

Kenneth Hart Williford

Deputy Project Scientist, NASA Mars 2020 rover mission

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Education:

- 2007: Ph.D., Earth and Space Sciences (certificate in Astrobiology)
University of Washington, Seattle, WA
Biogeochemistry of the Triassic–Jurassic boundary
- 2000: M.S., Geological Sciences, University of Washington, Seattle, WA
*Strontium/calcium thermometry in the Caribbean reef coral *Siderastrea siderea**
- 1998: B.S., Natural Resources *cum laude* University of the South, Sewanee, TN

Professional Experience:

- 2014-present: Deputy Project Scientist, NASA Mars 2020 rover mission
- 2014-present: Co-Investigator, SHERLOC instrument, NASA Mars 2020 rover mission
- 2013-present: Visiting Associate, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California
- 2012-present: Research Scientist, Jet Propulsion Laboratory, Pasadena, CA
- 2013-2014: Strategic Surface Sampling Scientist, NASA Mars Science Laboratory mission
- 2014-2016: Collaborator, Sample Analysis at Mars instrument, NASA Mars Science Laboratory mission
- 2013-2016: Science Team Member, NASA Mars Science Laboratory mission
- 2010-2012: Research Associate, Dept of Geoscience and Astrobiology Research Consortium, University of Wisconsin, Madison, WI
- 2007-2009: Research Associate, Western Australian Organic and Isotope Geochemistry Centre, Dept of Chemistry, Curtin University, Perth, Western Australia
- 2005-2007: NSF IGERT Fellow, University of Washington Astrobiology Program
- 2003-2005: Research Assistant, Dept of Earth and Space Sciences, University of Washington
- 2002-2003: Information Architect, Verisign Inc., Savannah, GA
- 2001: Geologist, Hall, Blake & Associates, Nashville, TN
- 2000-2001: Earth science, life science and math teacher: Good Hope School, St. Croix, USVI
- 1998-2000: Teaching Assistant, Dept of Geological Sciences, University of Washington

Teaching:

- 2000-2001: Good Hope School, St. Croix, USVI: Earth science, life science and mathematics
- 1998-2000: University of Washington: Geobiology, Invertebrate Paleontology, Dinosaurs, Introduction to Geology

Student Supervision:

- 2017-: Kelsey Moore, Ph.D. candidate, Massachusetts Institute of Technology
- 2017-: Joyce Yager, Ph.D. candidate, University of Southern California
- 2017-: Peter Wynn, undergraduate intern, University of Southern California
- 2016-: Ashley Berg, Ph.D. candidate, University of Tennessee
- 2015-: Amanda Allen, undergraduate intern, Santa Barbara City College
- 2015-: Lorenia Alejandra, undergraduate intern, Santa Ana College

2014-: Katrine Hansen, Ph.D. candidate, University of Copenhagen
 2014-: Jeffery Osterhout, M.S. University of Cincinnati, Ph.D. candidate UCLA
 2013-: Adam Hoffman, ongoing undergraduate internship, University of N. Arizona
 2016: Brandy Coats, undergraduate intern, University of California–Riverside
 2016: Erica Gaspari, undergraduate intern, Montana State University
 2016: Meika Nwaomah, STAR teacher intern
 2015: Ellie Hara, undergraduate intern, University of Southern California
 2015: Emily Ross, undergraduate intern, Carleton College
 2015: Kari Finstad, Ph.D. candidate, University of California, Berkeley
 2014: Kira Lorber, Ph.D. candidate, University of Cincinnati
 2014: Jorge Orbay, undergraduate intern, Columbia University
 2014: Isis Frausto-Vicencio, undergraduate intern, UCLA
 2014: Emily Meany, undergraduate intern, Caltech
 2008-2009: Salem Abogllila, Ph.D., Department of Applied Chemistry, Curtin University

Professional Societies:

2005–present: Geological Society of America
 2011–present: American Geophysical Union
 2011–present: Geochemical Society

Outreach and Service:

2017: Von Karman Lecture, *Mars 2020, or There and Back Again*
https://www.jpl.nasa.gov/events/lectures_archive.php?year=2017&month=11
 2015-: Technical advisory board, Boundaries of Life Initiative, Templeton Foundation
 2014: Donald Foster Hewett Seminar Series on The Origin of Life, Lehigh University, invited presentation “Looking for life on Mars (on Earth)”
 2014-: Editorial Board, *Geobiology*
 2012: Invited presentation at Explore: Life on Mars, Madison, Wisconsin
 2011: Imagine Mars: 6 week NASA/NEA program with Akira Toki Middle School
 2011: Astrobiology in Your Back Yard: outreach stations in Madison, Wisconsin
 2010: Astrobiology night at the ballpark with the Madison Mallards
 2008: Contributed a segment on the Triassic extinctions to the Animal Planet television program entitled “Animal Armageddon”
 2008: Conducted an outreach trip to the Pilbara to present an overview of astrobiology to the Port Hedland school and lead the students and teachers of the Marble Bar High School to an Archean stromatolite locality
 2007: Designed and led “Discover Smoke Farm,” a 48h event on a former dairy farm in the foothills of the Cascades including a BioBlitz and a day for young (age 6-10) students from Seattle to explore biodiversity in the field
 2007: Interviewed at Walcott Quarry for a segment on the Burgess Shale, part of the History Channel television program “How Life Began”
 2006: Graduate student representative to Astrobiology faculty position search committee, University of Washington
 2005: Curriculum committee member, Department of Earth and Space Sciences, University of Washington
 2005: Invited speaker, Northwest Geological Society
 2004: Technology committee member, Department of Earth and Space Sciences, University of Washington
 2004-2007: Project AstroBio: astrobiology-themed outreach with Seattle school teachers

Peer-Reviewed Publications:

- Williford, K.H., K.A. Farley, K.M. Stack, A.C. Allwood, D. Beaty, L. Beegle, R. Bhartia, A.J. Brown, M. de la Torre Juarez, S.-E Hamran, M.H. Hecht, J. Hurowitz, J.A. Rodriguez-Manfredi, S. Maurice, S. Milkovich, R.C. Wiens, The NASA Mars 2020 rover mission and the search for extraterrestrial life, in press. In: *From Habitability to Life on Mars*, Cabrol, N.A., and E.A. Grin, eds., Chapter 11, Elsevier.
- Ishida, A., Kitajima, K., Williford, K.H., Tuite, M.L., Kakegawa, T., Valley, J.W., 2018. Simultaneous in situ analysis of carbon and nitrogen isotope ratios in organic matter by secondary ion mass spectrometry, in press. *Geostandards and Geoanalytical Research*.
- Finstad, K.M., Pfeiffer, M., McNicol, G., Tuite, M., Williford, K.H., Amundson, R., A late Quaternary paleoenvironmental record in sand dunes of the northern Atacama Desert, Chile, in press. *Quaternary Research*.
- Flannery, D., Allwood, A.C., Summons, R.E., Williford, K.H., Abbey, W., Matys, E.D., Ferralis, N., 2018. Spatially-resolved isotopic study of carbon trapped in ~3.43 Ga Strelley Pool Formation stromatolites. *Geochemica et Cosmochimica Acta* 223: 21-35. (<https://doi.org/10.1016/j.gca.2017.11.028>).
- Abbey, W.J., Bhartia, R., Beegle, L.W., DeFlores, L., Paez, V., Sijapati, K., Williford, K., Tuite, M., Hug, W., Reid, R., 2017. Deep UV Raman spectroscopy for planetary exploration: The search for in situ organics. *Icarus* 290: 201-214 (<http://doi.org/10.1016/j.icarus.2017.01.039>).
- Izon, G., Zerkle, A.L., Williford, K.H., Farquhar, J., Poulton, S.W., Claire, M.W., 2017. Biologic regulation of atmospheric chemistry en route to planetary oxygenation. *Proceedings of the National Academy of Sciences of the United States of America* 114: E2571-2579 (<http://dx.doi.org/10.1073/pnas.1618798114>).
- Haddad, E.E., Tuite, M.L., Martinez, A.M., Williford, K.H., Boyer, D.L., Droser, M.L., Love, G.D., 2016. Lipid biomarker stratigraphic records through the Late Devonian Frasnian/Famennian boundary: Comparison of high- and low-latitude epicontinental marine settings. *Organic Geochemistry* 98: 38-53 (<http://dx.doi.org/10.1016/j.orggeochem.2016.05.007>).
- Schoepfer, S.D., Algeo, T.J., Ward, P.D., Williford, K.H., Haggart, J.W., 2016. Testing the limits in a greenhouse ocean: Did low nitrogen availability limit marine productivity during the end-Triassic mass extinction? *EPSL* 451: 138-148 (<http://dx.doi.org/10.1016/j.epsl.2016.06.050>).
- Tuite, M.L., Flannery, D.T., Williford, K.H., 2016. Organic geochemistry of a high-latitude Lower Cretaceous lacustrine sediment sample from the Koonwarra Fossil Beds, South Gippsland, Victoria, Australia. *Memoirs of Museum Victoria* 74: 73-79. (https://museumvictoria.com.au/pages/381429/073-079_MMV74_Tuite_2_WEB.pdf)
- Stack, K.M., Edwards, C.M., Grotzinger, J.P., Gupta, S., Sumner, D.Y., Calef, F.J. III, Edgar, L.A., Edgett, K.S., Fraeman, A.A., Jacob, S.R., Le Deit, L., Lewis, K.W., Rice, M.S., Rubin, D., Williams, R.M.E., Williford, K.H., 2016. Comparing orbiter and rover image-based mapping of an ancient sedimentary environment, Aeolis Palus, Gale Crater, Mars. *Icarus* 280: 3-21 (<http://dx.doi.org/10.1016/j.icarus.2016.02.024>).
- Morag, N., Williford, K.H., Kitajima, K., Philippot, P., Van Kranendonk, M.J., Lepot, K., Thomazo, C., Valley, J.W., 2016. Microstructure-specific carbon isotopic signatures of organic matter

