Lynda B. Williams

Arizona State University, School of Earth and Space Exploration, Tempe, AZ 85287-1404
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Research Interests: Biogeochemistry, stable isotopes, clay mineralogy, chemical interactions of fluids, minerals, microbes and organic compounds in sediments, with applications in hydrocarbon exploration, environmental issues, medical geology and origins of life.

Education:
Ph.D. (2000) Geochemistry, The University of Calgary (Alberta, Canada)
M.S. (1984) Geology, Dartmouth College (Hanover, NH, USA)
A.B. (1980) Geology, Smith College (Northampton, MA, USA)
Field (1979) Geology Field Camp, Cardwell, MT (Indiana University)

Awards/ Honors:
17th George Brown Honorary Lecturer, invited by the Clay Minerals Group (Min. Soc. Great Britain and Ireland), 2016
M.L. Jackson mid career-award from the Clay Minerals Society, 2009
Elected Fellow of the Geological Society of America, 2006
Elected Councilor Clay Minerals Society, 2006
John Kendall Doctoral Thesis Honorable Mention 2001
ICGS Best Dissertation, U of C 2000
International Clay Conference, Best paper, Ottawa, Ontario 1997
Sigma Xi Scientific Research Honor Society since 1980
AMAX Exploration Scholarship 1979
Thomas Logue Academic College Scholarship 1976

Professional Societies:
American Association of Petroleum Geologists
American Geophysical Union
Clay Minerals Society
Geochemical Society
Geological Society of America, Geology and Health Division
International Medical Geology Association
Mineralogical Society of America

Work Experience:

2009 -present Research Professor, School of Earth ad Space Exploration, ASU
- Manager of the Secondary Ion Mass Spectrometry Facility at ASU (since 2007)

2003 -2009 Associate Research Professor, School of Earth and Space Exploration, ASU.
1994 - 2003 Faculty Research Associate, Center for Solid State Science, ASU.
1991-1994 Faculty Research Assistant, Department of Geology, ASU.
1985 - 1991 Research Associate, Basin Research Institute, Louisiana State University.
1984 - 1985 Environmental Science Div., Argonne National Laboratory, Argonne IL.
1983 - Field work in the Selwyn Basin,Yukon Territory, Canada.
- Experience in measuring section, core logging, sampling and geochemical evaluation of shale-hosted massive sulfide deposits.

1982 -1984 Teaching Assistant at Dartmouth College

- Instructed labs in physical geology, geochemistry, economic geology and a field course in ore deposits and volcanoes in Mexico

1980 -1982 Geologist for F.M. Beck Inc., Mineral Exploration Consultant, Yarmouth, ME.

Grants Funded:

Williams, L.B. (PI) Supplement: Antibacterial mineral mapping: A new economic geology. NSF Geochemistry and Geobiology, 9/30/2015 – 9/14/2017 ($70,000).

Shock, E., Gould, I., Williams, L. (Co-PI), 2/2014-1/2017. How minerals control hydrothermal organic reactivity. NSF OCE-MGG $448,932.

Hervig, R.L., Williams, P and Williams, L.B. (Co-PI), Facility Support: Arizona State University Secondary Ion Mass Spectrometry Laboratories. NSF-Instrumentation and Facilities 10/2014 – 09/2017. $1,049,881

Williams, L.B. (PI) Antibacterial mineral mapping: A new economic geology. NSF Geochemistry and Geobiology, 9/15/2011 – 9/14/2015 ($379,775).

Everett Shock (PI), I. Gould, H. Hartnett, J. Holloway and L. Williams (Co-PI's)

Organic Geochemical Transformations and the Deep Biosphere: Identifying the Food Sources for Microbes in Sedimentary Systems. NSF Emerging Topics in Biogeochemical Cycles 9/1/2008 – 8/31/2013 ($ 1,528,290)

Williams, P. et al., (2012) (L.Williams; Collaborator) Acquisition of a Nanosims 50L Imaging Secondary Ion Mass spectrometer. ($3,266,911)

Williams, L.B. and Hervig, R.L. (2013) CLAS award, seed funding for pilot study on using boron and lithium isotopes for tracing hydrocarbon sources. $10,000.

Hervig, R.L., Williams, P and Williams, L.B. (Co-PI), 2010, Facility Support: Arizona State University Secondary Ion Mass Spectrometry Laboratory. 2/1/2010 – 6/1/2013 ($909,546)

Sandra Pizzarello (PI) and Lynda Williams (Co-PI) 2007 – 2009 Meteorite organics: Tracers of molecular asymmetry in Cosmochemistry NASA-Goddard Space Flight Center 018820-001 ($36,000)

Williams, L.B. (PI), Haydel, S. Co-PI (ASU Biodesign Inst.), Dennis Eberl (USGS), Ross Giese (SUNY Buffalo), 2006-2009 Assessing a clay mineral alternative antibiotic treatment for Buruli ulcer. National Institutes of Health, National Center for Complementary and Alternative Medicine ($438,970)

Williams, L.B. (PI) and Hervig, R.L. (Co-PI) 2004-2008, A SIMS study of the chemical dynamics of organic/inorganic interactions in sedimentary basins. Lithium Isotopes. U.S. Dept. of Energy, Renewal Grant DE-FG02-04ER15505 ($400,254)

Williams, L.B. (P.I.) and Hervig, R.L. (Co-P.I.) 2004-2007 Intra-crystalline boron isotope fractionation in illite/smectite: a geothermometer and paleo-fluid indicator. National Science Foundation Geology and Paleontology EAR-0229583 ($281,945)

Williams, L.B. (P.I.), 2002-2003 Smectite incubation of organic molecules in seafloor hydrothermal systems. Polymerization of organic compounds by kinetic pathways of smectite illitization. NSF Small Grant for Exploratory Research ($50,000)

Williams, L.B. (P.I.) and Hervig, R.L. (P.D.), 2000-2003, A SIMS study of the chemical dynamics of organic/inorganic interactions in sedimentary basins. U.S. Dept. of Energy, Renewal Grant #DE-FG03-94ER14414 ($315,106)

