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Education

Ph.D.	1991	Department of Geology, Indiana University, Bloomington, IN USA
M.S.	1989	Department of Geology, Indiana University, Bloomington, IN USA
B.A.	1984	*Cum laude*, Geology and Classical Civilization, Wellesley College, Wellesley, MA USA

Professional Appointments

2011	Crosby Lecturer, Dept. of Earth, Atmospheric and Planetary Sciences, MIT
2011	Visiting Faculty, Dept. of Biology and Geology & Geophysics, University of Utah
2010	Visiting Scientist, National Museum of Natural History, Smithsonian Institution
2002-present	Professor, Department of Geosciences, Pennsylvania State University
2004-2009	Associate Head for Graduate Programs and Research, Department of Geosciences, Pennsylvania State University
2003-2007	Director, Penn State Biogeochemistry Research Initiative in Education, NSF-IGERT graduate student training program
2002	Guest Investigator, Woods Hole Oceanographic Institution (sabbatical visitor)
1999-2002	Associate Director, Penn State Biogeochemistry Research Initiative in Education, NSF-IGERT graduate student training program
1997-2002	Associate Professor, Department of Geosciences, Pennsylvania State University
1991-1997	Assistant Professor, Department of Geosciences, Pennsylvania State University
1991	Postdoctoral Associate, Skidaway Institute of Oceanography, Savannah, GA; Advisor: S.G. Wakeham
1984-1990	Graduate Research Assistant, Dept of Geology, Indiana University; Advisor: J. M. Hayes
1984	Associate Instructor, Geologic Field Station, Indiana University
1981-1984	Visiting Investigator, Carnegie Institution of Washington, Geophysical Laboratory; Advisor: Thomas C. Hoering

Honors and Awards

2012	Science Innovation Award, European Association of Geochemistry
2011	Fellow, Geochemical Society and European Association of Geochemistry
2011	Fellow, American Academy of Microbiology
2010-2011	Fellow, John Simon Guggenheim Memorial Foundation
2007	Fellow, Geological Society of America
2001	Fellow, Canadian Institute for Advanced Research, Earth System Evolution Program
1999	James Lee Wilson Medal in Sedimentology, SEPM, the Society for Sedimentary Geology
1997	The Peter Schenck Award, European Association of Organic Geochemists
1987	NASA Graduate Student Researchers Program Fellowship
1984	The Patricia Roberts Harris Fellowship

At The Pennsylvania State University:

2008	Faculty Mentoring Award, College of Earth and Mineral Sciences
2004	The Wilson Award for Excellence in Teaching, College of Earth and Mineral Sciences
2002	Graduate Faculty Teaching Award, the Graduate School

PUBLICATIONS

Papers in Refereed Journals

1. Freeman K.H., Hayes J.M., Trendel J.M. and P. Albrecht (1990) Evidence from carbon-isotope measurements for diverse origins of sedimentary hydrocarbons. *Nature* **343**, 254-256.

2. Hayes J.M., Freeman K.H., Popp B.N. and C. Hoham (1990) Compound -specific isotopic analyses: A novel tool for reconstruction of ancient biogeochemical processes. In: *Advances in Organic Geochemistry 1989*, (B. Durand and F. Behar, eds.), *Organic Geochemistry* **16**, 1115-1128.

3. Lichtfouse E., Freeman K.H., Collister J.W. and Merritt D.A. (1991) Enhanced resolution of organic compounds from sediments by isotopic gas chromatography-combustion-mass spectrometry. *Journal of Chromatography* **585**, 177-180.

4. Freeman K.H. and Hayes J.M. (1992) Fractionation of carbon isotopes by phytoplankton and estimates of ancient CO_2 levels. *Global Biogeochemical Cycles* **6**, 185-198.

5. Freeman K.H. and Wakeham S.G. (1992) Variations in the isotopic composition and concentrations of alkenones in Black Sea particles and sediments. *Organic Geochemistry* **19**, 277-285.

6. Wakeham S.G., Freeman K.H., Pease T.K. and Hayes J.M. (1993) A photoautotrophic source for lycopane in marine water columns. *Geochimica Cosmochimica Acta* **57**, 159-165.

7. Freeman K.H., Wakeham S.G. and Hayes J.M. (1994) Predictive isotopic biogeochemistry: hydrocarbons from two anoxic marine basins, *Organic Geochemistry*, **21**, 629-644.

8. Ricci M.P., Merritt D.A., Freeman K.H. and Hayes J.M. (1994) Acquisition and processing data for isotope-ratio-monitoring mass spectrometry. *Organic Geochemistry* **21**, 561-572.

9. Freeman K.H., Boreham C., Summons R. and Hayes J.M. (1994) The effect of aromatization on the isotopic compositions of hydrocarbons during diagenesis. *Organic Geochemistry* **21**, 1037-1050.

10. Merritt D.A., Freeman K.H., Ricci M.P., Studley S.A. and Hayes J.M. (1995) Performance and optimization of a combustion interface for isotope-ratio-monitoring GCMS. *Analytical Chemistry* **67**, 2461-2473.

11. Filley T.R., Freeman K.H. and P.G. Hatcher (1996) Carbon isotope relationships between sulfide-bound steroids and proposed functionalized lipid precursors in sediments from the Santa Barbara Basin, CA. *Organic Geochemistry* **25**, 367-377.

12. Bidigare R.B., Fluegge A., Freeman K.H., Hanson K.L., Hayes J.M., Hollander D.J., Jasper J.P., King, L.L., Laws E.A., Milder J., Millero F.J., Pancost R.D., Popp B.N., Steinberg P.A. and S.G. Wakeham (1997). Consistent fractionation of ^{13}C in nature and in the laboratory: Growth-rate effects in some haptophyte algae. *Global Biogeochemical Cycles* **11**, 279-292. (Errata: vol. 13, 251-252).

13. Dias R.F. and K.H. Freeman (1997). Carbon-isotope analyses of semivolatile organic compounds in aqueous media using solid-phase microextraction and isotope-ratio-monitoring GCMS. *Analytical Chemistry* **69**, 944-950.

14. Filley T.R., Filley R.M., Eser S. and K.H. Freeman (1997). Compound-specific isotope analyses of products from carbonization of a FCC decant oil doped with ^{13}C-enriched 4-methyldibenothiophene. *Energy and Fuels* **11**, 637-646.

15. Pancost R.D., K.H. Freeman, S.G. Wakeham and C.Y. Robertson (1997). Controls on carbon isotope fractionation by diatoms in the Peru Upwelling Region. *Geochimica et Cosmochimica Acta* **61**, 4983-4992.

16. Canuel E.A., Freeman K.H. and S.G. Wakeham (1997). Isotopic compositions of lipid biomarker compounds in estuarine plants and surface sediments. *Limnology and Oceanography* **42**, 1570-1583.

17. Patzkowsky M.E., Suplik L.M., Arthur A.M., Pancost R.D. and K.H. Freeman (1997). Late Middle Ordovician environmental change and extinction: Harbinger of the Late Ordovician or continuation of Cambrian patterns? *Geology* **25**, 911-914.

18. Pancost R. D., Freeman K. H., Patzkowsky M. E., Wavrek D. A. and J. W. Collister (1998) Molecular indicators of redox and marine phytoplankton composition in the Late Middle Ordovician of Iowa, USA. *Organic Geochemistry* **29**, 1649-1662.

19. Huang Y., Freeman K. H., Eglinton T. I. and F. A. Street-Perrott (1999) δ^{13}C analyses of individual lignin phenols in the lacustrine environment: a novel proxy for deciphering past terrestrial vegetation changes. *Geology* **27**, 471-474.

20. Pancost R.D., Freeman K.H. and S.G. Wakeham (1999). Controls on photosynthetic carbon-isotope fractionation in the Peru upwelling region. *Organic Geochemistry* **30**, 319-340.

21. Pagani M., Arthur M. A. and K. H. Freeman (1999) Miocene evolution of atmospheric carbon dioxide. *Paleoceanography* **14**, 273-292.

22. Pagani M., Freeman K. H. and M. A. Arthur (1999) Late Miocene atmospheric CO2 concentrations and the expansion of C4 plants. *Science* **285**, 876-879.

23. Bidigare R. R., Hanson K. L., Buesseler K., Wakeham S. G., Freeman K. H., Pancost R. D., Miller F. J., Steinberg P., Popp B. N., Latas M., Landry M. R. and E. A. Laws (1999) Iron-stimulated changes in ^{13}C fractionation and export by equatorial Pacific phytoplankton: Toward a paleogrowth rate proxy. *Paleoceanography* **14**, 589-595.

