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EDUCATION:

Ph.D.: 2011, University of Tennessee, Geology
B.S.: 2005, Georgia Institute of Technology, Physics

PERSONAL INFORMATION:

Born: August 29th, 1981, Point Pleasant, NJ; Citizenship: USA.

FIELDS OF EXPERTISE:

- Surface composition and geology of terrestrial planets and moons
- Spacecraft instrumentation and operations (neutron/gamma-ray spectroscopy, multispectral, infrared spectroscopy, and rover operations)
- Nuclear spectroscopy of planetary bodies (neutron, gamma-ray, infrared, visible) and data reduction using passive and active neutron sources (for landed planetary missions)
- Small spacecraft and instrument development (interplanetary CubeSats)

PROFESSIONAL EXPERIENCE:

Since 2016: Assistant Professor, School of Earth and Space Exploration, ASU

Since 2015: Director of Projects, ASU NewSpace Initiative

2013 to 2015: Director of Research, ASU NewSpace Initiative

2013 to 2016: Postdoctoral Research Scientist, ASU

2012 to 2013: Assistant Staff Scientist, Malin Space Science Systems

2011 to 2012: Postdoctoral Researcher, Stony Brook University

2008 to 2011: NASA Graduate Research Program (GSRP) Fellow, NASA Goddard Space Flight Center and the Department of Earth and Planetary Sciences at University of Tennessee

PROFESSIONAL AFFILIATIONS:

American Geophysical Union (Planetary Sciences Section); The Planetary Society (Member)

HONORS AND AWARDS:

NASA Group Achievement Awards (2), MSL/Curiosity Science Team, 2015-2017

NASA Early Career Fellowship Award, 2016

Outstanding Young Alumnus Award, EPS Department, University of Tennessee, 2016

NASA Group Achievement Award, MSL/Curiosity Operations Team, 2013

NASA Graduate Student Researcher's Program Fellowship, 2008-2011

Interdisciplinary Research Award, EPS Department, University of Tennessee, 2010

Professional Promise Award, EPS Department, University of Tennessee, 2008
NASA Group Achievement Awards (2), MER 3rd & 4th Extended Missions, 2008
Excellence in Graduate Coursework, EPS Department, University of Ten., 2006 and 2007
NASA Group Achievement Awards (2), MER 1st, 2nd Extended Missions, 2004-2005

PROFESSIONAL ACTIVITIES:

Participating Scientist: NASA Mars Science Laboratory *Curiosity* Rover, 2016 to present
P.I., NASA *LunaH-Map* mission, 2015 to present
P.I., NASA Planetary Instrument Concepts for the Advancement of Solar System Observations - development of an active source, pulsed neutron and gamma-ray instrument (*SINGR*), 2015 to present
Co-I., NASA Mars 2020 Rover *Mastcam-Z* instrument team, 2014 to present
Science Team Member: NASA Mars Science Laboratory *Curiosity* Rover, 2012 to present
Science Team Member: NASA Mars Odyssey *CTX*, 2011 to 2012
Science Team Member: NASA Mars Exploration Rover Missions, 2006 to 2011

PROFESSIONAL SERVICE:

Panelist: NASA 'Planetary Vision 2050' Conference at NASA Headquarters, 2017
Member: LDAP External Review Panel, 2017
Member: MDAP External Review Panel, 2017
Member: PICASSO Review Panel, 2017
Member: NASA *PG&G*, *MDAP*, *ASTID*, *SSW*, 2012 to present
Reviewer: *JGRP*, *JGRA*, *MAPS*, *Icarus*, 2012 to present
Session Chair: *AGU Planetary Sciences Section*, 2011 and 2013
Committee Member: Stony Brook University Postdoctoral Working Group, 2012
Writing Associate: New York Academy of Sciences, 2012 to 2013
Consultant: NAS Science & Entertainment Exchange, 2012 - present

TEACHING EXPERIENCE:

