woodlands, TX, 2193.pdf.

Stillman, D.E., and R.E. Grimm, 2011, Heterogeneous Adsorbed and Salty Liquid Water at the Phoenix landing site, Mars, 42nd Lunar and Planetary Science Conf., 7-11 March, The Woodlands, TX, 2578.pdf.

Dinwiddie, C.L., R.N. Mcginnis, **D.E. Stillman**, K.L. Bjella, R.E. Grimm, 2011, Geophysical Mars Analog Studies of Multiphase Water in the Great Kobuk Sand Dunes, Northwestern Alaska, 42nd Lunar and Planetary Science Conf., 7-11 March, The Woodlands, TX, 2501.pdf.

Winebrenner, D.P., **D.E. Stillman**, R.E. Grimm, 2011, Detectability by Radar of Salts in Martian Ice Deposits, 42nd Lunar and Planetary Science Conf., 7-11 March, The Woodlands, TX, 2532.pdf.

Grimm, R.E., and **D.E. Stillman**, 2011, Progress in Prospecting for Near-surface H2O on the Moon and Mars with Dielectric Spectroscopy, 42nd Lunar and Planetary Science Conf., 7-11 March, The Woodlands, TX, 2550.pdf.

Grimm, R.E., A.C. Barr, K.P. Harrison, **D.E. Stillman**, K.L. Neal, M.A. Vincent, and G.T. Delory, 2011, Measurement of Thermal Lithospheric Thickness of Venus using Aerial Electromagnetic Sounding, 42nd Lunar and Planetary Science Conf., 7-11 March, The Woodlands, TX, 1551.pdf.

Lenferink, H.J., W.B. Durham, A.V. Pathare, L.A. Stern, **D.E. Stillman**, 2011, Creep of Water Ice Plus Magnesium Perchlorate Hydrate, 42nd Lunar and Planetary Science Conf., 7-11 March, The Woodlands, TX, 1909.pdf.

Stillman, D.E., D.P. Winebrenner, R.E. Grimm, A. Pathare, 2010, The Radar Effects of Perchlorate-Doped Ice in the Martian Polar Layered Deposits, Eos Trans. AGU, 91(52), Fall Meet. Suppl., Abstract P34A-03. **(invited)**

Dinwiddie, C.L., D.M. Hooper, T.I. Michaels, R.N. Mcginnis, **D. Stillman**, K. Bjella, S. Stothoff, G.R. Walter, M. Necsoiu, R.E. Grimm, 2010, Great Kobuk Sand Dunes, Alaska: A Terrestrial Analog Site for Polar, Topographically Confined Martian Dune Fields, Eos Trans. AGU, 91(52), Fall Meet. Suppl., Abstract P13B-1369.

Mcginnis, R.N., C.L. Dinwiddie, **D. Stillman**, K. Bjella, D.M. Hooper, and R.E. Grimm, 2010, Insights from a Geophysical and Geomorphological Mars Analog Field Study at the Great Kobuk Sand Dunes, Northwestern Alaska, Eos Trans. AGU, 91(52), Fall Meet. Suppl., Abstract P23A-1607.

Stillman, D.E., and R.E. Grimm, 2010, Mechanisms for the Attenuation of SHARAD Energy**,** 41st Lunar and Planetary Science Conf., 1-5 March, The Woodlands, TX, 2143.pdf.

Stillman, D.E., and R.E. Grimm, 2010, Dielectric Spectroscopy for Scientific and Resource Characterization of Lunar Regolith**,** Ground-based Geophysics on the Moon, 21-22 January, Tempe, AZ, 3018.pdf.

Stillman, **D.E.**, and R.E. Grimm, 2009, SHARAD Penetrates only the Youngest Geological Units on Mars, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract P13B-1276.

Grimm, R.E., **D.E. Stillman**, J.A. MacGregor, C.L Dinwiddie, D.M. Hooper, 2009, New insights into the electrical properties of ice and permafrost, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract NS42A-05.