24. Pancost R.D., Freeman K.H. and Patzkowsky M.E. (1999) Organic matter source variation and the expression of a Middle Ordovician carbon-isotope excursion. *Geology*, **27**, 1015-1018.

25. Pagani M., Freeman K. H. and M. A. Arthur (2000) Isotope analyses of molecular and total organic carbon from Miocene sediments. *Geochimica et Cosmochimica Acta* **64**, 37-49.

26. Pagani, M., Arthur M. A. and K. H. Freeman. (2000) Variations in Miocene phytoplankton growth rates in the southwest Atlantic: Evidence for changes in ocean circulation. *Paleoceanography* **15**, 486-476.

27. Huang Y., Freeman K. H., Wilkin R. T., Jones D. and M. A. Arthur (2000) Black Sea chemocline oscillations during the Holocene: Molecular and isotopic studies of marginal sediments. *Organic Geochemistry* **31**, 1525-1532.

28. Joachimiski M. M., Ostertag-Henning C., Pancost R. D, Strauss H., Freeman K. H., Littke R., Sinninghe Damste J. S. and G. Racki (2001) Water column anoxia, enhanced productivity and concomitant changes in $\delta^{13}C$ and $\delta^{34}S$ across the Frasnian-Famennian boundary (Kowala—Holy Cross Mountans, Poland). *Chemical Geology* **175**, 109-131.

29. Mandernack K. W., Kinney C. A., Coleman D., Huang Y. S., Freeman K. H. and J. Bogner (2000)The biogeochemical controls of N_2O production and emission in landfill cover soils: the role of methanotrophs in the nitrogen cycle. *Environmental Microbiology* **2**, 298-309.

30. Franks S. G., Dias, R.F., Freeman K. H., Boles J. R., Holba A., Fincannon A.L. and E. D. Jordan (2001). Carbon isotopic composition of organic acids in oil field waters, San Joaquin Basin, USA. *Geochimica et Cosmochimica Acta*, **65**, 1301-1310.

31. Freeman K. H. and L. A. Colarusso (2001). Molecular and isotopic records of C_4 grassland expansion in the late Miocene. *Geochimica et Cosmochimica Acta*, **65**, 1439-1454.

32. Rosell-Mele A. and 39 others (2001) Precision of the current methods to measure the alkenone proxy $Uk_{37'}$ and absolute alkenone abundance in sediments: Results of an interlaboratory comparison study. *Geochemistry, Geophysics and Geosystems* 2, paper number 2000GC000141 [9416 words, 13 figures, 6 tables].

33. Huang Y., Street-Perrott F. A., Metcalfe S. E., Brenner M., Moreland M. and K. H. Freeman (2001) Climate change as the dominant control on Glacial-Interglacial variations in C_3 and C_4 plant abundance. *Science* **293**, 1647-1651.

34. Filley T. R., Freeman K. H., Bianchi T., Colarusso L. A. and P. Hatcher (2001) An isotopic biogeochemical assessment of shifts in organic matter input to Holocene sediments from Mud Lake, Florida. *Organic Geochemistry* **32**, 1153-1167.

35. Pavlov A. A., Kasting J. F., Eigenbrode J. L. and K. H. Freeman (2001). Organic haze in Earth's early atmosphere: the source of low-^{13}C late Archean kerogens? *Geology* **29**, 1003-1006.

36. Joachimski M. M., Pancost R. D., Freeman K. H., Ostertag-Henning and W. Buggisch (2002). Carbon isotope geochemistry of the Frasnian-Famannian. Palaeogeography, Palaeoclimatology, Palaeoecology **181**, 91-109.

37. Filley T. R., Freeman K. H., Wilkin R. T and P.G. Hatcher (2002) Biogeochemical controls on reaction of sedimentary organic matter and aqueous sulfides in Holocene sediments of Mud Lake, Florida. *Geochimica et Cosmochimica Acta,* **66**, 937-954.

38. Dias R.F., Freeman K.H. and Franks S.G. (2002) Gas chromatography-pyrolysis-isotope ratio mass spectrometry: A new method for investigating intramolecular isotopic variation in low molecular weight organic acids. *Organic Geochemistry* **33**, 161-168.

39. Dias, R.F. , Freeman, K. H., Lewan, M. D., Franks, S. G. (2002) $\delta^{13}C$ of low-molecular-weight organic acids generated by the hydrous pyrolysis of oil-prone source rocks. *Geochimica et Cosmochimica Acta* **66**, 2755-2769.

40. Pagani M., Freeman K. H., Ohkouchi N. and K. Caldeira (2002) Comparison of water column [CO_2aq] with sedimentary alkenone-based estimate: A test of the alkenone-CO_2 proxy. *Paleoceanography* **17**, 1069-1081.

41. Ono, S., Eigenbrode, J.L., Pavlov, A.A., Kharecha, P., Rumble, D., Kasting, J.F. and K. H. Freeman (2003). Sulfur isotopic constraints on the Archean atmosphere and ocean. *Earth and Planetary Science Letters* **213**, 15-30.

42. Sheridan P. P., Freeman K. H., and J. E. Brenchley (2003). Estimated minimal divergence times of the major Bacterial and Archeaeal phyla. *Geomicrobiology Journal.* **20**, 91-109.

43. Pedentchouk, N., Freeman K. H., Harris, N. B., Clifford D. J. and K. Grice (2004) Sources of alkylbenzenes in Lower Cretaceous lacustrine source rocks, West African rift basins. *Organic Geochemistry* **35**, 33-45

44. Ono, S., Eigenbrode, J.L., Pavlov, A.A., Kharecha, P., Rumble, D., Kasting, J.F. and K. H. Freeman (2003) Sulfur isotopic constraints on the Archean atmosphere and ocean. *Earth and Planetary Science Letters* **213**, 15-30.

45. Harris N.B., Freeman K.H., Pancost R. D., White T.S. and G.D. Mitchell (2004) The character and origin of lacustrine source rocks in the Lower Cretaceous synrift section, Congo Basin, west Africa. *AAPG Bulletin* **88**, 1163-1184

46. Pearson A., Huang Z., Ingalls A.E., Romanek C.S., Wiegel J., Freeman K. H., Smittenberg R.H. and C.L. Zhang (2004) Nonmarine crenarchaeol in Nevada hot springs *Applied and Environmental Microbiology* **70**, 5229-5237.

47. Felipe M.A., Kubicki J. D. and K. H. Freeman (2005) A mechanism for carbon isotope exchange between aqueous acetic acid and CO_2/HCO_3-: an *Ab Initio* study. *Organic Geochemistry* **36,** 835-850.

48. Moran J. J., House C. H., Freeman K. H. and J. G. Ferry (2005) Trace methane oxidation in Euryarchaeota. *Archea* **1,** i-vii.

49. Pagani M., Zachos J. C., Freeman K. H., Tipple B. and S. Bohaty (2005) Marked Decline in Atmospheric Carbon Dioxide Concentrations During the Paleogene *Science*, 309: 600-603.

50. Wing S. L., Harrington G. J., Smith F. A., Bloch, J. I., Boyer D. M. and K. H. Freeman (2005) Transient floral change and rapid global warming at the Paleocene-Eocene boundary. *Science* 310, 993-996.

51. Smith F. A. and K. H. Freeman (2006) Influence of physiology and climate on δD of leaf wax *n*-alkanes from C3 and C4 grasses. *Geochimica et Cosmochimica Acta*. **70**(5): 1172-1187.

52. Pedenchouk N., Freeman K. H. and N. B. Harris. (2006) Hydrogen isotopic composition of organic matter from the Lower Cretaceous Lacustrine Gabon Basin. *Geochimica et Cosmochimica Acta* **70**(8): 2063-2072.

53. Eigenbrode J. L. and K. H. Freeman (2006) The rise of Late Archean aerobic microbial ecosystems. *Proc. Nat. Acad. Sci.* **103**, 15759-15764.

54. Turich C. H., Freeman K. H., Bruns M. A., Conte M., Jones A. D. and S. G. Wakeham (2007) Marine Archea lipid distributions: Patterns and provenance in the water column and sediments. *Geochimica et Cosmochimica Acta*, **71**, 3272-3291.