SES 591: 'Planetary Nuclear Spectroscopy Seminar', 2017
SES 494/598: 'Commercial Opportunities in Space', co-taught, 2014 to 2017
SES 100: 'Introduction to Exploration', 2016, 2018
AST 113: 'Astronomy Laboratory', 2016

DEPARTMENT/UNIVERSITY FACULTY SERVICE:

Co-Director: LANL/SESE Partnership with Interplanetary Initiative, 2017 to present
SESE Nininger Travel Award Review Panel, 2016
ASU/SESE Undergraduate Recruitment Committee, 2016 to present
Director of Projects: ASU NewSpace, 2016 to present
Dissertation Advisor for 3 graduate students, 2016 to present
Minor Advisor/Committee member for 4 graduate students, 2016 to present
Advisor: 5 undergraduate researchers, 2015 to present
SESE Undergraduate Mentor, 2016
SESE Camp SESE faculty mentor for Planetary Geology students, 2016

INVITED TALKS/LECTURES:

Invited Talk at LPSC Microsymposium on solar system polar volatiles, 2016
LunaH-Map talk at Santa Monica College STEM lecture series, 2016
Engineering Coffee on LunaH-Map, 2016

EDUCATION, OUTREACH, AND COMMUNITY ACTIVITIES

ASU KEDTalk on LunaH-Map, 2018
Fox 10 Newsmakers segment on LunaH-Map, 2016
SESE Night of the Open Door presentation on LunaH-Map, 2016
ASU Connections Podcast, 2016
LunaH-Map talk at SESE Earth and Space Exploration Day, 2016
Panelist: Project Hieroglyph at ASU Center for Science and the Imagination, guest science expert on asteroid subpanel, 2016
Consultant: Environmental Art at Bungie Studios, 2013 to 2015
Science Panelist: Phoenix Comicon, 2014
Science Organizer: San Diego Air and Space Museum Space Day, 2013
Science Volunteer: San Diego Festival of Science and Engineering, 2013

HOBBIES AND INTERESTS

Piano, guitar, audio production, video game environment and pixel art

TECHNICAL EXPERIENCE

Remote sensing (neutron, gamma-ray, infrared, visible) of terrestrial and other planetary surfaces; small spacecraft instrument development; orbital neutron detectors; next-generation pulsed neutron detector systems for landed spacecraft; imaging of terrestrial analogs with thermal infrared imaging systems; autonomous science planning and visual recognition systems; planetary geomorphology; commercial and academic partnerships for space partnerships and commercialization

PUBLICATIONS

I. First-Authored Peer-Reviewed Journal Articles

1. [Thermal Emission Spectroscopy of Microcrystalline Sedimentary Phases: Effects of Natural Surface Roughness on Spectral Feature Shape](#). **Hardgrove, C. J.**, A. D. Rogers, T. D. Glotch, and J. A. Arnold. *Journal of Geophysical Research: Planets* 121, no. 3 (2016).
2. [Thermal infrared and Raman microspectroscopy of moganite-bearing rocks](#). **Craig Hardgrove** and A. Deanne Rogers, *American Mineralogist*, Vol. 98, pp.78-84, (2013).
3. Effects of geochemical composition on neutron die-away measurements: Implications for Mars Science Laboratory's Dynamic Albedo of Neutrons instrument. **Craig Hardgrove**, Jeff Moersch, Darrell Drake, *Nuclear Instruments and Methods in Physics Research A*, 659, pp. 442-455, (2011).
4. [Thermal Imaging of Sedimentary Features on Alluvial Fans](#), **Craig Hardgrove**, Jeffrey E. Moersch, Stephen Whisner, *Planetary and Space Science*, Vol. 58, pp. 482-508, (2010).

5. [Thermal Imaging of Alluvial Fans; A New Technique for Remote Classification of Sedimentary Features](#), **Craig Hardgrove**, Jeffrey E. Moersch, Stephen Whisner, *Earth and Planetary Science Letters*, Vol. 285, pp. 124-130, (2009).