Grimm, R.E. and **Stillman D.E.**, 2009, Electrical properties of saline ices and ice-silicate mixtures: geophysical and astrobiological consequences, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract MR22A-05. **(invited)**

Dinwiddie C.L., R.N. McGinnis, **D.E. Stillman**, R.E. Grimm, D.M. Hooper, K. Bjella, 2009 Integrated Geophysical Examination of the CRREL Permafrost Tunnel's Fairbanks Silt Units, Fox, Alaska, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract C41A-0429.

Stillman, D.E., R.E. Grimm, and K.P. Harrison, 2009, The Anomalous Radar Transparency of Central Elysium Planitia and Amazonis Planitia**,** 40th Lunar and Planetary Science Conference, 23-27 March, The Woodlands, TX, 2412.pdf.

Stillman, D.E., and R.E. Grimm, 2008, Electrical Properties of Ice and Implications for Solar System Exploration**,** 39th Lunar and Planetary Science, 10-14 March, League City, TX, 2277.pdf.

Grimm, R.E. and **Stillman D.E.**, 2008, On the Origin of Widespread Subsurface Radar Attenuation at Mars**,** 39th Lunar and Planetary Science, 10-14 March, League City, TX, 2251.pdf.

Grimm, R.E. and **D.E. Stillman**, 2008, Electrical Properties of Saline Ices, Salt Hydrates, and Ice-Silicate Mixtures: Applications to Solar-System Exploration, The Science of Solar System Ices, 5-8 May, Oxnard, Ca, 9062.pdf. **(invited)**

Stillman, D.E., and R.E. Grimm, 2007, Electrical Properties of Ice and Ice-Silicate Mixtures for Mars Exploration, Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract P14A-04.

Stillman, D.E., and R.E. Grimm, 2007, Scientific and Resource Characterization of Lunar Regolith using Dielectric Spectroscopy, LEAG meeting, 1-5 October, Houston, TX, 3014.pdf.

Grimm, R.E., C.L Dinwiddie, **D.E. Stillman**, R.N. McGinnis, 2007, Frequency Dependence of Attenuation in Ground-Penetrating Radar: Insights from the Bishop Tuff, 77th Annual SEG Meeting, 23-28 September, San Antonio, TX, 5p.

Stillman, D.E., and R.E. Grimm, 2007, Laboratory Measurements of the Electrical properties of Water Ice-Silicate Mixtures and Implications for Dielectric Spectroscopy and Radar on Mars, 7th International Conference on Mars, Pasadena, CA: July 9–13, 2007, 3311.pdf.

Dinwiddie C.L., R.E. Grimm, R.N. McGinnis, **D.E. Stillman**, 2007, Moderately to Poorly Welded Tuff, Bishop, California: Geophysical and Geological Characterization to Determine the Source of Radar Scattering, , 7th International Conference on Mars, Pasadena, CA, 3334.pdf.

Stillman, D.E., and R.E. Grimm, 2007, Dielectric Spectroscopy mapping of Subsurface Ice on the Moon and Mars, 38th Lunar and Planetary Science, Houston, Texas, 1944.pdf.

Grimm, R.E., and **D.E. Stillman**, 2007, Abundance and Electrical Properties of Interfacial Water in the Martian Regolith, 38th Lunar and Planetary Science, Houston, Texas, 2249.pdf.

Stillman, D.E., and G.R. Olhoeft, 2006, Electromagnetic Properties of Martian Analog Minerals at RADAR Frequencies and Martian Temperatures, 37th Lunar and Planetary Science, Houston, Texas, 2002.pdf.

Grimm, R.E., **D.E. Stillman**, E Heggy, C.L. Dinwiddie, R.N. McGinnis, 2006, Moderately to Poorly Welded Tuff, Bishop, California: Broadband Performance of Ground-Penetrating Radar, EOS Trans. AGU, 87(52), Fall Meet. Suppl., Abstract P51G-06.

R.N. McGinnis, Dinwiddie C.L., **D.E. Stillman**, E Heggy, R.E. Grimm, 2006, Pyroclastic and Volcaniclastic Deposits Near Bishop, California: Geologic Controls on Near-Surface Electrical Resistivity and Radar Data, EOS Trans. AGU, 87(52), Fall Meet. Suppl., Abstract P31B-0132.

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Last updated 6/5/15