55. Moran J.J., House C. H. and K.H. Freeman (2007) Products of trace methane oxidation during non-methylotrophic growth by *Methanosarcina*. *J. Geophys. Res. Biogeosciences*. 112 (G2):G02011

56. Smith F. A., Wing S. and K. H. Freeman (2007) Carbon and hydrogen isotope compositions of plant lipids during the PETM as evidence for the response of terrestrial ecosystems to rapid climate change. *Earth and Planetary Science Letters* **262** (1-2): 50-65.

57. Wakeham S. G., Amann R., Freeman K. H., Hopmans E. C., Jorgensen B. B., Putnam I. F., Schouten S., Sinninghe Damste J. S., Talbot H. M.and D. Woebken (2007) Microbial ecology of the stratified water column of the Black Sea as revealed by a comprehensive biomarker study. *Organic Geochemistry* **39**, 2070-2097.

58. Moran J., Ventas, J., Beal, E., Orphan V., Freeman K. H. and C.H. House (2008) Methyl sulfides as intermediates in the anaerobic oxidation of methane. *Environmental Microbiology* **10** (1), 162–173.

.

59. Moran J.J., House C. H., Vrentas J. and K. H. Freeman (2008) Methyl sulfide production by a novel carbon monoxide metabolism in *Methanosarcina acetivorans. Applied and Environmental Microbiology* **74,** 540-542.

60. Turich, C.H., Freeman, K.H., Jones, A.D. , Bruns, M.A., Conte, M. and S.G. Wakeham (2008) Reply to the Comment by S. Schouten, M. van der Meer, E. Hopmans, and J.S. Sinninghe Damsté on "Lipids of marine Archaea: Patterns and provenance in the water column" G*eochimica et Cosmochimica Acta* **72**, 21, 1 November 2008, Pages 5347-5349

61. Junium C.K., Mawson D.H., Arthur M.A., Freeman K.H and B.J. Keely (2008) Unexpected occurrence and significance of zinc alkyl porphyrins in Cenomanian-Turonian black shales of the Demerara Rise. Organic Geochemistry **39**, 1081-1087

62. Eigenbrode J. L., Freeman K. H. and Summons R. E. (2008) Methylhopane biomarker hydrocarbons in Hamersley Province sediments provide evidence for Neoarchean aerobiosis. *Earth and Planetary Science Letters* **273**, 323-331.

63. Polissar, P. J., Fulton J., Turich C. H. and K. H. Freeman (2009) Measurement of ^{13}C and ^{15}N isotopic compositions on nanomolar quantities of organic materials. *Analytical Chemistry* **81**, 755-763

64. Thomas, R. B., Freeman K. H. and Arthur M.A. (2009) Intramolecular carbon isotopic analysis of acetic acid by direct injection of aqueous solution. Organic Geochemistry 40, 195-200.

65. Schouten S. and 28 others (2009) An interlaboratory study of TEX86 and BIT analysis using high-performance liquid chromatography-mass spectrometry. *Geochem. Geophys. Geosys.* 10, Art. No. Q03012Mar2012009

66. Polissar P. J., Freeman K. H., Rowley D. B., Smith F. A. and B. Currie (2009). Paleoaltimetry of the Tibetan Plateau from D/H Ratios of Lipid Biomarkers. *Earth and Planetary Science Letters* 287 (1), p.64-76.

67. Czaja A. D., Johnson, C. M., Beard, B. L., Eigenbrode, J. L., Freeman, K. H. and Yamaguchi K. E. (2010) Iron and carbon isotope evidence for ecosystem and environmental diversity in the ~2.7 to 2.5 Ga Hamersley Province, Western Australia. *Earth and Planetary Science Letters* **292**, 170-180.

68. Diefendorf, A.F., Mueller, K.E., Wing, S.L., Koch, P.L. and Freeman, K.H., (2010). Global patterns in leaf ^{13}C discrimination and implications for studies of past and future climate. *Proceedings of the National Academies of Science*, **107,** 5738-5743.

69. Mueller, K.E., Diefendorf, A.F., Freeman, K.H., and Eissenstat, D.N., (2010) Appraising the roles of nutrient availability, global change, and functional traits during the angiosperm rise to dominance. *Ecology Letters,* **13**, E1-E6.

70. Polissar P. J. and Freeman K. H. (2010) Effects of aridity and vegetation on plant-wax δD in modern lake sediments. *Geochimica et Cosmochimica Acta*, **74**, *5785-5797*

71. McInerney F. A., Helliker B. R. and K. H. Freeman (2011). Hydrogen isotope ratios of leaf wax n-alkanes in grasses are insensitive to transpiration. *Geochimica et Cosmochimica Acta*. **75**, *541-554.*

72. Freeman K. H., Mueller K. E., Diefendorf, A. F., Wing, S. L. and P. L. Koch (2011) Clarifying the influence of water availability and plant types on carbon isotope discrimination by C3 plants. Letter, *Proceedings of the National Academies of Science* **108**, E59-E60

73. Turich C. H. and K. H. Freeman (2011) Archaea lipids record paleosalinity in hypersaline conditions. *Organic Geochemistry* **42**, 1147-1157

74. Junium, C.K., B.J., Keely, K.H., Arthur, M.A., Freeman (2011) Chlorins in mid-Cretaceous black shales of the Demerara Rise: the oldest known occurrence. Organic Geochemistry **42**, 856-859

75. Meyer K.M., Macalady J. L., Fulton J. M., Kump L.R., Schaperdoth I., K.H. Freeman (2011) Carotenoid biomarkers as an imperfect reflection of the anoxygenic phototrophic community in meromictic Fayetteville Green Lake. *Geobiology* **9**, 321-329.

76. Cui Y. Kump L. R., Ridgwell A. J., Charles A. J., Junium C. K., Diefendorf A. F, Freeman K. H., Urban N. M. and Harding I. C. (2011) Slow release of fossil carbon during the Palaeocene-Eocene Thermal Maximum. *Nature Geosciences* **4**, 481-485.

77. Diefendorf A. F., Freeman K. H., Wing S. L. and H. V. Graham (2011) Production of n-alkyl lipids in living plants and implications for the geologic past. *Geochimica et Cosmochimica Acta* **75**, 7472-7485.

78. Medeiro P.M., Sikes E. L., Thomas B. and K. H. Freeman (2012) Flow discharge influences on input and transport of particulate and sedimentary organic carbon along a small temperate river. Geochimica et Cosmochimica Acta 77, 317-334.

79. Jones D. S., Albrecht H. L., Dawson K. S., Schaperdoth I., Freeman K. H., Pi, Y., Pearson A. and J. L. Macalady (2012) Community genomic analysis of an extremely acidophilic sulfur-oxidizing biofilm. *The ISME Journal* **6,** 158–170.

80. Diefendorf A. F., Freeman K. H. and S. L. Wing (2012). Diterpenoids and Triterpenoids in Temperate C3 Trees. *Geochimica et Cosmochimica Acta* **85**, 342-256.

81. Sachse D., White J., Kahmen A., Dawson T., West J. B., Sessions A., van der Meer M., Chikaraishi Y., Schmidt H.-L., Feakins S., Robins R., McInerney F., Pedentcouk N., Magill C., Freeman K. H. and Polissar P.J. (2012) Sources of variability in the hydrogen isotopic composition of organic compounds from photosynthetic organisms. *Annual Reviews in Earth and Planetary Sciences* **40**, in press (available online 3/2012).

82. Fulton, J., Arthur M. A. and K. H. Freeman (2012) Black Sea nitrogen cycling and the preservation of phytoplankton $\delta^{15}N$ signals during the Holocene. *Global Biogeochemical Cycles* **26**, GB2030, doi:10.1029/2011GB004196

83. Algeo T., Henderson C., Ellwood B., Rowe H., Elswick E., Bates S., Lyons T., Hower J. C., Smith C., Maynard B., Hays L., Summons R. E., Fulton J. M. and K. H. Freeman (2012). Elevated sediment fluxes in the Sverdrup Basin prior to the end-Permian mass extinction: A link to Siberian Traps volcanism? *GSA Bulletin* **124**, 1424-1448.

84. Mueller K. E., Polissar P. J., Oleksyn J. and K. H. Freeman (2012). Plant lipid biomarkers in leaves, roots, and soils of eleven temperate tree species. *Organic Geochemistry* **52**, 130-141.