II. *Peer-Reviewed Journal Articles with Significant Contribution*

1. T. S. J. Gabriel, C. Hardgrove, S. Czarnecki, L. Rampe, W. Rapin, C. N. Achilles, D. Sullivan, S. Nowicki, L. Thompson, Water abundance of dunes in Gale crater, Mars from active neutron experiments & implications for amorphous phases, *GRL Special Issue*, *submitted* (2018)
2. B. L. Ehlmann, K. S. Edgett, B. Sutter, C. N. Achilles, M. L. Litvak, M. G. A. Lapotre, R. Sullivan, A. A. Fraeman, R. E. Arvidson, D. F. Blake, N. T. Bridges, P. G. Conrad, A. Cousin, R. T. Downs, T. S. J. Gabriel, R. Gellert, V. E. Hamilton, C. Hardgrove, J. R. Johnson, S. Kuhn, P. R. Mahaffy, S. Maurice, M. McHenry, P. Y. Meslin, D. W. Ming, M. E. Minitti, J. M. Morookian, R. V. Morris, C. D. O'Connell-Cooper, P. C. Pinet, S. K. Rowland, S. Schröder, K. L. Siebach, N. T. Stein, L. M. Thompson, D. T. Vaniman, A. R. Vasavada, D. F. Wellington, R. C. Wiens, A. S. Yen. Chemistry, mineralogy, and grain properties at Namib and High dunes, Bagnold dune field, Gale crater, Mars: A synthesis of Curiosity rover observations, *JGRP Vol 122*, 12, pp. 2510-2543 (2017)
3. J. F. Bell III, A. Godber, S. McNair, M. A. Caplinger, J. N. Maki, M. T. Lemmon, J. Van Beek, M. C. Malin, D. Wellington, K. M. Kinch, M. B. Madsen, C. Hardgrove, M. A. Ravine, E. Jensen, D. Harker, R. B. Anderson, K. E. Herkenhoff, R. V. Morris, E. Cisneros, R. G. Deen. The Mars Science Laboratory Curiosity rover Mastcam instruments: Preflight and in-flight calibration, validation, and data archiving, *ESS*, 4, 7, 396-452 (2017).
4. Danika F. Wellington, James F. Bell, Jeffrey R. Johnson, Kjartan M. Kinch, Melissa S. Rice, Austin Godber, Bethany L. Ehlmann, Abigail A. Fraeman, Craig Hardgrove. Visible to near-infrared MSL/Mastcam multispectral imaging: Initial results from select high-interest science targets within Gale Crater, Mars, *American Mineralogist*, 102, 6, 1202-1217 (2017).
5. Litvak, Mitrofanov, Hardgrove, Stack, Sanin, Lisov, Boynton, Fedosov, Golovin, Harshman, Jun, Kozyrev, Kuzmin, Malakhov, Milliken, Mischna, Moersch, Mokrousov, Nikiforov, Starr, Tate, Tret'yakov, and Vostrukhin. "Hydrogen and Chlorine Abundances in the Kimberley Formation of Gale Crater Measured by the DAN Instrument on Board the Mars Science Laboratory Curiosity Rover." *Journal of Geophysical Research: Planets* 121, no. 5 (2016).
6. Tate, Moersch, Jun, Ming, Mitrofanov, Litvak, Behar, Boynton, Deflores, Drake, Ehresmann, Fedosov, Golovin, Hardgrove, Harshman, Hassler, Kozyrev, Kuzmin, Lisov, Malakhov, Milliken, Mischna, Mokrousov, Nikiforov, Sanin, Starr, Varenikov, Vostrukhin, and Zeitlin. "Water Equivalent Hydrogen Estimates from the First 200 Sols of Curiosity's Traverse (Bradbury Landing to Yellowknife Bay): Results from the Dynamic Albedo of Neutrons (DAN) Passive Mode Experiment." *Icarus* 262 (2015).