from ~3.5 Ga cherts of the Pilbara Craton support a biologic origin. *Precambrian Research* 275: 429-449 (<http://dx.doi.org/10.1016/j.precamres.2016.01.014>).

Williford, K.H., Ushikubo, T., Lepot, K., Kitajima, K., Hallmann, C., Spicuzza, M.J., Kozdon, R., Eigenbrode, J.L., Summons, R.E., Valley, J.W., 2016. Carbon and sulfur isotopic signatures of ancient life and environment at the microbial scale: Neoproterozoic shales and carbonates. *Geobiology* 14: 105-128 (<http://dx.doi.org/10.1111/gbi.12163>).

Kasprak, A.H., Sepúlveda, J., Price-Waldman, R., Williford, K.H., Schoepfer, S.D., Haggart, J.W., Ward, P.D., Summons, R.E., Whiteside, J.H., 2015. Episodic photic zone euxinia in the northeastern Panthalassic Ocean during the end-Triassic extinction. *Geology* 43: 307-310 (<http://dx.doi.org/10.1130/G36371.1>).

Schopf, J.W., Kudryavstev, A.B., Walter, M.R., Van Kranendonk, M.J., Williford, K.H., Kozdon, R., Valley, J.W., Gallardo, V.A., Espinoza, C., Flannery, D.T., 2015. A fossil sulfur-cycling microbiota from the 1.8 Ga Duck Creek Formation provides promising evidence of evolution's null hypothesis. *Proceedings of the National Academy of Sciences of the United States of America* 112: 2087-2092 (<http://dx.doi.org/10.1073/pnas.1419241112>).

Mahaffy, P.R. (and 26 others), 2015. The imprint of atmospheric evolution in the D/H of Hesperian clay minerals on Mars. *Science* 347: 412-414 (<http://dx.doi.org/10.1126/science.1260291>).

Ushikubo, T., Williford, K.H., Farquhar, J., Johnston, D.T., Van Kranendonk, M.J., Valley, J.W., 2014. Development of in situ sulfur four-isotope analysis with multiple Faraday cup detectors by SIMS and application to pyrite grains in a Paleoproterozoic glaciogenic sandstone. *Chemical Geology* 383: 86-99 (<http://dx.doi.org/10.1016/j.chemgeo.2014.06.006>).