Williams, L.B. (P.I.) and Hervig, R.L. (Co-P.I.) 2001-2002 Boron isotopes in illite/smectite, a potential low temperature geothermometer. NSF Small Grant for Exploratory Research ($30,000)

Hervig, R.L. (P.I.) and Williams, L.B. (Co-P.I.), 1997-2000 Chemical Dynamics of Hydrocarbon Reservoirs Investigated by Secondary Ion Mass Spectrometry. U.S. Dept. of Energy, Renewal Grant #DE-FG03-94ER14414 ($364,326)

Hervig, R.L. (P.I.) and Williams, L.B. (Co-P.I.), 1995-1996 A Microanalytical (SIMS) Study of the Trace Element and Isotopic Geochemistry of Diagenetic Silicates Supplemental Funds, U.S. Department of Energy, Grant #DE-FG03-94ER14414, Supplement ($29,046)

Hervig, R.L. (P.I.) and Williams, L.B. (Co-P.I.), 1993-1996 A Microanalytical (SIMS) Study of the Trace Element and Isotopic Geochemistry of Diagenetic Silicates, U.S. Department of Energy, Grant #DE-FG03-94ER14414, ($180,000)

Williams, L.B. (P.I.) 1991-1993, Organic/Inorganic Interactions of Nitrogen in Oilfields, Part1: Geochemistry, U.S. Department of Energy, Grant # DE-FG02-91ER14218, ($107,975)

Williams, L.B. (P.I.) 1991, Continuing Research Grant for Analytical Expenses, LSU, Basin Research Institute, ($5000)

Williams, L.B. (P.I.) and Ferrell, R.E. (P.D.), 1991, Fourier Transform Infrared Spectrometer System, LSU Basin Research Institute, ($20,000)

Williams, L.B. (P.I.) and Ferrell, R.E. (P.D.), 1987-1990, Ammonium Silicate Diagenesis and its Influence on the Interpretation of Fixed-Ammonium as an Exploration Tool, U.S. Department of Energy, Grant #DE FG05-87ER13748, ($183,349)

Patents:

M14-078P (10/28/2013) Boron and lithium isotopic method for tracing hydrocarbons and their by-products. Lynda B. Williams and Richard L. Hervig, Arizona Technology Enterprise, ASU Provisional Patent.

WO 2010/141070 A1 (9/12/2010) Synthetic antibacterial clay compositions and method of using same. Inventors: Lynda B. Williams, Dennis D. Eberl, Dave W. Metge, Alex E. Blum and Ronald W. Harvey. USGS Patent.

Manuscripts in progress:

Williams, L.B. (submitted) Geomimicry: Harnessing the antibacterial action of clays, *Clay Minerals* (invited Review honoring George Brown).

Martos-Villa, R., Pilar Mata, M., Williams, L.B., FNieto , F., Arroyo Rey, X. and Ignacio Sainz-Díaz, C.I. (accepted with revisions) Evidence of hydrocarbon-rich fluid interaction with clays: Clay mineralogy and boron isotope data from Gulf of Cádiz mud volcano sediments. *American Mineralogist*.

Yang, Z.*, Gould, I., Hartnett, H., Shock, E., Williams, L. (in prep.) Green organic oxidations using geomimicry. *Chemical Communications*

Clauer, N., Williams, L.B., Honty, M. (in prep.) Boron and lithium isotope geochemistry of East Slovak Basin oil and gas fields. *Chemical Geology. (Review 2016)*

Bobos, Iuliu, Williams, L.B. and Clauer, N. (in revision) Boron, lithium and nitrogen isotopes of hydrothermal tobelite from Harghita Bay, Romania, *Geochim. Cosmochim. Acta.*

Pauly, B. D., Williams, L. B., Hervig, R. L., Zierenberg, R. A., and Schiffman, P. (in revision) Insights into environmental controls on palagonitization revealed using SIMS microanalysis for boron and its isotopes. *Clays and Clay Minerals*.

Morrison, K.D., Williams, S.N. and Williams, L.B. (in prep.) The anatomy of an antibacterial clay deposit: A new economic geology. *Economic Geology* (2016)

Morrison, K.D. and Williams, L.B (invited) Review of what makes clays antibacterial? *Medical Research Archives*.

Londoño, S.C. and Williams, L.B. (in prep.) The antibacterial action of Al and transition metals in a lacustrine clay from the Colombian Amazon. *Environmental Science and Technology* (2016).

Refereed Publications: (*denotes student co-author)

51. *Morrison, K. D., Misra, R. and Williams, L.B. (2016) Unearthing the Antibacterial Mechanism of Medicinal Clay: A Geochemical Approach to Combating Antibiotic Resistance. Nature Sci. Rep. 5, 19043; doi: 10.1038/srep19043.

50. Williams, L.B. Elliott, W.C. and Hervig, R.L. (2015) Tracing hydrocarbons in gas shale using boron and lithium isotopes: Denver Basin USA, Wattenberg Gas Field. *Chemical Geology* 417:404-413. http://dx.doi.org/10.1016/j.chemgeo.2015.10.027

49. *Londoño, S.C. and Williams, L.B. (2015) Unraveling the antibacterial mode of action of a clay from the Colombian Amazon *Environmental Geochemistry and Health*. DOI 10.1007/s10653-015-9723-y.

48. *Yang, Ziming; *Lorance, E.D., *Bockisch, C., Williams, L. B., Hartnett, H. E., Shock, E.L., Gould, I. R. (2014) Hydrothermal Photochemistry as a Mechanistic Tool in Organic Geochemistry. The Chemistry of Dibenzylketone. J. Organic Chemistry **79**: 7861-7871. dx.doi.org/10.1021/jo500899x.

47. *Shipp, Jessie A., Gould, Ian R., Shock, Everett L., Williams, Lynda B. and Hartnett, Hilairy E. (2014) Sphalerite is a geochemical catalyst for carbon-hydrogen bond activation. Proceedings of the National Academy of Science **111**: 32: 11642-11645. www.pnas.org/cgi/doi/10.1073/pnas.1324222111.

46. Williams, Lynda B. and Hillier, Stephen (2014) Kaolins and Health: from first grade to first aid. *Elements, an International Magazine of Mineralogy, Geochemistry and Petrology*, invited chapter. July 2014, **10**: 207-211.

