

MARK ALLEN NANNY

Associate Professor - Environmental Chemistry
Boggs Professor of Engineering Education
Director – Sooner Engineering Education Center
School of Civil Engineering and Environmental Science, College of Engineering
Institute for Energy and the Environment, College of Earth and Energy
Adjunct Associate Professor - Department of Chemistry and Biochemistry
Adjunct Associate Professor – Department of Botany and Microbiology
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University of Oklahoma, 202 W. Boyd, Rm. 334, Norman, Oklahoma 73019
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EDUCATION

Wayne State University, Detroit, Michigan	B.S.	1986	Chemistry
University of Illinois, Urbana, Illinois	M.S.	1989	Chemistry
University of Illinois, Urbana, Illinois	Ph.D.	1994	Env. Chemistry
Pennsylvania State University, State College, PA	Post-Doc.	1994-1996	Env. Biogeochemistry

PROFESSIONAL EXPERIENCE

9/99 – Present Assistant and Associate (7/02) Professor, Institute for Energy and the Environment,
College of Earth and Energy, The University of Oklahoma, Norman, OK

8/96 - Present Assistant and Associate (7/02) Professor,
School of Civil Engineering and Environmental Science,
College of Engineering, The University of Oklahoma, Norman, OK

4/02 – Present Adjunct Assistant and Associate (7/02) Professor, Department of Botany and Microbiology,
College of Arts and Sciences, The University of Oklahoma, Norman, OK

11/98 - Present Adjunct Assistant and Associate (7/02) Professor,
Department of Chemistry and Biochemistry,
College of Arts and Sciences, The University of Oklahoma, Norman, OK

9/94 - 7/96 Postdoctoral Research Scholar, The Pennsylvania State University, University Park, PA

RESEARCH INTERESTS

1) Understanding and characterizing complex environmental processes at a molecular-scale level; quantitatively measuring the influence of non-covalent interactions between organic compounds and natural organic matter on the processes of bioavailability, biodegradation rates and products, pollutant aging, and electron transfer reactions of natural organic matter. 2) Characterization of complex organic mixtures, e.g., landfill leachate, lignocellulose solid wastes, natural organic matter, and wastewater. 3) Use of nuclear magnetic resonance spectroscopy and fluorescence spectroscopy to examine molecular motion of organic molecules associated covalently and non-covalently with dissolved and solid phase organic matrices such as natural organic matter, black carbon materials, and carbonaceous nanomaterials.

EDUCATIONAL RESEARCH INTERESTS

1) Authentic teaching of K-12 science and math. 2) Incorporating scientific research activities into K-12 science education and teacher preparation. 3) Improving K-12 science and mathematics education in rural schools. 4) International STEM education for high school students, teachers, undergraduates, and graduate students.

PROFESSIONAL AFFILIATIONS

American Chemical Society: Environmental Chemistry Division, Geochemistry Division
Sigma Xi; International Humic Substance Society; Universities Council on Water Resources
Society of Environmental Toxicology and Chemistry; American Society for Engineering Education

HONORS AND ACTIVITIES

Boggs Professor of Engineering Education, College of Engineering, 2009
The Regent's Award for Superior Accomplishment in Research and Creative Activities, 2007 from the Board of Regents of the University of Oklahoma.
Invited research presentation "Static, Solid-State ^2H NMR Studies of Interactions between Benzene- d_6 and Natural Organic Matter" Nanny, M.A., Eastman, M., and Brothers, L.C., Division of Physical Chemistry and Division of Geochemistry, 229 the National American Chemical Society Meeting, San Diego, CA, March 2005
Invited Research Presentation "Deuterium NMR Analysis of Molecular-Interactions Between Organic Compounds and Soil Components" Soil Science Society Annual Meeting, Charlotte, NC, October 21, 2001.
Recognition Award for Support of School Renewal from the Oklahoma Network for Excellence in Education, for work with Oklahoma City public high schools, 2000.
NSF-CAREER Award, 1998
OU Faculty Research Award 1997
Cambridge Isotope Laboratory Research Grant, 1995
Dissertation/Thesis Award for the Outstanding Water Resources Dissertation in the field of Environmental and Biological Sciences, 1st place, July 1995
Certificate of Appreciation, ACS Environmental Chemistry Division, 1994
Certificate of Merit for a Notable First Appearance at ACS National Meeting, ACS Envir. Chem. Div. 1991
Graduate Student Award, ACS Environmental Chemistry Division, 1991
Phi Lambda Upsilon Award for Undergraduate Research, 1986
Wayne State University Merit Scholarship, 1982-1986

CITATIONS (Scientific publications only; Web of Science Search)

Total citations: 660 **Average citations per item:** 10.31 **h-index:** 12 **Accessed:** 8-05-09

BOOKS (CO-EDITED) (1)

NMR Spectroscopy in Environmental Chemistry, Nanny, M.A., Minear, R.A., Leenheer, J.A., eds., Oxford University Press, 1998.