7. Sanin, Mitrofanov, Litvak, Lisov, Starr, Boynton, Behar, Deflores, Fedosov, Golovin, Hardgrove, Harshman, Jun, Kozyrev, Kuzmin, Malakhov, Milliken, Mischna, Moersch, Mokrousov, Nikiforov, Shvetsov, Tate, Tret'yakov, and Vostrukhin. "Data Processing of the Active Neutron Experiment DAN for a Martian Regolith Investigation." *Nuclear Inst. and Methods in Physics Research*, A 789 (2015).
8. Lanza, Ollila, Cousin, Wiens, Clegg, Mangold, Bridges, Cooper, Schmidt, Berger, Arvidson, Melikechi, Newsom, Tokar, Hardgrove, Mezzacappa, Jackson, Clark, Forni, Maurice, Nachon, Anderson, Blank, Deans, Delapp, Léveillé, Mcinroy, Martinez, Meslin, and Pinet. "Understanding the Signature of Rock Coatings in Laser-induced Breakdown Spectroscopy Data." *Icarus* 249 (2015).
9. [Transient Liquid Water and Water Activity at Gale Crater on Mars](#), F. Javier Martin-Torres, Maria-Paz Zorzano, Patricia Valentin-Serrano, Ari-Matti Harri, Maria Genzer, Osku Kemppinen, Edgard G. Rivera-Valentin, Insoo Jun, James Wray, Morten Bo Madsen, Walter Goetz, Alfred S. McEwen, **Craig Hardgrove**, Nilton Renno, Vincent F. Chevrier, Michael Mischna, Rafael Navarro-Gonzalez, Jesus Martinez-Frias, Pamela Conrad, Tim McConnochie, Charles Cockell, Gilles Berger, Ashwin R. Vasavada, Dawn Sumner and David Vaniman, *Nature - Geoscience*, Vol. 8, 357-361 doi:10.1038/ngeo2412 (2015)
10. [Water and chlorine content in the Martian soil along the first 1900 m of the Curiosity rover traverse as estimated by the DAN instrument](#), I.G. Mitrofanov, M.L. Litvak, A. Sanin, R. Starr, D.I. Lisov, R.O. Kuzmin, A. Behar, W.V. Boynton, **C. Hardgrove**, K. Harshman, I. Jun, R.E. Milliken, M.A. Mischna, J.E. Moersch, C.G. Tate, *Journal of Geophysical Research - Planets*, Vol. 119, 7, 1579-1596 (2014).
11. [Local Variations of Bulk Hydrogen and Chlorine-Equivalent Neutron Absorption Content Measured at the Contact Between the Sheepbed and Gillespie Lake Units in Yellowknife Bay, Gale Crater, Using the DAN Instrument Onboard Curiosity](#), M.L. Litvak, I.G. Mitrofanov, A.B. Sanin, D. Lisov, A. Behar, W.V. Boynton, L. Deflores, F. Fedosov, D. Golovin, **C. Hardgrove**, K. Harshman, I. Jun, A.S. Kozyrev, R.O. Kuzmin, A. Malakhov, R. Milliken, M. Mischna, J. Moersch, M. Mokrousov, S. Nikiforov, V.N. Shvetsov, K. Stack, R. Starr, C. Tate, V.I. Tret'yakov, A. Vostrukhin and the MSL Team, *Journal of Geophysical Research - Planets*, Vol. 119 (2014).
12. [A martian case study of segmenting images automatically for granulometry and sedimentology, Part 1: Algorithm](#), Suniti Karunatillake, Scott M. McLennan, Kenneth E. Herkenhoff, Jonathan M. Husch, **Craig Hardgrove**, J.R. Skok, *Icarus*, Vol. 229, pp. 400-407, (2014).
13. [A martian case study of segmenting images automatically for granulometry and sedimentology, Part 2: Assessment](#), Suniti Karunatillake, Scott M. McLennan, Kenneth E. Herkenhoff, Jonathan M. Husch, **Craig Hardgrove**, J.R. Skok, *Icarus*, Vol. 229, pp. 408-417, (2014).
14. [A Habitable Fluvio-Lacustrine Environment at Yellowknife Bay, Gale Crater, Mars](#), J. P. Grotzinger, D. Y. Sumner, L. C. Kah, K. Stack, S. Gupta, L. Edgar, D. Rubin, K. Lewis, J.