45. *Pauly, B., Williams, L.B., Hervig, R.L., Schiffman, P., Zierenburg, R. (2014) Methods for in-situ SIMS microanalysis of boron and its isotopes in palagonite. *Clays and Clay Minerals.* **62**: 3: 224-234.

44. Clauer, N., Williams, L.B., Fallick, A.E. (2014) Genesis of nanometric illite crystals elucidated by light-element (hydrogen, lithium, boron and oxygen) isotope tracing, and K-Ar and Rb-Sr dating, *Chemical Geology*, **383**: 26 – 50. http://dx.doi.org/10.1016/j.chemgeo.2014.05.025

43. *Morrison, K.D., Underwood, J.C., Metge, D.W., Eberl, D.D. and Williams, L.B. (2014) Mineralogical variables that control the antibacterial effectiveness of a natural clay deposit. *Environmental Geochemistry and Health*. **36**: 4: 613-631.

42. Williams, L.B., Środoń, J., Huff, W., Clauer, N. and Hervig, R.L. (2013) Light element distributions in Baltic Basin bentonites: Potential for tracing hydrocarbons. *Geochimica et Cosmochimica Acta* **120**: 582-599.

41. Pizzarello, S., *Davidowski, S., Holland, G.P., Williams, L.B. (2013) Processing of meteoric organic materials as a possible analog of early molecular evolution in planetary environments. Proc. Nat. Acad. Sci. **110**: 39: 15614-15619.

40. *Shipp, J., Gould, I., Williams, L.B, Shock, E. Hartnett, H.E., (2013) Organic Functional Group Transformations in Water at Elevated Temperature and Pressure: Reversibility, Reactivity, and Mechanisms. *Geochimica et Cosmochimica Acta* **104**: 194-209.

39. *Ziming Yang, Gould, I.R., Williams, L.B., Hartnett, H.E. and Shock, E.L. (2012) The central role of ketones in reversible and irreversible hydrothermal organic functional group transformations. *Geochimica et Cosmochimica Acta* **98**: 48-65.

38. Pizzarello, S. and Williams L.B. (2012) Ammonia in the early solar system: an account from carbonaceous meteorites. Astrophysical Journal. **749**: 161-166.

37. Williams, L.B., Clauer, N.C. and Hervig R.L. (2012) *Light stable isotope microanalysis of clays in sedimentary rocks.* In (Paul Sylvester, ed.) Quantitative mineralogy and microanalysis of sediments and sedimentary rocks. Mineralogical Association of Canada Short Course **42**: 55-73.

36. *Nele Muttik, Kalle Kirsimäe, Horton E. Newsom, Lynda B. Williams (2011) Boron isotope composition of secondary smectite in suevites at the Ries crater, Germany: implications for the origin of alteration fluids. *Earth and Planetary Science Letters*, **310**: 244-251.

35. Williams, L.B., Metge, D.W., Eberl, D.D., Harvey, R.W., *Turner, A.G., Prapaipong, P., Poret-Peterson, A.T. (2011) What makes natural clays antibacterial? *Environmental Science and Technology*, **45**: 3768-3773.

34. Pizzarello, Sandra, Williams, Lynda B., Lehman, Jennifer, Holland, Gregory and Yarger, Jeffery L. (2011) Ammonia in primitive asteroids: a case for exobiology. *Proceedings of the National Academy of Science*, **108**: 11: 4303-4306.

33. Williams, L.B., Holloway, J.R., *Canfield, B., Glein, C., Dick, J., Hartnett, H. Shock, E. (2010) Birth of biomolecules from the warm wet sheets of clays near spreading centers, In *Earliest Life on Earth*, Sue Golding and Miryam Glikson eds., Springer Publishing (invited chapter).

32. Williams, L.B. and Haydel, S.E. (2010) Evaluation of the medicinal use of clay minerals as antibacterial agents, *International Geology Review*, **52**: (7/8): 745-770.

31. Williams, L.B., Haydel, S.E. and Ferrell, R.E, Bentonites, Bandaids and Borborygmi, (2009) Invited paper for *Elements, an International Magazine of Mineralogy, Geochemistry and Petrology*. Special Issue on Bentonites, edited by Derek Bain, **5**: 2: 99-102.

30. Williams, L.B., Haydel, S.E., Giese, R.F. and Eberl, D.D. (2008) Chemical and mineralogical characteristics of French green clays used for healing. *Clays and Clay Minerals* **56**: 4: 437-452.

29. Haydel, S.E. *Remenih, C.M. and Williams, L.B. (2008) Broad-spectrum in vitro antibacterial activities of clay minerals against antibiotic-susceptible and antibiotic-resistant bacterial pathogens. *Journal of Antimicrobial Chemotherapy*, 61, 353-361.

28. Williams, L.B. (2007) Clay mineral stable-isotope geochemistry. *Euroclay Conference Proceedings*. Aveiro, Portugal. July 23-27, 2007. Invited lectures, p.42-51.

27. Williams, L.B., *Turner, A. and Hervig, R.H. (2007) Intracrystalline boron isotope partitioning in illite-smectite: Testing the geothermometer, *American Mineralogist*, **92**: 1958-1965.

26. *Yabuta, H., Williams, L.B., Cody, G.D., Alexander C.M.O'D. and Pizzarello, S., (2007) The insoluble carbonaceous material of CM chondrites: A possible source of discrete organic compounds under hydrothermal conditions, *Meteoritics & Planetary Science*, **42**: 37-48.

25. Williams, L.B. and Hervig, R.L. (2006) Crystal size dependence of illite-smectite isotope equilibration with changing fluids. *Clays and Clay Minerals* **54**: 531-540.

24. *Michalski, J.R., *Kraft, M.D., Sharp, T.G., Williams, L.B. and Christensen, P.R. (2006) Emission spectroscopy of clay minerals and evidence for poorly crystalline aluminosilicates on Mars from TES data. J. Geophys. Res.-Planets, **111**: E3004: 14p.

23. Williams, L.B., and Hervig, R.L. (2005) Lithium and boron isotopes in illite/smectite: The importance of crystal size. *Geochim. et Cosmochim. Acta* **69**: 24: 5705-5716.