SCIENTIFIC PUBLICATIONS (34)

Salazar-Ballesteros, C.; Nanny, M.A. "Influence of Hydrogen-Bonding Upon the TiO_2 Photooxidation of Isopropanol and Acetone in Aqueous Solution" *J. of Catalysis*, in press, 2009

Sirisornprasarn, A.; Luepromchai, E.; Nanny, M.A. "Role of Dissolved Humic Substances and Dissolved Organic Matter on Degradation of Phenanthrene by Crude Ligninolytic Enzymes from *Agrocybe* sp. CU 43" *J. Applied Science*, in press, 2009

Beasley, K. K.; Gieg, L. M.; Sufлита, J. M.; Nanny, M.A. "Polarizability and Spin Density Correlate with the Relative Anaerobic Biodegradability of Alkylaromatic Hydrocarbons" *Environ. Sci. Technol.*, 43(11), 4995-5000, 2009.

McInerney, M.; Mouttaki, H.; Nanny, M.A. "The metabolism of hydroxylated and fluorinated benzoates by *Syntrophus aciditrophicus* and the detection of a fluorodiene metabolite" *Applied Environ. Microbiol.* 75, 998-1004, 2009.

AbuBakr, S.; Macmil, S.L.; Nanny, M.A.; Duncan, K.E. "Enzymatic transformation of humic substances by NDO" *Soil Biology and Biochemistry*, 40, 2055-2062, 2008.

Mouttaki, H.; Nanny, M. A.; McInerney, M. J.; "Use of benzoate as an electron acceptor by *Syntrophus aciditrophicus* grown in pure culture with crotonate" *Environmental Microbiology*, 10(12), 3265-3274, 2008.

- Gadad, P.; Nanny, M.A. "Influence of Cations on Noncovalent Interactions between 6-Propionyl-2-Dimethylaminonaphthalene (PRODAN) and Dissolved Fulvic and Humic Acids" *Water Research*, 42, 4818-4826, 2008.
- Zhu, X; Nanny, M. A.; Butler, E. C. "Photocatalytic Oxidation of Aqueous Ammonia in Model Grey Waters" *Water Research*, 42, 2736-2744, 2008.
- Ratasuk, N.; Nanny, M.A. "Characterization and Quantification of Reversible Redox Sites in Humic Substances," *Envir. Sci. Technol.*, 41(22) 7844-7850, 2007.
- Gadad, P.; Li, H.; Nanny, M.A. "Characterization of Noncovalent Interactions between 6-Propionyl-2-Dimethylaminonaphthalene (PRODAN) and Dissolved Fulvic and Humic Acids," *Water Research*, 41, 4488-4496, 2007.
- Eastman, M.A.; Nanny, M. A., "Fitting of Deuterium Quadrupole Echo Spectra with Multiple Motional Models" *Journal of Magnetic Resonance*, 184(2), 302-314, 2007.
- Zhu, Xingdong; Nanny, Mark A., and Elizabeth C. Butler "Effect of inorganic anions on the titanium dioxide-based photocatalytic oxidation of aqueous ammonia and nitrite," *Journal of Photochemistry and Photobiology, A: Chemistry*, 185(2-3), 289-294, 2007.
- Mouttaki, Housna; Nanny, Mark A. and Micheal J. McInerney, "Cyclohexane Carboxylate and Benzoate Formation from Crotonate in *Syntrophus aciditrophicus*" *Applied and Environmental Microbiology*, 73(3), 930-938, 2007.
- Irene A. Davidova, Lisa M. Gieg, Mark Nanny, Kevin G. Kropp, and Joseph M. Suflita "Stable Isotopic Studies of *n*-Alkane Metabolism by a Sulfate-Reducing Bacterial Enrichment" *Applied and Environmental Microbiology*, 71(12), 8174-8182, 2005.
- Zhu, X., Castleberry, S.R., Nanny, M.A., and Butler, E.C. "Effect of pH and Catalyst Concentration on the Photocatalytic Oxidation of Aqueous Ammonia and Nitrite in Titanium Dioxide Suspensions" *Environmental Science & Technology*. 39, 3784-3791, 2005.
- Chen, L., Nanny, M.A., Knappe, D.R.U., Wagner, T.B., and Ratasuk, N. "Chemical Characterization and Sorption Capacity Measurements of Degraded Newsprint from a Landfill" *Environ. Sci. Technol.*, 38(13) 3542-3550, 2004.
- Leenheer, J.A., Nanny, M.A., and McIntyre, C. "Terpenoids as Major Precursors of Dissolved Organic Matter in Landfill Leachates, Surface Water, and Groundwater" *Environ. Sci. Technol.*, 37(11), 2323-2331, 2003
- Nanny, M.A. and N. Ratasuk "Characterization and comparison of hydrophobic neutral and hydrophobic acid dissolved organic carbon isolated from three municipal landfill leachates" *Wat. Res.*, 36, 1572-1584, 2002.
- Wu, Bingyan; Taylor, Caleb M.; Knappe, Detlef R. U.; Nanny, Mark A.; Barlaz, Morton A. "Factors Controlling Alkylbenzene Sorption to Municipal Solid Waste." *Environ. Sci. Technol.* , 35(22), 4569-4576, 2001
- Nanny, M.A. and Maza, J.P. "Noncovalent Interactions between Monoaromatic Compounds and Dissolved Humic Acids: A Deuterium NMR T₁ Relaxation Study" *Environ. Sci. Technol.*, 35 (2), 379-384, 2001.
- Elshahed, M.S., Bhupathiraju, V.K., Wofford, N.Q., Nanny, M.A., and M.J. McInerney "Metabolism of benzoate, cyclohex-1-ene carboxylate and cyclohexane carboxylate by *Syntrophus aciditrophicus* strain SB in syntrophic association with H₂-using microorganisms" *Applied and Environmental Microbiology*, 67 (4), 1728-1738, 2001.
- Nanny, M.A. "Deuterium NMR Characterization of Noncovalent Interactions Between Monoaromatic Compounds and Fulvic Acids" *Organic Geochemistry*, 901-907, 1999.