85. Dawson K. S., Freeman K. H. and J. L. Macalady (2012). Molecular characterization of lipids from halophilic archaea grown under different salinity conditions Molecular characterization of archaeal lipids across a hypersaline gradient. *Organic Geochemistry* **48,** 1–8.

86. Fulton J. M., Arthur M. A. and K. H. Freeman (2012). The cyanobacterial biomarker scytonemin in the Holocene Black Sea. *Organic Geochemistry* **49**, 47-55.

87. Magill C., Ashley G. M. and K. H. Freeman. Landscape variability and early human environments in Africa. *Proceedings of the National Academy of Science*, in press.

88. Magill C., Ashley G. M. and K. H. Freeman. Water, plants and early humans in eastern Africa during the Pleistocene. *Proceedings of the National Academy of Science*, in press.

89. Mueller K. E., Eissenstat D. M., Muller C., Oleksyn J. and K.H. Freeman. Lipid concentrations in soil closely track lipid concentrations in plant leaves and roots. *Soil Biology and Biochemistry*, in review.

90. Close H. G., Shah S. R., Ingalls A. E., Diefendorf A. F., Brodie E. L., Hansman R. L., Freeman K. H., Aluwihare L. I. and A. Pearson (2012) Export of submicron particulate organic matter to mesopelagic deths in an oligotrophic gyre, *PNAS*, in review.

91. Magill C. and K. H. Freeman. Sequential in-cell separation of sedimentary lipids using pressurized liquid extraction. *Journal of Chromatography, A*, in revision.

92. Pancost R. D., Freeman K. H., Hermann A.D. Patzkowsky M. E., Ainsaar L. and T. Martma. Reconstructing Late Ordovician pCO2 Using the Carbon Isotopic Composition of Sedimentary Organic Matter. *Geochimica et Cosmochimica Acta*, in revision.

93. Henderson, A. Fox D. and K. H. Freeman. Latent power of C4 plants tip Plio-Pleistocene climate cooling. *Geology*, in revision.

94. Dawson S. K., Schaperdoth I., Freeman K. H. and J. L. Macalady. Anaerobic biodegradation of pristine, phytane and archaeal ether-linked isoprenoid lipids. *Organic Geochemistry*, in revision.

Manuscripts

Magill C., Ashley G. M., Domingues-Rodrigo M. and K. H. Freeman. Biomarker evidence for microhabitats within FLK *Zinjanthropus* archaeological Level 22 at Olduvai Gorge suggest central foraging behaviors by hominins. *Nature*, in preparation.

Albrecht H. L., Freeman K. H., Macalady, J. L. and S. G. Wakeham. Bacteriohopanepolyols across the oxygen minimum zone of the Eastern Tropical North Pacific. *Organic Geochemistry*, in preparation.

Graham H. X., Patzkowsky M. E., Wing S. and K. H. Freeman. Isotopic characteristics of canopies and simulated leaf assemblages.

Henderson A.K., Graham H., Magill C., Fox D., Patzkowsky M. and K. H. Freeman. Angiosperm n-alkane distribution patterns and the geologic record of C4 grasslands.

Diefendorf A. F., Wing S. L. and K. H. Freeman. Comparison of plant terpenoids and megafloras as paleovegetation proxies in Paleocene and Eocene sediments in the Bighorn Basin, WY.

Book Chapters (Refereed)

95. Freeman D.H., Angelese R.M., Freeman K.H., Hoering T.C., Flynn J.S., Lango T.A. and Homanay-Preyer T.C. (1987) Group isolation of nickel and vanadyl porphyrins from crude oil using macrporous silica gel. A.C.S. Symposium Series: *Metalloporphyrins and metal complexes in petroleum source rocks*. H.Filby and J.F. Branthaver,eds.

96. Pancost R.D., K.H. Freeman and M.A. Arthur (1997). The Organic Geochemistry of the Cretaceous Western Interior Seaway through the Cenomanian-Turonian interval. In: Stratigraphy and Paleoenvironments of the Cretaceous Western Interior Seaway, USA, Concepts in Sedimentology and Paleontology, 6 (W. Dean, M.A Arthur, eds) 173-188.

97. Freeman K. H. (2001) Isotopic biogeochemistry of marine carbon. In: *Stable Isotope Geochemistry* (J. W. Valley and D. R. Cole, eds.), Reviews in Mineralogy and Geochemistry, volume 43, 579-605.

98. Freeman, K. H. and Pagani M. (2005) Alkenone-based estimates of past CO_2 levels: A consideration of their utility based on an analysis of uncertainties. In: Ehleringer J., Cerling T. and Dearing D. (eds). *A history of atmospheric CO_2 and its implications for plants, animals, and ecosystems.* American Geophysical Union, pages 55-78.

99. Freeman K. H. and Pancost R. D. Molecular and isotopic signatures of terrestrial paleoclimate and ecology. In: Organic Biogeochemistry, Treatise on Geochemistry, Elsevier.

Book Editorships

100. Yelcin N., Derrine S., Farrimond P. Freeman K. H., Littke R., Maxwell J., Requejo R., Welhelms, A. (2001) Advances in Organic Geochemistry 1999, Proceedings of the International Meeting of Organic Geochemists, Istanbul, Turkey. Published as special volumes of *Organic Geochemistry*, Pergamon Press.

101. Falkowski P. and Freeman K. H. Organic Biogeochemistry, Treatise on Geochemistry, K. K. Turekian and H.D. Holland, series editors; Elsevier. In preparation.

Undergraduate, Master and Doctoral Theses

102. Freeman, K. H. (1984) Chromatographic Isolation of Petroporphyrins: A Sample Preparative Sequence. Honors Thesis, Wellesley College, 97 pp.

103. Freeman K. H. (1989) Isotopic Composition of Individual Compounds in the Messel Shale (Eocene). Master thesis, Indiana University, 58 pp.

104. Freeman K. H. (1991) The Carbon Isotopic Compositions of Individual Compounds from Ancient and Modern Depositional Environments. Doctoral dissertation, Indiana University, 146 pp.

Book Reviews and Other Publications (Non-refereed)

105. Freeman K.H. (1987) Introduction of T.C. Hoering for the 1987 Alfred E. Triebs Award. *Geochimica et Cosmochimica Acta*, **52**, 944-945.

106. Freeman, K.H. (1995) Review of Organic Geochemistry, Principles and Applications (M. Engel and S. Macko, eds.), Plenum Press, New York, 861 pp., for *Journal of Sedimentary Geology* (formally *Journal of Sedimentary Petrology)*, January, 1995.

107. Freeman K.H. (1997) A new look at old carbon. *Science* **277**, 777-778. [Perspective article on paper by Eglinton *et. al.*, *Science* **277**, 796(1997).]

108. Freeman K.H. (1998) Review of Organic Acids in Geologic Processes (E.D. Pittman and M.D. Lewan, eds.) Springer-Verlag Press, New York, 482pp., for *Geochimica et Cosmochimica Acta*, **62** (4), 730-731.

109. Freeman K. H. (2004) Citation for presentation of the 2003 Distinguished Service Award to Hubert L. Barnes. *Geochimica et Cosmochimica Acta* **68**, 1967.

110. Summons R.E., Freeman K.H., Grice K. et al., (2008) Where would we be without the isotopes? Organic Geochemistry 39, 483-484

111. Freeman, KH (2009) Bounty from Biomarkers. Review of Echoes of Life: What Fossil Molecules Reveal about Earth History, *Science* **323**, 879.

112. Freeman, KH (2009) A biogeochemist ponders muddy molecules and past climates. *Nature* 462: 701 (Research Highlights, Journal Club)

Published Reports (Reviewed)

113. Jordan, T. et al. (2001) Basic Research Opportunities in Earth Science. (A report to the NRC recommending funding opportunities for NSF-Earth Sciences.) National Academy Press, 154 pp.

114. Sachs J. P., Schneider R. R., Eglinton T. I., Freeman K. H., Ganssen G., McManus J. F. and D. W. Oppo (2000) Alkenones as paleoceanographic proxies. *Geochemistry Geophysics Geosystems* (G3)

1, 13 p. (paper # 2000GC000059). Report from a workshop on alkenone-based paleoceanographic indicators, Woods Hole Oceanographic Institution, October 1999.

115. Lunine J. I. et al. (2003) Life in the Universe, an Assessment of U.S. and International Programs in Astrobiology. (A report to the Space Studies Board, NRC) The National Academy Press, 48pp.