Williford, K.H., Grice, K., Holman, A., McElwain, J., 2014. An organic record of terrestrial ecosystem collapse and recovery at the Triassic–Jurassic boundary in East Greenland. *Geochimica et Cosmochimica Acta* 127: 251-263 (<http://dx.doi.org/10.1016/j.gca.2013.11.033>).

Farley, K.A. (and 33 others), 2013. In situ radiometric and exposure age dating of the martian surface. *Science* 343: published online 9 December 2013 (<http://dx.doi.org/10.1126/science.1247166>).

Lepot, K., Williford, K.H., Ushikubo, T., Sugitani, K., Mimura, K., Spicuzza, M.J., Valley, J.W., 2013. Texture-specific isotopic compositions in 3.4 Gyr old organic matter support selective preservation in cell-like structures. *Geochimica et Cosmochimica Acta* 112: 66-86 (<http://dx.doi.org/10.1016/j.gca.2013.03.004>).

Williford, K.H., Ushikubo, T., Schopf, J.W., Lepot, K., Kitajima, K., Valley, J.W., 2013. Preservation and detection of microstructural and taxonomic correlations in the carbon isotopic compositions of individual Precambrian microfossils. *Geochimica et Cosmochimica Acta* 104: 165-182 (<http://dx.doi.org/10.1016/j.gca.2012.11.005>).

Williford, K.H., Van Kranendonk, M.J., Ushikubo, T., Kozdon, R., Valley, J.W., 2011. Constraining atmospheric oxygen and seawater sulfate concentrations during Paleoproterozoic glaciation: in situ sulfur three-isotope microanalysis of pyrite from the Turee Creek Group, Western Australia. *Geochimica et Cosmochimica Acta* 75: 5686-5705 (<http://dx.doi.org/10.1016/j.gca.2011.07.010>).

- Williford, K.H., Grice, K., Logan, G.A., Chen, J., Huston, D., 2011. The molecular and isotopic effects of hydrothermal alteration of organic matter in the Paleoproterozoic McArthur River Pb/Zn/Ag ore deposit. *Earth and Planetary Science Letters* 301:382-392 (<http://dx.doi.org/10.1016/j.epsl.2010.11.029>).
- Aboglila, S., Grice, K., Trinajstic, K., Snape, C., Williford, K.H., 2011. The significance of 24-norcholestanes, 4-methylsteranes and dinosteranes in oils and source-rocks from East Sirte Basin (Libya). *Applied Geochemistry* 26: 1694-1705 (<http://dx.doi.org/10.1016/j.apgeochem.2011.04.026>).
- Aboglila, S., Grice, K., Dawson, D., Williford, K.H., 2010. Use of biomarker distributions and compound specific isotopes of carbon and hydrogen to delineate hydrocarbon characteristics in the East Sirte Basin (Libya). *Organic Geochemistry* 41:1249-1258 (<http://dx.doi.org/10.1016/j.orggeochem.2010.05.011>).
- Zonneveld, J.P., Beatty, T.W., Williford, K.H., Orchard, M.J., McRoberts, C.A., 2010. Stratigraphy and sedimentology of the lower Black Bear Ridge section, British Columbia: candidate for the base-Norian GSSP. *Stratigraphy* 7(1): 61-82.
- Aboglila, S., Grice, K., Trinajstic, K., Dawson, D., Williford, K., 2010. A geochemical evaluation of thermal maturity and depositional paleoenvironments of seven Cretaceous formations from the East Sirte Basin (Libya). *LPI Petroleum Research Journal* (in press).
- Williford, K.H., Foriel, J., Ward, P.D., Steig, E.J., 2009. Major perturbation in sulfur cycling at the Triassic/Jurassic boundary. *Geology* 37(9): 835-838 (<http://dx.doi.org/10.1130/G30054A.1>).
- Grice, K., Lu, H., Atahan, P., Asif, M., Hallmann, C., Greenwood, P., Maslen, E., Tulipani, S., Williford, K.H., Dodson, J., 2009. New insights into the origin of perylene in geological samples. *Geochimica et Cosmochimica Acta* 73(21): 6531-6543 (<http://dx.doi.org/10.1016/j.gca.2009.07.029>).
- Ward, P., McRoberts, C., Williford, K. Reply to comment on: "The organic carbon isotopic and paleontological record across the Triassic-Jurassic boundary at the candidate GSSP section at Ferguson Hill, Muller Canyon, Nevada, USA" by Ward et al. (2007). *Palaeogeography, Palaeoclimatology, Palaeoecology* 273(1-2): 205-206 (<http://dx.doi.org/10.1016/j.palaeo.2008.01.002>).
- Williford, K.H., Ward, P.D., Garrison, G.H., Buick, R., 2007. An extended stable organic carbon isotope record across the Triassic-Jurassic boundary in the Queen Charlotte Islands, British Columbia, Canada. *Palaeogeography, Palaeoclimatology, Palaeoecology* 244(1-4): 290-296 (<http://dx.doi.org/10.1016/j.palaeo.2006.06.032>).
- Ward, P.D., Garrison, G.H., Williford, K.H., Kring, D., Goodwin, D., Beattie, M., McRoberts, C., 2007. The organic carbon isotopic and paleontological record across the Triassic-Jurassic boundary at the candidate GSSP section at Ferguson Hill, Muller Canyon, Nevada, USA. *Palaeogeography, Palaeoclimatology, Palaeoecology* 244(1-4): 281-289 (<http://dx.doi.org/10.1016/j.palaeo.2006.06.042>).