22. Williams, L.B., *Canfield, B.C. *Voglesonger, K.M, and Holloway J.R., 2005. Organic compounds in a primordial womb. *Geology*, **33**: 11: 913-916.

21. *Michalski, J.R., *Kraft, M.D., Sharp, T.G., L.B. Williams, P.R. Christensen (2005) Mineralogical constraints on the high silica Martian surface component observed by TES. *Icarus* **174**: 161-177.

20. Williams, L.B., and Hervig, R.L. (2004) Boron isotope composition of coals: A potential tracer of organic contaminated fluids. *Applied Geochemistry* **19**: 1625-1636.

19. Williams, L.B., Holland, M., Eberl, D.D., T. Brunet and L. Brunet de Courssou (2004) Killer Clays! Natural antibacterial clay minerals. Feature article. (Invited) London *Mineralogical Society Bulletin*, **139**: 3-8.

18. Williams, L.B. and Hervig, R.L. (2002) Intracrystalline boron isotope variations in clay minerals: a potential low-temperature single mineral geothermometer. Invited paper. *American Mineralogist* **87**: 1564-1570.

17. Hervig, R.L., Moore, G.M., Williams, L.B., Peacock, S.M., Holloway, J.R., and Roggensack, K.R. (2002) Isotopic and elemental partitioning of boron between hydrous fluid and silicate melt. *American Mineralogist Letter*, **87**:769-774.

16. Williams, L.B., Weiser, M.E., Hutcheon, I., and Hervig, R.L. (2001) Application of boron isotopes to understanding fluid/rock interactions in a hydrothermally stimulated oil-reservoir in the Alberta basin, Canada. *Geofluids* **1**: 229-240.

15. Williams, L. B., Hervig, R. L., Holloway, J. R., and Hutcheon, I. (2001) Boron isotope geochemistry during diagenesis: Part 1. Experimental determination of fractionation during illitization of smectite. *Geochimica Cosmochimica Acta* **65**: 11: 1769-1782.

14. Williams, L.B., Hervig, R.L., and Hutcheon, I. (2001) Boron isotope geochemistry during diagenesis: Part 2. Applications to organic-rich sediments. *Geochimica et Cosmochimica Acta* **65**: 11: 1783-1794.

13. Williams, L.B., Hervig, R.L., Wieser, M.E., and Hutcheon, I. (2001) The influence of organic matter on the boron isotope geochemistry of the Gulf Coast Sedimentary Basin, USA, *Chemical Geology*, **174**: 445-461.

12. Williams, L.B., Hervig, R.L. and Bjørlykke, K., 1997. New evidence for the origin of quartz cements in hydrocarbon reservoirs revealed by oxygen isotope microanalyses, *Geochimica et Cosmochim Acta* **61**: 12: 2529-2538.

11. Williams, L.B., Hervig, R.L., and Dutton, S.P. (1997) (Invited), Constraints on paleofluid compositions through microanalyses of diagenetic quartz in the Travis Peak Fm, Eastern Texas. In *Basinwide Diagenetic Patterns: Integrated Petrologic, Geochemical and Hydrologic Considerations*. Society of Economic Paleontologists and Mineralogists Special Publication 57, p. 269-280.

10. Hervig, R.L., Williams, L.B., Kirkland, I. and Longstaffe, F.J. (1995) Oxygen Isotope Microanalyses of Diagenetic Quartz: Possible Low Temperature Occlusion of Pores *Geochimica et Cosmochimica Acta* **59**: 12:2537-2543.

9. Williams, L.B., Ferrell, R.E. Jr., Hutcheon, I., Bakel, A.J. Walsh, M.M. and Krouse, H.R. (1995) Nitrogen isotope geochemistry of organic matter and minerals during diagenesis and hydrocarbon migration. *Geochimica et Cosmochimica Acta* **59**: 4: 765-779.

8. Williams, L. B., Wilcoxon, B.R., Ferrell, R.E. Jr., and Sassen, R. (1992) Diagenesis of ammonium during hydrocarbon maturation and migration, Wilcox Group, Louisiana, USA, *Applied Geochemistry* **7**: 123-134.

7. Compton, J.S., Williams, L.B., and Ferrell, R.E.Jr. (1992) Mineralization of organogenic ammonium in the Monterey Formation, Santa Maria and San Joaquin Basins, California, *Geochimica et Cosmochimica Acta* **56**: 1979-1991.

6. Williams, L.B. and Ferrell, R.E. Jr. (1991) Ammonium substitution in illite during maturation of organic matter: *Clays and Clay Minerals* **39** (4): 400 - 408.

5. Williams, Lynda B., Ferrell, Ray E., Chinn, Elizabeth W., and Sassen, Roger, (1989) Fixed-ammonium in clays associated with crude oils, *Applied Geochemistry* **4** (6): 605-616.

4. Williams, Lynda B., Ferrell, Ray E., and Carpenter, Paul K. (1988) CHEMOD: an automated chemical and modal analysis technique, *American Mineralogist* **73**: 1457-1464.

3. Williams, L.B., Zantop, H., and Reynolds, R.C. (1987) Ammonium silicates associated with sedimentary exhalative ore deposits: a geochemical exploration tool, *Journal of Geochemical Exploration* **27**:125-141.

2. Hull, A.B. and Williams, L.B. (1985) The geochemistry of brine in rock salt under temperature gradients and gamma-radiation fields; a selective bibliography, *Argonne National Laboratory, Technical Memorandum*, 73 p.

1. Benton, L.B. (previous name) (1984) NH_4-geochemistry near sedimentary exhalative deposits in the Selwyn Basin: a possible exploration tool, *Yukon Exploration and Geology J. 1983*, Jim Morin (ed.), Whitehorse, Yukon, p. 45-54.

Recent Abstracts / Presentations:

Williams, L.B. (2016) Geomimicry: Harnessing the antibacterial action of clays. Plenary Lecture (invited) for the 8th Mid-European Clay Conference, Kocise Slovakia, July 4-8, 2016.

Williams, L.B., (2016) How to identify antibacterial clays. Clay Minerals Society 53rd Annual Meeting, Atlanta, GA June 5-8, 2016.