Schieber, N. Mangold, R. Milliken, P. G. Conrad, D. DesMarais, J. Farmer, K. Siebach, F. Calef III, J. Hurowitz, S. M. McLennan, D. Ming, D. Vaniman, J. Crisp, A. Vasavada, K. S. Edgett, M. Malin, D. Blake, R. Gellert, P. Mahaffy, R. C. Wiens, S. Maurice, J. A. Grant, S. Wilson, R. C. Anderson, L. Beegle, R. Arvidson, B. Hallet, R. S. Sletten, M. Rice, J. Bell III, J. Griffes, B. Ehlmann, R. B. Anderson, T. F. Bristow, W. E. Dietrich, G. Dromart, J. Eigenbrode, A. Fraeman, **C. Hardgrove**, K. Herkenhoff, L. Jandura, G. Kocurek, S. Lee, L. A. Leshin, R. Leveille, D. Limonadi, J. Maki, S. McCloskey, M. Meyer, M. Minitti, H. Newsom, D. Oehler, A. Okon, M. Palucis, T. Parker, S. Rowland, M. Schmidt, S. Squyres, A. Steele, E. Stolper, R. Summons, A. Treiman, R. Williams, A. Yingst, MSL Science Team, *Science*, Vol. 343, no. 6169, (2014).

15. [Neutron background environment measured by the Mars Science Laboratory's Dynamic Albedo of Neutrons instrument during the first 100 sols](#), I. Jun, I. Mitrofanov, M. L. Litvak, A. B. Sanin, W. Kim, A. Behar, W. V. Boynton, L. DeFlores, F. Fedosov, D. Golovin, **C. Hardgrove**, K. Harshman, A. S. Kozyrev, R. O. Kuzmin, A. Malakhov, M. Mischna, J. Moersch, M. Mokrousov, S. Nikiforov, V. N. Shvetsov, C. Tate, V. I. Tret'yakov and A. Vostrukhin, *Journal of Geophysical Research - Planets*, Vol. 118, 11, pp. 2400-2412, (2013).
16. [MAHLI \(Mars Hand Lens Imager\) at the Rocknest Sand Shadow: Science and Science-enabling Activities](#), Michelle Minitti, Linda Kah, R. Yingst, Kenneth Edgett, Robert Anderson, Luther Beegle, Joseph Carsten, Robert Deen, Walter Goetz, **Craig Hardgrove**, David Harker, Kenneth Herkenhoff, Joel Hurowitz, Louise Jandura, Megan Kennedy, Gary Kocurek, Gillian Krezoski, Stephen Kuhn, Daniel Limonadi, Leslie Lipkaman, Morten Madsen, Timothy Olson, Matthew Robinson, Scott Rowland, David Rubin, Calina Seybold, Juergen Schieber, Mariek Schmidt, Dawn Sumner, Vandana Tompkins, Jason Van Beek, Tessa Van Beek, *Journal of Geophysical Research - Planets, Results from the First 100 Sols of the Mars Science Laboratory Mission: Bradbury Landing Through Rocknest*, Special Issue, (2013).
17. [Evidence for episodic alluvial fan formation in far western Terra Tyrrhena, Mars](#), Rebecca M.E. Williams, A. Deanne Rogers, Matthew Chojnacki, Joseph Boyce, Kimberly D. Seelos, **Craig Hardgrove**, Frank Chuang, *Icarus*, Vol. 221, pp. 222-237, (2011).
18. [Reexamining the relationship between Apollinaris Patera and the basalts of the Gusev crater plains, Mars](#), Nicholas Lang, Harry Y. McSween Jr., Livio L. Tornabene, **Craig J. Hardgrove**, *Journal of Geophysical Research*, Vol. 115, E04006, (2010).
19. [Surface and subsurface composition of the Life in the Atacama Field Sites from Rover Data and Orbital Image Analysis](#), Jennifer L. Piatek, **Craig Hardgrove**, Jeffrey E. Moersch, Darrel M. Drake, Michael B. Wyatt, Michael Rampey, Orion Carlisle, Kim Warren-Rhodes, James M. Dohm, Andrew N. Hock, Nahalie A. Cabrol, David S. Wettergreen, Edmond A. Grin, Guillermo Chong Diaz, Peter Coppin, Shmuel Weinstein, Charles S. Cockell, Lucia Marinangeli, Gian Gabriele Ori, Trey Smith, Dominic Jonak, Michael Wagner, Kristen Stubbs, Geb Thomas, Erin Pudenz, and Justin Glasgow, *Journal of Geophysical Research*, Vol. 112, (2007).