116. Freeman K. H. and M. Goldhaber (2011) Future Directions in Geobiology and Low-Temperature Geochemistry, NSF-sponsored workshop report. *Elements*, 7(2) 138-139 (abridged).

117. Freeman K. H. and M. Goldhaber (2011) Future Directions in Geobiology and Low-Temperature Geochemistry, NSF-sponsored workshop report. (Full version)

118. Montanez I. P. et al. (2011) Understanding Earth's Deep Past: Lessons for our Climate Future (A report to the NRC by the Committee on the Importance of Deep-Time Geological Records for Understanding Climate Change Impacts.) National Academy Press, 194.

EDUCATION, TEACHING AND RESEARCH TRAINING

Supervision of Graduate Student Research

Past Students

As major advisor:

Richard Pancost	Ph.D. (Geosciences)	1998	Professor, University of Bristol
Lee Colarusso	M.S. (Geosciences)	1998	MFG Sheppard Miller
Francis Cooper	M.S. (Geosciences)	1995	Software engineer, Geosoft
Robert Dias	Ph.D. (Geosciences)	2000	U.S.G.S., Denver
Melinda Foland	M.S. (Geosciences)	2001	Engineer, ThermoFisher
Kenneth McRowe	M.S. (Geosciences)	2003	Consulting hydrologist
Nicolai Pendentchouk	Ph.D. (Geosciences)	2004	RCUK Fellow, Univ. of East Anglia
Jennifer Eigenbrode	Ph.D. (Geosciences)	2004	Scientist, NASA Goddard
Courtney Turich	Ph.D. (Geosciences)	2006	ConocoPhillips
Kristine Nielson	M.S. (Geosciences)	2006	Ph.D. student, Purdue University
James Moran	Ph.D. (Geosciences)	2007	Scientist, Pacific Northwest Natl. Lab
Katja Meyer	Ph.D. (Geosciences)	2008	Postdoc., Stanford Univ.
Aaron Diefendorf	Ph.D. (Geosciences)	2010	Asst. Professor, U. Cincinnati
Heidi Albrecht	Ph.D. (Geosciences)	2011	Shell Oil
Katherine Dawson	Ph.D. (Geosciences)	2011	Postdoc, Caltech

As co-advisor or research supervisor:

Timothy Filley	Ph.D. (Geosciences)	1997	Professor, Purdue University
Daniel McKinney	Ph.D. (Fuel Sciences)	1998	Shell Oil
Mark Pagani	Ph.D. (Geosciences)	1998	Professor, Yale University
Mark Strynar	Ph.D. (Soil Science)	2002	Researcher, U.S. EPA
Jamie Fulton	Ph.D. (Geosciences)	2010	Postdoc, WHOI
Christopher Junium	Ph.D. (Geosciences)	2010	Assitant Professor, Syracuse University
Kevin Mueller	Ph.D. (Ecology)	2011	Postdoc, Univ. Minnesota

Current students

Clayton Magill	Ph.D. (Geosciences)	(2007-present) passed Comprehensive, 2010
Heather Graham	Ph.D. (Geosciences)	(2008-present) passed Comprehensive, 2010; CIC-Smithsonian Fellowship, 2012-2013
Laurence Bird	Ph.D. (Geosciences)	(2010-present) passed Candidacy, 2011
Elizabeth Denis	Ph.D. (Geosciences)	(2010-present) passed Candidacy, 2011; NSF Graduate Fellowship 2012-2015
Laura Fontanills	M.S. (Geosciences)	(2012-present); Bunton-Waller Fellowship, 2012-2013
Angela Chung	M.S. (Geosciences)	(2012-present)
Christine Doman	M.S. (Geosciences)	(2012-present)

Supervision of Postdoctoral and Visiting Scholars

Hiroshi Naraoka,	2/96-12/96 (supported by Japanese Government); Tokyo University
Michael Joachimski	5/97-7/97 (supported by German Government)
Yongsong Huang	1/97-12/99(supported by grants to Freeman and Arthur); Brown University
Larissa Dsikowitzky	5/00-6/00 (supported by German Government)
Andy Zimmerman	7/00-02 (supported by IGERT-BRIE; Brantley Freeman); Univ. Florida
Gary Icopini	7/00-01 (supported by IGERT-BRIE; Brantley, Freeman)
Ros Rickaby	12/00 (supported by Harvard University)
Thomas Kuhn	1-2/01; 9-11/01; 2/02; 11/02 (supported by German Government)

Francesca (Smith) McInerney 8/02-2006 (supported by BRIE, Smithsonian Institution and Freeman), Northwestern University
Pratigya Polissar 1/05-2008 (supported by Freeman via CIFAR awards to Freeman, D. Rowley, U. Chicago, S. Willett, ETH), LDEO, Columbia University
Anna Henderson 2010-present (supported by CIFAR; Freeman and S. Cowling)
Lidia Katarzyna Trocha 2011-present (supported by Freeman and D. Eissenstat)
Rosemary Bush 2011 visiting student from Northwestern University
Allie Baczynski 2011 visiting student from Northwestern University
Kendra Chritz 2011-2012 visiting student from University of Utah
Abigail Rooney 2012 visiting student from Trinity College, Dublin, Ireland
Sarah Enders 2012 visiting student from University of California at Davis

Supervision of Undergraduate Research

One-semester projects
Ryabtseva, M.A., 1992, A study of Oil Spills
Sunderland, T., 1993, Biological Effects of Oil Spills in the Marine Environment
Hosterman, J., 1993, Transport and Microbial Degredation of Halogenated Organic Compounds in the Subsurface
Bogle, C, 1994, Humic Substances: Structure, Transformations and Interactions with Contaminants
Cuno, C., 1994, Detoxification and Removal of BTEX Compounds from Unsat-urated Zones and Groundwater Sources
Voght, E., 1995, Legislation, Assessment and Remediation of Sites Contaminated with Petroleum Hydrocarbons
Darcy, J., 1996, The Origins of life at Hydrothermal Vents (J. Kastings, advisor)
Harvey, M., 1996, Acid Rain and Its Effects on Aquatic Ecosystems

Senior and Honors Theses (Two-semester projects)
Follweiler, D., 1994, Compound-Specific Isotope Analyses of Plants and Sediments from Mud Lake, Florida. Honors Thesis in Chemistry
Laukonen, K., 1997, Century-Long Sediment Record of Golf Course Herbicide Applications, Green Lake, Fayetteville, N.Y. Honors Thesis in Geosciences
Sandomenico, T., 1997, Caffeine and Other Organic Tracers of Sewage in Soils and Groundwaters Associated with the Living Filter Project, State College, PA. Senior Thesis in Geo-Environmental Engineering
Moreland, M., 1999, Isotopic Records of Ecosystem Shifts in Tropical Lakes. Senior Thesis in Geosciences
Potisk, S. (2004). Isotopic analyses of microbial RNA monomers. Senior Thesis in Geosciences
Beausang, D.H. (2005) Spatial associations between climate and leaf wax n-alkanes from C3 and C4 grasses. Honors thesis in Geography.
Thornburg, J. (2006) The Younger Dryas transition observed in lacustrine sediments from Castor Lake, Washington. Senior Thesis in Geosciences
Galligan, K. (2009) Carbon and hydrogen isotopic compositions of plants past and present.
Sayles, Masoud (2010) Carbon sequestration in forest soils and the effects of tree species on soil organic matter.
Tavalavage, Annie (2012) Lipid biomarkers in sedge specimens.