Conference Presentations:

- Tuite, M.L., Williford, K.H., 2017. Ocean acidification and the $\delta^{15}\text{N}$ record of Paleozoic epeiric seas. American Geophysical Union Fall Meeting, B21A-1952.

- Abakians, H., Donnellan, A., Chapman, B.D., Williford, K.H., Francis, R., Ehlmann, B.L., Smith, A.T., 2017. Using small UAS for mission simulation, science validation, and definition. American Geophysical Union Fall Meeting, NH31A-0207.
- Ishida, A., Kitajima, K., Williford, K.H., Kakegawa, T., Valley, J.W., 2017. Development of Simultaneous in situ Analysis of Carbon and Nitrogen Isotope Ratios in the Organic Matter by Secondary Ion Mass Spectrometry, American Geophysical Union Fall Meeting, PP41B-1293.
- Skoog, E.J., Tuite, M.L., Williford, K.H., 2017. Organic Adsorption Capacity of Aluminum for Potential Mars Sample Return Contamination Analysis, American Geophysical Union Fall Meeting, P41B-2833.
- Beegle, L. *and 19 others* including Williford, K.H., 2017. SHERLOC on Mars 2020. American Geophysical Union Fall Meeting, P43G-01.
- Figuroa, M.C., Gregory, D.D., Lyons, T.W., Williford, K.H., 2017. Isotopic and elemental chemistry of sedimentary pyrite: A combined analytical and statistical approach to a novel planetary biosignature, P43G-07.
- Williford, K.H., 2017 (invited). Spatially resolved biosignature analysis and the search for signs of ancient life in the solar system. Goldschmidt 2017, Paris, France.
- Bontognali, T., Al-Saad Al-Kuwari, H., McKenzie, J., Al-Disi, Z., Williford, K., Vasconcelos C., Petrash, D., Sadooni, F., Tuite, M., Dittrich, M. A geobiological model for the formation of dolomite in sabkha environments. Goldschmidt 2017, Paris, France.
- DiLoretto, Z., Al-Kuwari, H., Al-Disi, Z., McKenzie, J., Vasconcelos, C., Palermo, C., Williford, K., Sadooni, F., Tuite, M., Bontognali, T., Dittrich, M., 2017. Dolomite formation within microbial mats in the coastal Khor Al-Adaid sabkha of Qatar. Goldschmidt 2017, Paris, France.
- Lepot, K., Williford, K., Philippot, P., Thomazo, C., Ushikubo, T., Kitajima, K., Valley, J.W., 2017. Isotope microanalyses of 2.72 Ga organic matter: metabolism versus diagenesis versus matrix effects. Goldschmidt 2017, Paris, France.
- Williford, K.H., Farley, K.A., Mars 2020 Project Science Group, Mars 2020 Landing Site Working Group, 2017. An update on development and landing site selection for the NASA Mars 2020 rover mission. Astrobiology Science Conference 2017, Mesa, AZ USA.
- Beegle, L.W., Bhartia, R., Carrier, B., DeFlores, L., Abbey, W., Asher, S., Burton, A., Fries, M., Conrad, P., Clegg, S., Edgett, K.S., Ehlmann, B., Hug, W., Reid, R., Kah, L., Neelson, K., Nelson, T., Minitti, M., Popp, J., Langenhorst, F., Sobron, P., Steele, A., Wiens, R., Williford K., Yingst, R.,A., 2017. The SHERLOC investigation for Mars 2020. Astrobiology Science Conference 2017, Mesa, AZ USA.
- Hipkin, V.J., Beaty, D.W., Hansen, R., Hausrath, E.M., Maggiori, C., McCoubrey, R., Parrish, J., Ralston, S.J., Williford, K., CanMars Science Team, Validating Accuracy of Rover-Based Sample Selection Approaches with a Field Validation Team: Returned Sample Analysis and Relevance to Mars 2020. Astrobiology Science Conference 2017, Mesa, AZ USA.
- Manning-Berg, A.R., Tuite, M., Williford, K., Czaja, A.D., Kah, L.C. Exceptional Preservation of Biomarkers in the 1.2 Ga Angmaat Formation Chert, Bylot Supergroup, Baffin Island. Astrobiology Science Conference 2017, Mesa, AZ USA.