20. [Life in the Atacama: Searching for life with rovers \(science overview\)](#), Nathalie A. Cabrol, David Wettergreen, Kim Warren-Rhodes, Edmond A. Grin, Jeffrey Moersch, Guillermo Chong Diaz, Charles S. Cockell, Peter Coppin, Cecilia Demergasso, James M. Dohm, Lauren Ernst, Gregory Fisher, Justin Glasgow, **Craig Hardgrove**, Andrew N. Hock, Dominic Jonak, Lucia Marinangeli, Edwin Minkley, Gian Gabriele Ori, Jennifer Piatek, Erin Pudenz, Trey Smith, Kristen Stubbs, Geb Thomas, David Thompson, Alan Waggoner, Michael Wagner, Shmuel Weinstein, Michael Wyatt *Journal of Geophysical Research*, Vol. 112, (2007).
21. [Life in the Atacama: A scoring system for habitability and the robotic exploration for life](#), Andrew N. Hock, Nathalie A. Cabrol, James M. Dohm, Jennifer Piatek, Kim Warren-Rhodes, Shmuel Weinstein, David S. Wettergreen, Edmond A. Grin, Jeffrey Moersch, Charles S. Cockell, Peter Coppin, Lauren Ernst, Gregory Fisher, **Craig Hardgrove**, Lucia Marinangeli, Edwin Minkley, Gian Gabriele Ori, Alan Waggoner, Mike Wyatt, Trey Smith, David Thompson, Michael Wagner, Dominic Jonak, Kristen Stubbs, Geb Thomas, Erin Pudenz, Justin Glasgow, *Journal of Geophysical Research*, Vol. 112, (2007).

II. Selected Conference Abstracts

1. Suzanne F Nowicki, Katherine Mesick, Daniel D.S. Coupland, Nicholas A. Dallmann, William C Feldman, Laura C. Stonehill, Craig Hardgrove, Steven Dibb, Travis S. J. Gabriel and Stephen West. Constraining the Origin of Phobos with the Elpasolite Planetary Ice and Composition Spectrometer (EPICS) – Simulated Performance, AGU P54B-10 (2017)
2. Bethany L Ehlmann, Kenneth S Edgett, Brad Sutter, Cherie Achilles, Maxim L Litvak, Mathieu Gaetan Andre Lapotre, Robert J Sullivan Jr, Abigail A Fraeman, Raymond E Arvidson, David Frederick Blake, Nathan Thomas Bridges, Pamela Gales Conrad, Agnes Cousin, Robert T Downs, Travis S. J. Gabriel, Ralf Gellert, Victoria E Hamilton, Craig J Hardgrove, Jeffrey Roy Johnson, Stephen Kuhn, Paul R Mahaffy, Sylvestre Maurice, Pierre-Yves Meslin, Michael McHenry, Douglas W Ming, Michelle Elaine Minitti, John Morookian, Richard V Morris, Catherine O'Connell-Cooper, Patrick Claude Pinet, Scott Kaniela Rowland, Susanne Schröder, Kirsten L Siebach, Nathaniel Stein, Lucy M Thompson, David Vaniman, Ashwin R Vasavada, Danika F Wellington, Roger C Wiens and Albert Yen. The Sands of the Bagnold Dunes, Mars and Volatiles in Mars Soils, AGU P51H-10 (2017)
3. Abigail Fraeman, Candice Bedford, John Bridges, Lauren A Edgar, Craig Hardgrove, Briony H. N. Horgan, Travis S. J. Gabriel, John P Grotzinger, Sanjeev Gupta, Jeffrey Roy Johnson, Elizabeth B Rampe, Richard V Morris, Mark R Salvatore, Susanne P Schwenzer, Kathryn Stack, Patrick Claude Pinet, David M Rubin, Catherine M Weitz, Danika F Wellington, Roger C Wiens, Amy J Williams and Ashwin R Vasavada, Curiosity at Vera Rubin Ridge: Testable Hypotheses, First Results, and Implications for Habitability
4. C. Hardgrove, B. L. Ehlmann. Achieving Visionary Planetary Science Goals with Deep Space CubeSats. Planetary Science Vision 2050 Workshop, Abstract #8183 (2017)