Williams, L.B., Morrison, K.D., Eberl, D.D. and Williams, S.N. (2015) The anatomy of an antibacterial clay mine. Euroclay Conference, Edinburgh, Scotland, July 2-8, 2015.

Williams, L.B., and Bose, M. (2015) Characterizing the contents of nanopores in black shale using Nano-Secondary Ion Mass Spectrometry (SIMS) Euroclay Conference, Edinburgh, Scotland July 2-8, 2015.

Morrison, K.D. and Williams, L.B. (2015) Unearthing the antibacterial activity of medicinal clays; the role of metal toxicity. Euroclay Conference, Edinburgh, Scotland

Williams, L.B., (2015) The mystery of antibacterial clays: a story of mud, metals and metabolic malfunction. International Applied Geochemistry Conference, Tucson, Az.

Londoño, S.C. and Williams, L.B., (2015) Evaluating the antibacterial action of a clay from the Colombian Amazon. International Applied Geochemistry Conference, Tucson, Az.

Londoño, S.C. and Williams, L.B. (2015) Evidence for clay mineral sorption of bacterial nutrients causing growth inhibition. Geological Society of America Annual Meeting, Baltimore, MD.

Bockish, C.D., Williams, L.B., Hartnett, H.E., Shock, E.L., Gould, I.R. (2015) Dehydration and deoxygenation of organic compounds under hydrothermal conditions: Geomimicry. Geological Society of America Annual Meeting, Baltimore, MD.

Johnson, K.N., Williams, L.B., Gould, I.R., Hartnett, H.E., Shock, E.L. (2015) Mineral-assisted organic transformations of carboxylic acids at hydrothermal conditions. Geological Society of America Annual Meeting, Baltimore, MD.

Johnson, K., Gould, I, Williams, L., Hartnett, H., Shock, E. (2015) Hydrothermal mineral-assisted organic transformations of carboxylic acids. Astrobiology Science Conference, 2015, Chicago, Il.

Hartnett, H., Shipp, J., Yang, Z., Williams, L., Gould, I., Shock, E. (2015) Minerals can be catalysts for organic reactions in hydrothermal environments (invited). American Chemical Society, Geochemistry Division, 249th national Meeting, March 22-26, Denver, CO.

Londono, S.C. and Williams, L.B. (2014) The cell-clay separation and elemental composition analysis applied to antibacterial clay research. Geological Society of American Annual Meeting, Vancouver, B.C. Oct. 19-23, 2014.

Williams, L.B., Bose, M., Anderson, J.R. (2014) Boron isotope measurements of oil shale and coal combustion products. Goldschmidt, Sacramento CA. June 9-13, 2014.

Morrison, K.D. and Williams, L.B. (2014) The antibacterial activity of minerals provides new insights on metal toxicity. Clay Minerals Society annual meeting, College Station, Texas. (2nd place award)

Londono, S.C. and Williams, L.B. (2014) Transmission electron microscopy in antibacterial clay investigations. Clay Minerals Society annual meeting, College Station, Texas.

Williams, L.B. and Hervig, R.L. (2013) Unconventional isotopes in unconventional oil shales. Clay Minerals Society 50th Anniversary meeting, Champaign-Urbana, IL, Oct 6-10, 2013.

Morrison, K.D. and Williams, L.W. (2013) Mineralogical and geochemical variations in an antibacterial clay deposit. Clay Minerals Society 50th Anniversary meeting, Champaign-Urbana, IL, Oct 6-10, 2013.

Londoño, S. C. and Williams, L.B., (2013) Evaluating the role of zeta potential in a natural antibacterial clay from the Colombian Amazon. Clay Minerals Society 50th Anniversary meeting, Champaign-Urbana, IL, Oct 6-10, 2013.

Martos-Villa, R., Campo, M.P.M., Williams, L.B., Nieto, F. and Sainz-Diaz, I. (2013) Clay mineralogy and B isotope data of mud volcano sediments of the Gulf of Cádiz: Evidence of interactions of hydrocarbon-rich fluids with clays at depth. Geophysical Research Abstracts, European Geophysical Union General Assembly 2013. Clay Minerals Society 50th Anniversary meeting, Champaign-Urbana, IL, Oct 6-10, 2013.

Williams, L.B. (2013) Healing clay processes. 5th International Medical Geology Association meeting, MEDGEO 2013, August 25-29, Arlington, VA.

Londoño, S. C., Williams, L.B. (2013) Exploratino of the cytotoxicity of antibacterial natural clay of lacustrine origin. 5th International Medical Geology Association meeting, MEDGEO 2013, August 25-29, Arlington, VA.

Morrison, Keith D.*; Williams, Lynda B. (2013) Antibacterial minerals: establishing an antibacrerial mechanism. 5th International Medical Geology Association meeting, MEDGEO 2013, August 25-29, Arlington, VA.

Morrison, K.D. and Williams, L.B., (2012) Evaluating the role of iron in antibacterial minerals. Geological Society of America Annual Meeting, Charlotte, NC, paper #212233.

Londoño, S. C. and Williams, L.B. (2012) Unraveling the mode of action for a natural antibacterial clay of lacustrine origin. Geological Society of America Annual Meeting Charlotte, NC, paper #213025.

Bruce D. Pauly, Lynda B. Williams, Richard L. Hervig, Robert A. Zierenberg, and Peter Schiffman (2012) Determination of geochemical characteristics of glass alteration environments using boron isotopes. American Geophysical Union Annual meeting, San Francisco, CA.

Morrison, K. and Williams, L.B. (2012) Interactions between antibacterial clays and bacteria: Determining the reactivity and geochemistry of transition metals. Clay Minerals Society Annual Meeting, Golden, CO.

Londoño, S. C. and Williams, L.B. (2012) Physical and chemical characterization of an antibacterial clay from the NW Amazon Basin: Implications for its mode of action. Clay Minerals Society Annual Meeting, Golden, CO.

Williams, L.B., Hervig, R.L. Środoń, J., Huff, W., Clauer, N (2012) Organic maturity and hydrocarbon migration recorded by nitrogen, boron and lithium trace eements and isotopes in authigenic illite from the Baltic Basin. Clay Minerals Society Annual Meeting, Golden, CO.