- Bontognali, T.R.R., Al Disi, Z.A., McKenzie, J.A., Al-Kuwari, H.A.S., Vasconcelos, C., Williford, K.H., Strohmenger, C.J., Sadooni, F., Rivers, J.M., Palermo, C., Dittrich, M., 2016. Modern dolomite formation in the Dohat Faishakh sabkah, Qatar. Dolomieu Conference.
- Williford, K.H., 2015. Automated imaging techniques for biosignature detection in geologic samples. American Geophysical Union Fall Meeting. B21A-0405.
- Finstad, K., Tuite, M., Williford, K., Amundson, R., 2015. Molecular and isotopic signs of life and climate in the hyperarid Atacama desert. American Geophysical Union Fall Meeting. B21A-0407.
- Izon, G., Zerkle, A., Farquhar, J., Williford, K.H., Poulton, S., Claire, M., 2015. Clarifying the haze: Biological control as an atmospheric primer for the GOE? Goldschmidt Conference. 1401.
- Williford, K.H., Ushikubo, T., Sugitani, K., Lepot, K., Kitajima, K., Mimura, K., Valley, J.W., 2015. A sulfur four-isotope signature of Paleoarchean metabolism. Astrobiology Science Conference 7275.
- Morag, N., Williford, K.H., Kitajima, K., Philippot, P., Van Kranendonk, M.J., Lepot, K., Valley, J.W., 2015. Microstructure-specific carbon isotopic signature of organic matter supports biological origin in the ~3.5 Ga cherts of the Pilbara Craton. Astrobiology Science Conference 7186.
- Hays, L.E., Beaty, D.W., Williford, K.H., Farley, K.A., 2015. Astrobiology input to landing site selection for Mars 2020: An in-situ exploration and sample caching rover. Astrobiology Science Conference 7624.
- Williford, K.H., Allwood, A., Beegle, L., Bhartia, R., Flannery, D., Hoffmann, A., Mora, M., Orbay, J., Petrizzo, D., Tuite, M., Willis, P., 2014. Sample Return Science. American Geophysical Union Fall Meeting. P21D-3962.
- Beegle, L., Bhartia, R., DeFlores, L., Asher, S., Burton, A., Clegg, S., Conrad, P., Edgett, K., Ehlmann, B., Langenhorst, F., Fries, M., Nealson, K., Popp, J., Sobron, P., Steele, A., Wiens, R., Williford, K., 2014. SHERLOC: Scanning Habitable Environments With Raman & Luminescence for Organics & Chemicals, an Investigation for 2020. American Geophysical Union Fall Meeting. P24A-06.
- Mora, M., Tuite, M., Hoffmann, A., Willis, P., Williford, K., 2014. New Method for Detection of Organosulfur Biosignatures in Mars-Analog Terrestrial Sedimentary Facies. P21D-3965.
- Williford, K.H., Eigenbrode, J., Hallmann, C., Kitajima, K., Kozdon, R., Summons, R.E., Kudryavstev, A., Lepot, K., Schopf, J.W., Spicuzza, M., Sugitani, K., Ushikubo, T., Lepot, K., Van Kranendonk, M.J., Valley, J., 2013. In situ, spatially resolved biosignature detection at the microbial scale. American Geophysical Union Fall Meeting. P44B-05.
- Williford, K.H., Eigenbrode, J., Hallmann, C., Kitajima, K., Kozdon, R., Summons, R.E., Kudryavstev, A., Lepot, K., Schopf, J.W., Spicuzza, M., Sugitani, K., Ushikubo, T., Lepot, K., Van Kranendonk, M.J., Valley, J., 2013. In situ, spatially resolved biosignature detection at the microbial scale. International Biogeoscience Conference, Nagoya, Japan.
- Williford, K.H., Ushikubo, T., Schopf, J.W., Lepot, K., Kitajima, K., Valley, J., 2012. In situ carbon isotope analysis of microbial fossils. Astrobiology Science Conference, Atlanta, Georgia.