5. S. West, C. Hardgrove, R. Starr, E. B. Johnson, J. Christian, A. Genova, A. Colaprete, D. Nelson. LunaH-Map Miniature Neutron Spectrometer Response Over Neutron Suppressed Regions. 48th Lunar and Planetary Science Conference, Abstract #2909 (2017)
6. B. L. Ehlmann, S. S. Johnson, B. Horgan, P. B. Niles, E. S. Amador, P. D. Archer, S. Byrne, C. S. Edwards, A. A. Fraeman, D. P. Glavin, T. D. Glotch, C. Hardgrove, P. O. Hayne, E. S. Kite, N. L. Lanza, M. G. A. Lapotre, J. Michalski, M. Rice, A. D. Rogers. Mars Exploration Science in 2050. Planetary Science Vision 2050 Workshop, Abstract #8236 (2017)
7. C. G. Tate, J. Moersch, B. Ehresmann, I. Jun, C. Hardgrove, M. Litvak, I. Mitrofanov, P. Bellutta, W. V. Boynton, F. Fedosov, D. Golovin, K. Harshman, D. Hassler, A. Kozyrev, A. Malakhov, M. Mokrousov, S. Nikiforov, A. B. Sanin, A. Vostrukhin. Refined Water Equivalent Hydrogen Estimates Using Passive Data from the MSL Dynamic Albedo of Neutrons Experiment: Sols 0–753. 48th Lunar and Planetary Science Conference, Abstract #1455 (2017).
8. T. S. J. Gabriel, C. Hardgrove, M. Litvak, I. Mitrofanov, W. V. Boynton, F. Fedosov, D. Golovin, I. Jun, M. Mischna, C. G. Tate, J. Moersch, K. Harshman, A. S. Kozyrev, A. Malakhov, M. Mokrousov, S. Nikiforov, A. B. Sanin, A. Vostrukhin, P. D. Archer Jr., H. B. Franz, L. Thompson, MSL Science Team. Bulk Hydrogen Content of High-Silica Rocks in Gale Crater with the Active Dynamic Albedo of Neutrons Experiment. 48th Lunar and Planetary Science Conference, Abstract #2875 (2017).
9. LunaH-Map (Lunar Polar Hydrogen Mapper): Orbital Neutron Spectroscopy from a 6U CubeSat, C. Hardgrove, J.F. Bell III, R. Starr, A. Colaprete, M. Robinson, D. Drake, I. Lazbin, G. West, E.B. Johnson, J. Christian, A. Genova, D. Dunham, B. Williams, D. Nelson, A. Babuscia, P. Scowen, K.M. Cheung, A. Klesh, M. Tsay, S. Stem, E. Cisneros, H. Kerner, S.T. West, R.J. Amzler, Z. Burnham, S. Puckett, N. Barba, M. Beasley, *3rd COSPAR Symposium (2017)*.
10. To the Moon in a Shoebox: Engineering the Lunar Polar Hydrogen Mapper, S. West, C. Hardgrove, I. Lazbin, A. Babuscia, D. Nelson, and the LunaH-Map Team, *Interplanetary Small Satellite Conference (2017)*.
11. The Lunar Polar Hydrogen Mapper (LunaH-Map) Mission: Revealing Hydrogen Distributions at the Moon's Pole with a 6U CubeSat, **C. Hardgrove**, J. Bell, J. Thangavelautham, A. Klesh, R. Starr, T. Colaprete, M. Robinson, D. Drake, E. Johnson, J. Christian, A. Genova, D. Dunham, B. Williams, D. Nelson, A. Babuscia, P. Scowen, K.M. Cheung, M. Beasley, T. McKinney, A. Taits, V. Hernandez, P. Wren, A. Thoesen, A. Godber, *21st Improving Space Operations Workshop, Exploring Space Using Game-Changing Approaches (2015)*.
12. Lunar Polar Hydrogen Mapper (LunaH-Map), **C. Hardgrove**, J. Bell, J. Thangavelautham, A. Klesh, R. Starr, T. Colaprete, M. Robinson, D. Drake, E. Johnson, J. Christian, A. Genova, D. Dunham, B. Williams, D. Nelson, A. Babuscia, P. Scowen, K.M. Cheung, M. Beasley, T. McKinney, A. Taits, V. Hernandez, P. Wren, A. Thoesen, A. Godber, *International Small Satellite Conference (2015), Abstract A3*.