Williams, L.B., Clauer, N. and Hervig, R.L. (2012) Light stable isotope microanalysis of clays in sedimentary rocks. Geological Society of Canada-Mineralogical Society of Canada Annual Meeting, St. Johns, Newfoundland. May, 25-26. Invited Lecture for Short Course on Quantitative Mineralogy and Microanalysis of Sediments and Sedimentary Rocks.

Williams, L.B. and Hervig, R.L. (2011) The boron isotopic composition of elephant dung: Inputs to the global boron budget. American Geophysical Union Annual meeting, San Francisco. V13a 2582.

Williams, L.B. and Hervig,, R.L. (2011) What's all the stink about BO-? Using negative molecular ions to measure boron isotopes in samples with trace boron. American Geophysical Union Annual meeting, San Francisco. V13a 2581.

Yang, Z., Gould, I.R., Hartnett, H.E., Williams, L.B. Shock, E.L. (2011) Pathways and mechanisms for hydrothermal reactions of ketones. American Geophysical Union Annual meeting, San Francisco.

Shipp, J., Hartnett, H.E., Gould, I.R., Shock, E., Williams, L.B., (2011) Reversible interconvrsion between alkanes, alenes, alcohols and ketones under hydrothermal conditions. American Geophysical Union Annual meeting, San Francisco. V11b 2522.

Williams, L.B. (2011) Antibacterial Clays and their Potential for Medicinal Applications. GEOMED 2011, Bari Italy, Sept 20-25. Invited Plenary Lecture.

Bobos, I and Williams, (2011) L.B., Boron, lithium and nitrogen isotope geochemistry of K- and NH_4-rich illite/smectite clays in fossil hydrothermal systems. Goldschmidt Conference, Prague, Czech Republic, Mineralogical Magazine, Vol. 75 (3): 539.

Muttik, Nele, Kirsimae, Kalle, Newsom, Horton E. and Williams, Lynda B. (2011), Boron isotope composition of smectite in suevites at the Ries Crater, Germany. Lunar and Planetary Science Conference, Houston, Tx Abst. 2413.

Williams, L.B. (2010) What makes clay minerals antibacterial? Geological Society of America. Geological Society of America, Abstracts with Programs, Vol. 42, No. 5, p. 220

Williams, L.B., Hervig, R.L. and Srodon, J. (2010) Ex-situ studies of nanominerals by Secondary Ion Mass Spectrometry. Goldschmidt Conference, Knoxville Tennessee. June 13-18, 2010. Geochim. Cosmochim. Acta Supplement 74(12).

Holloway, J., Williams, L., Canfield, B., Dick, J., Glein, C. Hartnett, H. and Shock, E. (2010) Abiotic organic synthesis in clays. Goldschmidt Conference, Knoxville, TN, June 13-18. Geochim. Cosmochim. Acta Supplement 74(12).

Glein, C.R., Gould, I.R., Williams, L.B., Hartnett, H.E. and Shock, E.L. (2010) Mechanistic organic geochemistry of carboxylic acids. Goldschmidt Conference, Knoxville Tennessee. June 13-18, 2010. Geochim. Cosmochim. Acta Supplement 74(12).

Shipp, J.A., Hartnett, H.E., Gould, I.R., Shock, E.L. and Williams, L.B. (2010) Mineral effects on the interconversion between alkanes and alkenes in hydrothermal systems. Goldschmidt Conference, Knoxville Tennessee. June 13-18, 2010. Geochim. Cosmochim. Acta Supplement 74(12).

Yang, Z., Gould, I.R., Williams, L.B., Hartnett, H.E. and Shock, E.L. (2010) Reversible functional group interconversion in organic hydrothermal reactions; the central role of ketones. Goldschmidt Conference, Knoxville Tennessee. June 13-18, 2010. Geochim. Cosmochim. Acta Supplement 74(12).

Ross, D.K., Ito, M., Rao, M.N., Hervig, R., Williams, L.B., Nyquist, L.E. and Peslier, A., (2010) Jarosite in the Shergottite Que 94201. Lunar and Planetary Science Conference, Houston, Tx.

Metge, D.W., Harvey, R.W., Eberl, D.D., Wasylenki, L.E. and Williams, L.B. (2009) Evaluating the oxidation state of antibacterial minerals. Goldschmidt conference, Davos, Switzerland. Volume 73, Issue 13 Supplement 1, A875.

Williams, L.B. (2009) Stable isotopes of clay minerals archive organic sources. Invited lecture for the M.L. Jackson Mid-Career Award. 46th Annual Clay Minerals Society Meeting, abstract. Billings, Montana June 5-11.

Williams, L.B., Eberl, D.D., Metge, D.M. and Harvey, R.W. (2009) Mineralogical and chemical comparison of antibacterial clays. Abstract D5. 46th Annual Clay Minerals Society Meeting, abstract. Billings, Montana June 5-11.

Pauly, B.D., Williams, L.B., Hervig, R.E. and Schiffman, P. (2009) Boron behavior during seawater palagonitization revealed using SIMS microanalyses: implications for environmental control. 46th Annual Clay Minerals Society Meeting, abstract. Billings, Montana June 5-11.

Pizzarello, S. and Williams, L.B. (2009) Soluble organic species released from the insoluble carbonaceous material of a pristine CR2 meteorite. Lunar and Planetary Science Conference, Houston, TX.

Williams, L.B. and Hervig, R.L. (2008) SIMS analysis of illite isotopic systems during crystal growth: Application to gas exploration. Bi-annual geological SIMS workshop 5, Madison, Wisconsin, June 2008. Abstract for poster.

Williams, L.B., Elliott, C.W., Hervig, R.L. (2008) Tracing natural gas migration using boron and lithium isotopes, Goldschmidt Conference Proceedings, Abstract 593. Vancouver, B.C.

Spivak-Birndorf L. J., Wadhwa M. and Williams L. B. (2008) Boron isotopes in the nakhlites: Implications for crustal fluids on Mars. Geochimica et Cosmochimica Acta, 72, Supplement, A889.

Spivak-Birndorf L. J., Wadhwa M. and Williams L. B. (2008) Boron isotopic composition of igneous minerals and secondary alteration products in Nakhla. Ground Truth From Mars Conference, Abstract 4050.