Summer student project supervision
D. Beausang (2003, 2004), S. Harman (2003), S. Potisk (2003), A. Kleinhesselink (2004), D. Zemirah (2004); J. Thornburg (2004-2005); K. Galligan (2004-2005; 2007-2008); N. Patel (2009); N. Rivera (2009); P. Crooks (2009); J. Harris (2010)

Technical Staff Supervised & Supported

Denny Walizer, Senior Research Assistant	1991-present
Margaret Ricci, Senior Research Assistant	1996-2002
Robert Burfield Research Assistant	1997-1998
Gabriel Montemurro, Research Assistant	1997-1999
Tracy Michelle Henniger, Research Assistant	2001-2004
Pratigya Polissar, part-time technician	2002-2005
Chris Lernihan, Research Assistant	2002-2006
Nevin Whitman, Laboratory Assistant	Summer 2007
Laurie Eccles	2010-present

Courses Taught (all at Penn State University)

Semester	Course #	Title	Enrollment
Spring 1992	Geosc 454	Geology of Oil and Gas (80%)	24
	Geosc 497	Marine Biogeochemistry (33%)	6
Fall 1992	Geosc 419	Organic Geochemistry (50%)	10
Spring 1993	Geosc 454	Geology of Oil and Gas	15
	Earth 002	Gaia--The Earth System	60
	Geosc 597a	Hydrosciences Colloquium	2
Fall 1993	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	15
Spring 1994	Geosc 454	Geology of Oil and Gas (10%)	13
	Geosc 497c	Marine Biogeochemistry (33%)	9
	Earth 002	Gaia-The Earth System	97
Fall 1994	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	28
	Geosc 597i	Organic Matter and Earth History	8
Spring 1995	Geosc 494	Geology of Oil and Gas (5%)	14
	Geosc 597	Field Biogeochemistry	10
	Earth 002	Gaia-The Earth System	117
Fall 1995	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	21
Spring 1996	Earth 002	Gaia-The Earth System	95
	Geosc 597d	Origin and Early Evolution of Life (33%)	15
Fall 1996	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	21
	Geosc 597d	Hydrosciences Colloquium	
Spring 1997	Earth 002	Gaia- The Earth System	108

	Geosc 497i	Field Techniques in Environmental Geochemistry (20%)	9
Fall 1997	Geosc 497i	Field Techniques in Environmental Geochemistry (20%)	12
Spring 1998	Geosc 597d	Molecular Indicators of Geologic Processes	5
Fall 1998	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	25
	Geosc 497i	Field Techniques in Environmental Geochemistry (20%)	13
Spring 1999	Earth 100	Environment Earth	175
	Geosc 502	Evolution of the Biosphere (5%)	20
	Geosc 504	Advanced Geochemistry (10%)	5
Fall 1999	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	23
	Geosc 413	Field Techniques in Environmental Geochemistry (20%)	12
	Geosc 4/597a	Astrobiology (10%)	8
Spring 2000	Geosc 597c	Microbial Biogeochemistry	6
	Geosc 597a	Biogeochemical Analysis (7 %)	5
Fall 2000	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	23
	Geosc 413	Field Techniques in Environmental Geochemistry (20 %)	15
	Geosc 597a	Biogeochemical Analyses (1 lecture & lab)	11
	Geosc 597f	Issues in Geosciences (5 %)	18
	Geosc 597c	Astrobiology Seminar (1 lecture)	4
Spring 2001	Geosc 597a	Microbial Biogeochemistry (50%)	9
	Earth 002	Gaia – The Earth System	190
Fall 2002	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	8
	Geosc 597c	Methane Biogeochemistry (25%)	13
Spring 2003	Earth 002	Gaia—The Earth System	140
	Geosc 597a	Microbial Biogeochemistry (50%)	5
Fall 2003	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	12
	Geosc 597	Biogeochemical Analyses (2.5 weeks)	5
Spring 2004	Earth 002	Gaia—The Earth System	100
	Geosc 597x	Stable isotopes in Terrestrial Ecosystems	8
Fall 2004	Geosc 519	Stable Isotope Geochemistry	8
	Geosc 597	Biogeochemical Analyses (20%)	5
Spring 2005	Geosc 597	Microbial Biogeochemistry (25%)	6
Fall 2005	Geosc 419	Organic Geochemistry of Natural Waters and Sediments	8
	Geosc 500	Issues in Geosciences (20%)	22
Spring 2006	Geosc 597A	Molecular Isotope Systems	6

Fall 2006	Geosc 518	Stable Isotope Geochemistry	10
	Geosc 500	Issues in Geosciences (10%)	19
Spring 2007	Earth 002	Gaia—The Earth System	90
Fall 2007	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	11
Fall 2008	Geosc 518	Stable Isotope Geochemistry	18
	Geosc 500	Issues in Geosciences (50%)	25
Fall 2009	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	15
	Geosc 500	Issues in Geosciences (50%)	20
Spring 2010	Geosc 518	Stable Isotope Geochemistry	8
	Geosc 597	Isoscapes Seminar	7
Fall 2011	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	20
	Abio 590	Astrobiology seminar (10%)	8
Spring 2012	Geosc 518	Stable Isotope Geochemistry	12
	Earth 2	Gaia—The Earth System	125
Fall 2012	Geosc 419	Organic Geochemistry of Natural Waters & Sediments	24
	Geosc 587	Preparing for an Academic Career in the Geosciences (50%)	8
	Geosc 597E	Topics in Biogeochemistry (50%)	16
	Geosc 597C	Petroleum Geosystems (10 %)	16
Spring 2012	Geosc 518	Stable Isotope Geochemistry	
	Geosc 597 B	Words to Live by: Writing Science	

Other Teaching & Curricular Activities

Associate Head for Graduate Programs and Research, Department of Geosciences, 2004-2010.

Stable Isotope Ecology (Biology 581), University of Utah, Salt Lake City UT, (instructor); 1999, 2000, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012

Professor-in-charge, Geobiology B.S. degree program, Department of Geosciences, 2004-2005

Director, IGERT Biogeochemistry Research Initiative in Education (BRIE), 2003-2007 (Associate director, 1999-2003)

Dual-Title Ph.D. program in Biogeochemistry (lead author on proposal; with Chris House); program approved Spring 2008.

Participation in Seminars and Workshops

Gordon Research Conference on Organic Geochemistry, Plymouth, N.H., 13-17, August 1990 (invited speaker)

Workshop on Interfacing a Gas Chromatograph to an Isotope-Ratio Mass Spectrometer, Department of Chemistry, University of Bristol, England, 23-24 September, 1991 (co-organized workshop; wrote report summarizing workshop for Finnigan MAT)

Symposium on Compound Specific Isotope Analyses in Organic and Petroleum Geochemistry, American Chemical Society National Meeting, San Francisco, 5-10 April 1992 (session chair)

Gordon Research Conference on Organic Geochemistry, Plymouth, N.H. 10-14 August, 1992 (invited speaker)

International Association of Geochemistry and Cosmochemistry, 3rd International Symposium on Geochemistry of the Earth Surface 1-4 August 1993 (invited keynote speaker)

IAGC-SEPM Field Trip, Paleosols, Paleoclimate and Paleoatmospheric p-CO_2: Paleosols in Central Pennsylvania, 5-6 August 1993 (participant)

SEPM 1993 Theme Meeting: Climate Eustasy and Life, 8-12 August 1993, University Park, PA (member of organizing committee and technical session convener)

Chesapeake-Region Association of Biogeochemists (CRABS), 1st Annual Meeting, 19-20 May, 1994, Chesapeake Biological Laboratory, Solomons, MD (co-organizer)

International Symposium on Biogeochemical Cycles and Global Change, Max-Planck-Gesellschaft, Max Planck Institute for Meteorology, Hamburg, Germany, January 16-18, 1995 (invited speaker)

Chesapeake-Region Association of Biogeochemists (CRABS), 2nd Annual Meeting, 27-28 May, 1995, Penn State University, University Park, PA (co-organizer)

American Chemical Society National Meeting: Isotopic and Molecular Biogeochemistry of Organic Matter In Ancient and Modern Environments, 20-24 August, 1995, Chicago, IL (symposium organizer; 37 papers)

Geological Society of America, Organic Geochemistry Division of the Geochemical Society Symposium: Variability of Isotope Compositions in Modern and Fossil Organic Matter, 5 November 1995 (symposium co-organizer; 26 papers)

Chesapeake-Region Association of Biogeochemists (CRABS), 3rd Annual Meeting, 24-25 May, 1996, University of Virginia, Charlottesville, VA (co-organizer; 25 papers; co-author on 3 papers)

Gordon Research Conference on Organic Geochemistry: Organic and Isotopic Records of Paleoclimate, Plymouth, NH, 11-16 August 1996 (session chair and discussion leader)

The 3rd Canadian Continuous-Flow Isotope Ration Mass-Spectrometry Workshop, National Hydrology Research Institute, Saskatoon, Saskatchewan, Canada, 9-11 September 1996 (keynote speaker)

Keynote Symposium: Linkages Among Dynamic Processes of Oceans, Continents and Atmospheres, Geological Society of America Annual Meeting, 28-31 October 1996 (invited speaker)

Gordon Research Conference on Chemical Oceanography, 10-15 August, 1997, Meriden, NH (invited speaker; co-authored with M. Pagani and M. Arthur)