13. [Detecting High Manganese Phases in Curiosity Mastcam Multispectral Images and Chemcam Passive Visible to Near Infrared Spectra](#), **C. Hardgrove**, J. Johnson, N. Lanza, M. Rice, J. Bell, K. Kinch, D. Wellington, R. Arvidson, A. Godber, *46th Lunar and Planetary Science Conference (2015)*, Abstract #2748
14. [Modeling of Mars Science Laboratory Curiosity's Dynamic Albedo of Neutrons Instrument Data Using Elemental Geochemistry](#), **C. Hardgrove**, J. Moersch, I. Mitrofanov, M. Litvak, A. Behar, W. V. Boynton, L. Deflores, D. Drake, F. Fedosov, D. Golovin, I. Jun, K. Harshman, A. S. Kozyrev, A. Malakhov, R. Milliken, R. O. Kuzmin, M. Mischna, M. Mokrousov, S. Nikiforov, A. B. Sanin, C. Tate, A. Varenikov, *45th Lunar and Planetary Science Conference (2014)*, Abstract #1664
15. Visible and near-infrared spectra of manganese oxides: Detecting high manganese phases in Curiosity Mastcam multispectral images, **Craig Hardgrove**, Nina Lanza, James Bell, Melissa Rice, Roger Wiens, Jeffrey Johnson, Richard Morris, MSL Science Team (2014) *Eos Trans. AGU, Fall Meet. Suppl.*, Abstract P34A-07
16. DAN Active Parameters and Mastcam Hydration Survey Imaging: Comparisons Across Yellowknife Bay, Gale Crater, Mars, **Craig J. Hardgrove**, Melissa S. Rice, Jeffrey Moersch, Igor G. Mitrofanov, Maxim Litvak, Danika F. Wellington, Alberto Behar, James F. Bell, William V. Boynton, Lauren DeFlores, Darrell Drake, Fedor Fedosov, Dmitry Golovin, Insoo Jun, Karl Harshman, Alexander Kozyrev, Alexey Malakhov, Ralph Milliken, Ruslan Kuzmin, Michael A. Mischna, Maxim Mokrousov, Sergey Nikiforov, Anton Sanin, Christopher Tate, MSL Science Team (2013) *Eos Trans. AGU, 89(53), Fall Meet. Suppl.*, Abstract P23B
17. Chlorine and Hydrogen Contents from the First 90 Sols of MSL DAN Active Measurements, **C. J. Hardgrove**, J. Moersch, D. Drake, I. G. Mitrofanov, M. Litvak, A. Behar, W. V. Boynton, L. Deflores, F. Fedosov, D. Golovin, I. Jun, K. Harshman, A. S. Kozyrev, A. Malakhov, R. Milliken, R. O. Kuzmin, M. Mischna, M. Mokrousov, S. Nikiforov, A. B. Sanin, C. Tate, A. Varenikov, and the MSL Science Team (2013) *44th Lunar and Planetary Science Conference*, Abstract #1752
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