Spivak-Birndorf L. J., Wadhwa M. and Williams L. B. (2008) The boron isotopic composition of Nakhla iddingsite. LPS XXXIX, Abstract #1904.

Rampe, E. B., Kraft, M. D., Sharp, T. G., Williams, L., and Turner, A. (2008) Characterization of Natural Mixed-Layer Illite/Smectite and Physical Mixtures of Illite and Smectite Using TIR and VNIR Spectroscopy: Are Mixed-Layer Clays on Mars?, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract P53B-1444.

Turner, A., Remenih, C., Haydel, S.E. and Williams, L.B. (2008) Comparing antibacterial clay properties in search of new medicinal applications, 45th Annual Clay Minerals Society of America Annual Meeting, New Orleans, April 5-10.

Haydel, S. E. and Williams, L.B. (2008) Broad-spectrum antibacterial activities of clay minerals. 45th Annual Clay Minerals Society of America Annual Meeting, New Orleans, April 5-10.

Invited Lectures:

Plenary Lecture (2016) Geomimicry: Harnessing the antibacterial action of clays. Plenary Lecture (invited) for the 8th Mid-European Clay Conference, Kosice Slovakia, July 4-8 2016.

University of Illinois, Chicago Colloquium, April 4, 2014. Hydrothermal experiments for calibrating stable isotopes of boron and lithium in clays: Applications for tracing hydrocarbons.

Univ. Illinois, Special Lecture: Antibacterial clays, April 5, 2014.

Clay Minerals Society, Unconventional isotopes in unconventional oil shale. 2013. 50th Anniversary of the Clay Minerals Society, session on Isotopes in Clays, organized by Fred Longstaffe.

U.S. Geological Survey, Lakewood, CO. July 10, 2012. Introducing antibacterial clay research; what makes natural clays antibacterial? Hosted by Geoff Plumlee, Minerals and Health Division.

GAC-MAC 2012, Keynote Lecture, Shortcourse on Quantitative Mineralogy and Microanalysis of Sediments. Mineralogical Association of Canada Workshop, Newfoundland, May 2012.

GEOMED 2011, Plenary Lecture for the International Medical Geology Association, Antibacterial Clays and their Potential for Medicinal Applications. Bari Italy, Sept 20-25 2011.

Astrobiology Seminar: 'Abiotic organic synthesis of biomolecules in clay' February, 2010, ASU.

ASU Seminar: 'Mineralogical and chemical comparison of antibacterial clays' Oct 29, 2010. Arizona State University.

Astrobiology Seminar: 'Boron isotopes in hydrocarbon systems; following the oil' March, 2010.

Plenary Lecture: Trace element and isotopic geochemistry of clays applied to research in energy, life and medicine. Clay Minerals Society, Jackson Lecture, June 2009.

Colloquium: Exploring chemical and physical properties of antibacterial clays. SUNY Buffalo Oct 23, 2008.

Colloquium: Volatile Light Elements in Baltic Basin Bentonites: Correlating Crystal Growth and Chemical Tracers for Hydrocarbon Exploration. Univ. New Mexico Nov. 16, 2007.

Invited Lecture, EUROCLAY Conference, Stable isotope geochemistry of clay minerals. Aveiro Portugal, July 23-27, 2007.

Colloquium: Exploring the chemical dynamics of organic interactions with clay minerals using stable isotopes. U. S. Geological Survey, Denver, CO, December, 2005.

Colloquium: Exploring the chemical dynamics of organic interactions with clay minerals using stable isotopes. University of California, Riverside, November 2005.

Colloquium: Trace element isotopic variations during burial reflecting illite growth in a matrix of smectite. Arizona State University, Tempe, March 2004.

Colloquium: Stable isotope tracers of environmental change: insights from the clay mineral record, SUNY Buffalo, Buffalo, New York, January 2003

Colloquium: Exploring new stable isotopic tracers of environmental change and subsurface fluid migration, Wellesley College, Wellesley Massachusetts, February 2003

Colloquium: Isotopes in nanospace: a new frontier for understanding organic/inorganic interplays in minerals, University of California, Davis, March, 2003

Informal Lecture: Origins of Life Between the Nanosheets? Investigation of a clay mineral incubator in seafloor hydrothermal systems, University of California, Davis, March, 2003

Informal Lecture: Textural analysis and potential surface and chemical properties of illite that may influence mycobacterial growth. Missillac, France, August, 2002.

Committees/Service:

University Committees:

SESE Post-Doc Committee (2015 - present)
Research Professor Committee (2015- present)
SESE Safety Officer 2010-2017
CLAS Committee on Excellence (2008-2009)
Advisory committee on ASU Facilities Cost-Benefits analysis (2008)

National/International Service:

Clay Minerals Society, Vice-president elect 2017.
Clay Minerals Society Annual Meeting 2016, Clays and Health Session Chair
Clay Minerals Society Ad Hoc committee on Journal merger.
Judge at the INTEL International Science Fair, Phoenix, AZ May 2016.
Session Chair, Bioreactive clay minerals: impacts on environmental and human health, 2015 Euroclay Conference, Edinburgh, Scotland. July 5-10,2015.
Panelist for National Science Foundation: Geobio. and Geochem., 2012 - 2016
Associate Editor, American Mineralogist, 2013-present
Chair, Membership committee, GSA Geology and Health Division, 2014-2016.
Chair, Student Grant committee, Clay Minerals Society, 2014-2016.
Technical Program Chair, 2013 Int. Medical Geology Association, MEDGEO conference, Washington, D.C.
Judge at the INTEL International Science Fair, Phoenix, AZ May 2013.
Panelist for NASA: MSL Participating Scientist Proposal Review, Fall 2011.
Clays and Clay Minerals Committee on Committees 2010-2011
Associate Editor: Clays and Clay Minerals 2008 – 2011
Chair, Membership committee 2007-2009, Clay Minerals Society
Geology and Health Division of the Geological Society of America (GSA), Denver
News editor, Clay Minerals Society newsletter in ELEMENTS, 2005-2006
Nominating committee for Clay Minerals Society 2006-2007
Chair, Bailey Award Committee, Clay Minerals Society 2006
Nominating committee for the Geology and Health Division of the GSA, 2006
Panelist for NSF Geobiology and Low Temperature Geochemistry, 2005
Elected Clay Minerals Society Council 2004-2007.
Clay Minerals Society 2003 Committee on Awards
Clay Minerals Society 2003 Ad Hoc fund raising committee for Reynolds scholarship