- Williford, K.H., Ushikubo, T., Lepot, K., Kitajima, K., Spicuzza, M.J., Hallmann, C., Eigenbrode, J., Summons, R.E., Valley, J., 2012. In situ carbon and sulfur isotope analysis of Archean organic matter and pyrite. Astrobiology Science Conference, Atlanta, Georgia.
- Williford, K.H., Ushikubo, T., Lepot, K., Kitajima, K., Spicuzza, M.J., Hallmann, C., Eigenbrode, J., Summons, R.E., Valley, J., 2011. In situ carbon isotope analysis of Archean organic matter with SIMS. American Geophysical Union Fall Meeting. B21E-0323.
- Grice, K., Nabbefeld, B., Maslen, E., Jarula, C., Holman, A., Melendez, I., Tulipani, S., Twitchett, R., Hays, E., Summons, R.E., Mella, L., Williford, K.H., McElwain, J., Böttcher, M., 2011. Exploring mass extinctions and their association with global warming events from multiproxy biomarker and isotopic approaches. American Geophysical Union Fall Meeting. B14D-05.
- Grice, K., Nabbefeld, B., Hays, L., Williford, K.H., Holman, A., Summons, R.E., McElwain, J., Böttcher, M., 2011. Exploring mass extinction events (Triassic/Jurassic and Permian/Triassic): association with global warming events. International Meeting of Organic Geochemistry.
- Tulipani, S., Grice, K., Greenwood, P., Lockhart, R., Asif, M., Williford, K.H., Schimmelmann, A., 2011. The significance of novel A-norsteranes and perylene in Devonian reefs and crude oils. International Meeting of Organic Geochemistry.
- Tulipani, S., Grice, K., Greenwood, P., Lockhart, R., Asif, M., Williford, K.H., 2011. The significance of perylene and low molecular weight norsterane biomarkers in Devonian reefs (Canning Basin, WA) and associated crude oils. Australia New Zealand Microcirculation Society.
- Grice, K., Nabbefeld, B., Twitchett, R., Summons, R.E., Hays, L., Williford, K.H., Holman, A., McElwain, J., Böttcher, M., 2011. Exploring mass extinction events – using biomarkers & stable isotopes (carbon and hydrogen). Australia New Zealand Microcirculation Society.
- Kasprak, A.H., Sepulveda, J., Price-Waldman, R., Williford, K.H., Whiteside, J.H., Summons, R.E., 2011. Anoxia Precedes the end-Triassic Mass Extinction: Evidence from the Kennecott Point Formation, British Columbia. American Geophysical Union Fall Meeting. B11B-0483.
- Williford, K.H., Van Kranendonk, M.J., Ushikubo, T., Kozdon, R., Spicuzza, M.J., Valley, J.W., 2011. Transitional oxygenation recorded in the Paleoproterozoic Turee Creek Group, Western Australia. Goldschmidt 2011. Prague, Czech Republic.
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