6th International Conference on Paleoceanography, Discussion Panel: *Details of Tertiary global cooling: is CO_2 still the major cause?* 23-28 August 1998, Lisbon, Portugal (invited panel member)

Union Session: Research Opportunities in the Solid Earth Sciences: A 10-Year Vision. Advisory session for NSF and NRC in developing a long-term vision for basic research in earth sciences. AGU national meeting, December 1998, San Francisco, CA (invited speaker)

Ocean Meeting, Biosphere 2, Oracle, AZ, July 1999 (invited participant)

Low-Temperature Geochemistry workshop, Boston, MA, June 1999 (invited participant and co-author)

Workshop on alkenone-based paleoceanographic indicators, Woods Hole Oceanographic Institution, October 1999 (invited participant and report co-author)

Molecular Biogeochemistry, a technical session at the Goldschmidt Meeting, May, 2001 (session organizer)

Stable Isotope Geochemistry, a short course sponsored by the Mineralogical Society of America and the Geochemical Society, November, 2001 (invited speaker and author)

History of Atmospheric CO_2 and its Effect on the Evolution of Plants, Animals and Ecosystems, a symposium sponsored by the David and Lucile Packard Foundation and the University of Utah, December, 2001, Snowbird, Utah (invited speaker)

Gordon Research Conference on Organic Geochemistry, Plymouth, NH, August 2002 (invited speaker)

ASTID working group for molecular and isotopic analyses of Martian regolith. University of Michigan, 10/2002 (invited speaker and workshop participant)

American Chemical Society, National Meeting, session honoring Geochemistry Division Medal recipient, J. M. Hayes, 3/2003 (invited speaker)

Weathering System Science Workshop, University of Deleware (NSF-EAR sponsored) 10/2005 (Breakout group Moderator and participant)

Archaeal Lipids, The Goldschmidt Conference, Moscow, ID, 5/2005 (Session organizer)

Workshop on *Proxy Development and Applications in Paleoceanography and Paleoclimatology*. Sponsored by the U.S. National Science Foundation (ATM, EAR and OCE), 12/2005 (steering committee member and invited speaker).

Roundtable Discussion on Life in a Material World, annual meeting, Board on Earth Sciences and Resources, NRC (organizer and moderator)

AAAS Abelson Advancing Science Seminar: Microbes, Minerals and the Environment, October 26, 2006, Washington, DC (invited speaker)

Paul W. Gast Lecture, Geochemical Society, V.M. Goldschmidt Meeting, August, 2007 Cologne, Germany (invited speaker).

International Meeting on Organic Geochemistry, Stable Isotope Applications, Torquay, England, September 2007 (session chair)

Short Course: Stable Isotopes in Biogeochemistry, held in association with the International Meeting on Organic Geochemistry, Torquay, England, September 2007 (Organizer and speaker)

Workshop on Biosignatures in Ancient Rocks, Sudbury, Ontario, Canada, September 2007; sponsored by NASA Astrobiology, the Agouron Institute and the Canadian Institute for Advanced Research (invited speaker).

Workshop on Equable Climates, Harvard University Center for the Environment, Harvard University, Cambridge, MA, 4-5 April, 2008 (invited participant).

Scientific Steering Committee, Workshop entitled: Unknown Knowns and Known Unknowns: Chemical Oceanography in a Changing World, 22-24 February, 2009; Savannah GA

Scientific Steering Committee, ISOCOMPOUND: Advances in analyses and applications of compound specific stable isotopes in ecology, ecosystem- and earth sciences; funded by the ESF network MOLTER and NSF network BASIN, 1-5 June 2009, Potsdam, Germany

Participant, and invited speaker, planning meeting and workshop for program in Astrobiology, Canadian Institute for Advanced Research (CIFAR); Toronto; 2/09

Steering Committee member and co-organizer, NSF-sponsored workshop, Future Directions in Geobiology and Low-Temperature Geochemistry, Washington, D.C., August, 2010

Invited Participant, NSF-sponsored workshop, Conservation Paleobiology, Paleontological Research Institution in Ithaca, NY, June 3-5, 2011

Invited speaker, "Hydrogen isotopes as environmental recorders: from water to sedimentary biomarkers through biological systems," LE STUDIUM conference, Institute for Advanced Studies, Orleans, France, September 15-16, 2011.

Invited speaker, Environmental Contexts of Early Human Evolution, Lamont Climate Center, Lamont-Doherty Earth Observatory, April 18-19, 2012

Session Chair, Gordon Research Conference on Organic Geochemistry, Holderness, NH, August, 2012

Speaking Engagements (invited; does not include professional meetings)

School of Oceanography, University of Washington, May, 1991

Skidaway Institute of Oceanography, University System of Georgia, September, 1991

Department of Chemistry and Biochemistry and Department of Geology, University of Maryland, November, 1991

Petroleum and Natural Gas Engineering, Penn State, February,1992

Department of Geology, University of Pennsylvania, February,1992

Department Earth and Planetary Sciences, Harvard University, December,1992

Department of Geological Science, Northwestern University, September, 1993

Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology, October,1993 (paleoceanography colloquium series)

Max Planck Institute for Marine Microbiology, Bremen, Germany, January, 1995

Finnigan MAT, Research and Development Division, Bremen, Germany, January, 1995

Department of Geological Sciences, Cornell University, May, 1995

Atlantic Richfield Oil Company (ARCO), Research Division, Plano, TX, October, 1995

Department of Geography, Penn State University, October,1995

Department of Geology, Lehigh University, January, 1995

Marine Science Program, University of North Carolina, Chapel Hill, February, 1996

Department of Geology & Geophysics, Yale University, February, 1997 (series on global change)

Department of Geology and Marine Geology & Geophysics Group, Graduate School of Oceanography, University of Rhode Island, March, 1997

Atlantic Richfield Oil Company (ARCO), Research Division, Plano, TX, May, 1997

Department of Geosciences, University of Minnesota, November, 1998

Department of Marine Chemistry and Geochemistry, Woods Hole Oceanographic Institution, April, 1999

Department of Geological Sciences, Indiana University, April, 1999

Department of Geological Sciences, The University of Chicago, May, 2000

Department of Geological Sciences, The University of Michigan, October, 2000 (Turner Lecture Series)

Department of Geology and Geophysices, University of Connecticut, November, 2000

Petroleum and Marine Division, Australia Geologic Survey Organization, Canberra, Australia, October, 2000

Canadian Institute for Advanced Research, Earth System Evolution; Montreal, November, 2000

Canadian Institute for Advanced Research, Earth System Evolution; Toronto, 11/02

Department of Earth and Planetary Sciences, University of Tennesee, Knoxville, 2003 (Klepser Lecturer)

Department of Geological Sciences, University of South Carolina, 2003

College of Marine Sciences, the University of South Florida, St. Petersburg, FL, March, 2005

School of Earth and Atmospheric Sciences, The Georgia Institute of Technology, Atlanta, GA., November, 2005 (Keynote Speaker for Graduate Student Symposium)

Geophysical Laboratory, Carnegie Institute of Washington, Washington, D.C., January, 2006

Department of Geology, Portland State University, Portland, OR, May, 2006

Department of Marine Sciences, Rutgers University, March, 2007

College of Science, University of Arizona, Tucson, January, 2008

Microbial Science Institute, Harvard University, Cambridge MA, April, 2008

Department of Geology, Yale University (Biogeochemistry seminar), February, 2010

Department of Marine Sciences, University of North Carolina, April, 2010

Department of Geology, University of Cincinnati, April, 2010

National Museum of Natural History, Smithsonian Institution, 11/9/2010

Department of Biology, University of Utah, 2/8/2011

Department of Earth, Atmospheric and Planetary Science, MIT, March, 2011 (Organic Geochemistry Seminar)

Craig Venter Institute, San Diego, CA, Paleobiology during the Genomics Era, 5/12/2011

Department of Earth, Atmospheric and Planetary Science, MIT, March, 2011 (Crosby Lecture)

Department of Geology, Wellesley College, Wellesley, MA, 10/18/2011

Lamont-Doherty Earth Observatory, Columbia University, Lamont, NY, 2/19/2012

Origins Lecture, Department of Geology, McMaster University, Toronto, Canada, 3/12/2012