Reviewer for the following Journals:

Mineralogical Society of America, Clays and Clay Minerals, Clay Minerals, Applied Clay Science, Colloids and Surfaces B: Biointerfaces, Applied Geochemistry, Geochimica et Cosmochimica Acta, Chemical Geology, Earth and Planetary Science Letters, Geology, Journal of Hazardous Materials, Atmospheric Environment, Chemosphere, Environmental Science and Technology, Environmental Geochemistry and Health, Reviews in Mineralogy (MSA Series).

Public Recognition/Outreach:

2016
NSF Press Release
http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=137239&org=NSF Scientists discover how blue and green clays kill bacteria | NSF - National Science Foundation
www.nsf.gov
http://phys.org/news/2016-01-scientists-blue-green-clays-bacteria.html
+12 on-line articles
National Public Radio
http://science.kjzz.org/content/249809/asu-scientists-uncover-how-clay-can-kill-harmful-bacteria
2014

NSF Discovery Article
http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=132052&org=NSF
http://www.iflscience.com/health-and-medicine/minerals-clay-could-be-used-combat-antibiotic-resistance (over 50 on-line stories on this research).
Earth Magazine, News Notes, Antibacterial clays could fight superbugs, Sara Pratt.
ASU press release http://sese.asu.edu/node/1886 on Shipp et al., 2014 PNAS paper.
Physics Today, Physics Update, Oct., 2014. (Mark Wilson ed.)
Geochemical News: https://asunews.asu.edu/20140728-sphalerite-research
Earth and Space Exploration Day K-12 Outreach: Clays of our Lives, 2014
Organized Annual SIMS Workshop (Jan 8-10, 2014).

2013
Technical Program Director and Organizer of the International Medical Geology Association Meeting, Washington, D.C. August 25-19, 2013
Session Chair 2013 Clays and Health, Clays and Clay Minerals Society, 50th Anniversary, Champaign-Urbana Il.
Organized Annual SIMS Workshop (Jan 9-11, 2013).
Earth and Space Exploration Day K-12 Outreach: Clays of our Lives, 2013

2012
Organized Annual SIMS Workshop (Jan 4-6, 2012).
Earth and Space Exploration Day K-12 Outreach: Clays of our Lives, 2012
Session Chair for 2012 Clay Minerals Soc. Meeting, Clays and Health, Golden, CO.

2011
Organized Annual SIMS Workshop (Jan 5-7, 2011)
Earth and Space Exploration Day K-12 Outreach: Booth on Nano-minerals, 2011
2010
Managed Annual SIMS Workshop (Jan 12-14, 2010) for hands-on SIMS experience.
Earth and Space Exploration Day K-12 Outreach: Booth on Nano-minerals, 2010
2009
Organized symposium 'Drugstore in the Dirt' at the 2009 Annual CMS Meeting
Research Highlighted in Eurekalerts (written by Carol Hughes)
Highlighted in ASU Research Stories (written by Conrad Storad)
2008
Featured in Nov/Dec: *Phoenix Woman Magazine*, Editorial: Top Arizona Women Scientists
ACS Press release on antibacterial clays research. Associated press coverage. Jan 2008
Scientific American Article Jan. 2008
Geotimes Article, Feb. 2008
C&EN News article April, 2008
Arizona Republic and USA Today front page headlines
Symposium organizer, 'Clay Minerals and Health', 2008 Joint meeting of the Clay Minerals Society with Am. Chem. Soc., Geochemistry Division, New Orleans.
2007
Interview with Morning Star TV on 'healing clay' research
Salley Ride Fesitval, Clays and cosmetics (Middle school science class).
Interview with Biogeochemistry.org on Medicinal clay research

Symposium organizer, 'Beneficial aspects of minerals in public health' 2007

2006

Science News Media stories on Williams et al., Healing Clay research
Interview with School of Life Science Podcast.
Fellow of the Geological Society of America (2006) citation.
Nominated by: Dr. Lynn M. Walter (University of Michigan)

"Professor Lynda B. Williams is nominated for her exceptionally broad impact on the field of low temperature geochemistry. Lynda has made major intellectual contributions to the understanding of water/rock interactions, developing boron isotope systematics, origin of biopolymers, and the potential public health implications of clay minerals."

2005

NSF and GSA Press Release on Williams et al., Origins of Life research, GEOLOGY.
National Public Radio interview (KJZZ) with Roland Pease, Producer. BBC Radio
Symposium organizer, 2005 Clays and Health, Clay Minerals Society, Burlington, VT.

2003

Symposium organizer 'Medicinal Applications of Minerals' for the 2003 joint CMS/MSA Annual Meeting, Athens, GA. Funded keynote lecturer Prof. Graham Cairnes-Smith.

Recent Students Advised (last 10 yrs):

Keith David Morrison (2010-2016 Ph.D., Advisor)
Sandra Carolina Londono-Arias (2009-2016 Ph.D, Advisor)
Xinming Chen, Ph.D. candidate, Antifungal activity of OMT clay (2nd project advisor)
Clelia Tommimabry, (2013-2014) Space Grant undergraduate research student
Amanda Turner, B.S. Geology and Chemistry 2008 (Honors project advisor)
Ken Voglesonger, Post-doc 2007
Tami Gerke, Post-doc, 2006

Advisory Committees:

Katie Noonan, Ph.D. committee, 2012
Jorge Nunez, Ph.D. committee, 2012
Steve Guggino, Ph.D. committee, 2012
Chris Glein, Ph.D. committee, 2012
Lev Spivack-Birndorf Ph.D. committee 2012
Vicki Mills M.S. committee 2009
Mike Kraft, Ph.D. committee 2008
Joe Michalski, Ph.D. committee 2007
Brandon Canfield, Ph.D. committee, 2006