SERVICE TO THE UNIVERSITY, PUBLIC AND PROFESSION

Service to the Pennsylvania State University

Service to the Department

1991-1998	Member, Undergraduate Program Committee
1993-1995	Member, Graduate Program Committee, Candidacy Panel
1994-1996	Alternate Representative to Dept. Executive Committee
1994	Member, Faculty Search Committee for Geochemical Record of Global Change
1995-1999	Chair, Global Change and Earth History Curriculum Committee
1996	Member, Staff Functioning Evaluation Committee
1997	Member, Search Committee for Environmental Geochemistry faculty position
1997	Member, Advisory Search Committee for Head of Geosciences Department
1997-1999	Member, Department Promotion & Tenure Committee
1997	Member, Ad Hoc Committee to evaluate appointment of S. Lvov to faculty
1997-2000	Member, Admissions Committee for graduate program in geosciences
1998	Member, Department Executive Committee
1998-1999	Member, Search Committee for Geofluids/Astrobiology faculty position
1999-2000	Member, Search Committee for C-cycle faculty position in Meteorology
1999-2001	Member, Graduate Program Committee
2000	Judge, Graduate Student Colloquium
2000-2001	Member, Search Committee for Ice and Climate faculty position in Geosciences
2000-2004	Ombudsperson, Graduate Program in Geosciences
2000-2001	Member, Promotion and Tenure Committee
2003-2004	Chair, Task Force to develop B.S. Curriculum in Geobiology
2003	Member, Search Committee for Astrobiology faculty position
2003-2004	Member, Department Executive Committee (Diversity Representative)
2004-present	Associate Head of Graduate Programs and Research
2004-present	Member, Department Executive Committee (as Associate Head)
2004-2007	Member, multiple *ad hoc* search committees for staff positions (Geoscience & EESI)
2008-2009	Member, Search Committee for Carbon Sequestration faculty position (Geosc & EME)
2009	Member, search committee for faculty position in Sedimentary Geology
2009, 2010	Participant, Shake, Rattle and Rocks (departmental outreach activity)
2011-2012	Member, Promotion and Tenure Committee
2011-2013	Member, Nominations Committee
2012	Member, Graduate Admissions Committee
2012-2013	Member, search committee for faculty position in Hydrogeology

Service to the College

1992-1994	Member, Facilities Committee
1996-2000	EMS Representative at Faculty Meetings of the College of Agricultural Sciences
2002-2003	Chair, Environment Committee and ad hoc task force on Diversity
2003-2004	Member, College Diversity Council
2004	Member, EESI Strategic Planning Committee
2005	Member, EESI ad hoc committee on future faculty hires in Earth Science and Ecology
2007	Member, Search Committee for the Associate Dean for Diversity in EMS
2012-present	Faculty Ombudsman, and member, Faculty Advisory Committee
2012	Member, SWAE committee

Service to the University

1992-present	Member, Marine Sciences Minor Committee

2000-2004	Chair, Marine Sciences Minor Committee
1992	Mentor, NSF-sponsored "Ms. Wiz" program for elementary school girls
1994-1996	Advisor, Women in Science and Engineering Research Internship Program
1995, 1996	Faculty Judge, Graduate Student Research Exposition
1999	Member, Ad-Hoc Committee on Recruitment of Women Scientists at Penn State
2002-2005	Member, Selection Committee, Faculty Scholar Medal in the Physical Sciences
2005	Chair, Selection Committee, Faculty Scholar Medal in the Physical Sciences
2008-present	Chair, Ad Hoc Task Force, Water and Energy in a Changing World
2008-present	Member, Search Committee, Director of Water Resources Research Center, PSIEE
2010-present	Supervisor, light-element stable isotope facility, Environmental Sustainability Laboratory

Service to the Profession and the Public

Service to Business and Industry

1992	Consultant on analytical methods in environmental research for Nittany Geosciences, a hydroscience firm in State College, PA
1993-1995	Reviewer, geochemistry textbooks (3 total) for John Wiley & Sons, Inc
1995-1999	Consultant on organic and isotope geochemistry of oil-field brines, ARCO, Plano, TX
1996	Instructor, 2-day short course on reservoirs, seals and source rocks in rift basins, Japan National Oil Corporation, Technology Research Center, Chiba, Japan
2000	Consultant on molecular isotopic analyses of petroleum products; Stanford University

Service to U.S. Government Agencies

1992-1994	Panel Member, National Science Foundation, Division of Ocean Sciences, Program in Chemical Oceanography
1995, 1997	Panel Member, National Science Foundation, Divisions of Ocean and Earth Sciences, Program in Environmental Geochemistry and Biogeochemistry
1998-2000	Member, Committee on Basic Research Opportunities in the Solid Earth Sciences, U.S. National Research Council
2000	Participant and report co-author, Workshop on Terrestrial Carbon Cycle, Division of Earth Sciences, National Science Foundation
2001-2003	Member, U.S. National Committee for SCOPE (Scientific Committee on Problems of the Environment); sponsored by the U.S. National Research Council
2001-2004	Member, Committee on the Origins and Evolution of Life, U.S National Research Council
2002	Panel Member, National Science Foundation, Division of Earth Sciences, Program in Geology and Paleontology
2004	Member, Chronos geochemical database working group (funded by NSF)
2005-2010	Member, Board on Earth Sciences and Resources, U.S. National Research Council
2006	Panel Member, NASA Exobiology
2008-2010	Member, Committee on the Importance of Deep-Time Geologic Records for Understanding Climate Change Impacts, U.S. National Research Council

Professional Journal Editorships

1993-1996	Associate Editor, *Organic Geochemistry*
1996-1999	Member, Editorial Advisory Board, *Geochimica et Cosmochimica Acta*
1999-2001	Associate Editor, *Geochimica et Cosmochimica Acta*
2005-2011	Member, Editorial Board, *Geobiology*
2000-present	Member, Editorial Committee, *Annual Review of Earth and Planetary Sciences*
2006-present	Associate Editor, *Annual Review of Earth and Planetary Sciences*

Service to Professional Organizations

1999	Member, Scientific Committee, 19th International Meeting in Organic Geochemistry, European Association of Organic Geochemists
1997-2000	Member, Best Paper Award Committee, Organic Geochemistry Division, Geochemical Society
1999-2001	Member, Patterson Medal Committee, Geochemical Society
2000-2006	Member, Awards Committee, European Association of Organic Geochemists
2004-2006	Vice Chairman, 2006 Gordon Research Conference in Organic Geochemistry
2006-2008	Chairman, 2008 Gordon Research Conference in Organic Geochemistry
2007-2009	Chair, Triebs Medal award committee, The Geochemical Society
2012	Chair-Elect, Organic Geochemistry Division, The Geochemical Society
2012	Member, Joint Publication Committee, The Geochemical Society
2011-2012	Member, Geochemical Fellows selection committee

Manuscripts Reviewed for: *Bulletin of the Am. Assoc. of Petroleum Geologists, Estuaries, Geochemica et Cosmochimica Acta, Geology, J. of Sed. Petrology, Limnology and Oceanology, Marine Chemistry, Global Biogeochemical Cycles, Science, Organic Geochemistry, Geology,* book chapters.

Proposals Reviewed for: American Chemical Society, Petroleum Research Fund, The National Science Foundation, NASA, international funding agencies.

External Reviewer for Hire, Tenure, and Promotion Portfolios:
The University of Massachusetts, University of Kentucky, University of Minnesota; University of California, Berkeley; Northwestern University; William and Mary; Johns Hopkins; Iowa State University; Bates College; Woods Hole Oceanographic Institute (numerous times; also served on *ad hoc* review committees); Amherst College; Michigan State University; University of California, Davis, Franklin and Marshall; Caltech; University of Stockholm; Northwestern University, York University, Yale University, Brown University

Advisory and Review Boards:

2007- present	Member, Geological Sciences Advisory Board, Department of Geological Sciences, Indiana University, Bloomington, IN
2009	Member, External Review Committee, Woods Hole-MIT Joint Ph.D. Program in Oceanography
2009-present	Member, MIT Corporation Visiting Committee, Department of Earth, Atmospheric and Planetary Sciences (EAPS)
2010-present	Member, National Ocean Sciences Accelerator Mass Spectrometry facility (NOSAMS) Advisory Board (Committee Chair: 2012)
2011	Member, Evaluation Committee, Department of Earth Sciences, ETH Zurich

Membership in Professional Societies
American Chemical Society, American Geophysical Union, European Association of Organic Geochemists, Geochemical Society, Geological Society of America, Canadian Institute for Advanced Research, American Academy of Microbiology, The Cosmos Club