del Rio, J.C.; McKinney, D.E.; Knicker, H.; Nanny, M.A.; Minard, R.D.; Hatcher, P.G. "Structural characterization of bio- and geo-macromolecules by off-line thermochemolysis with tetramethylammonium hydroxide" *Journal of Chromatography A*, 823, 433-448, 1998.

Selifonov, S.A.; Chapman, P.J.; Akkerman, S.B.; Gurst, J.E.; Bortiatynski, J.M.; Nanny, M.A.; Hatcher, P.G. "Use of ^{13}C -NMR to Assess Fossil Fuel Biodegradation: Fate of 1- ^{13}C -Acenaphthene in Creosote Polycyclic Aromatic Compounds Mixtures Degraded by Bacteria" *Appl. Environ. Microb.*, 64 (4), 1447-1453 1998.

Nanny, M.A.; Minear, R.A. "Characterization of Soluble Unreactive Phosphorus Using ^{31}P Nuclear Magnetic Resonance Spectroscopy", *Marine Geol.*, 139, 77-94, 1997.

Nanny, M.A.; Bortiatynski, J.M.; Hatcher, P.G. "Non-covalent interactions between acenaphthenone and dissolved fulvic acid as determined by ^{13}C NMR T_1 relaxation measurements", *Environ. Sci. Technol.*, 31(2), 530-534, 1997.

Nanny, M.A.; Bortiatynski, J.M.; Tien, M.; Hatcher, P.G. "Investigations of Enzymatic Alterations of 2,4-Dichlorophenol Using ^{13}C NMR in Combination with Site-Specific ^{13}C -Labeling: An Important Step in Understanding the Environmental Fate of this Pollutant", *Environ. Toxic. Chem.*, 15(11) 1857-1864, 1996.

Hatcher, P.G.; Nanny, M.A.; Minard, R.D.; Dible, S.D.; Carson, D.M., "Comparison of two thermochemolytic methods for the analysis of lignin in decomposing wood: The CuO oxidation method and the method of thermochemolysis with tetramethylammonium hydroxide (TMAH)" *Org. Geochem.* 23(10) 881-888, 1996.

Nanny, M.A.; Kim, S.; Minear, R.A. "Aquatic Soluble Unreactive Phosphorus: HPLC Studies on Dissolved Organic Phosphorus in Concentrated Lake Water Samples" *Water Research*, 29(9), 2138-2148, 1995.

Nanny, M.A.; Minear, R.A. "Use of Lanthanide Shift Reagents with ^{31}P FT-NMR Spectroscopy to Analyze Concentrated Lake Water Samples", *Environ. Sci. Technol.*, 28(8), 1521 - 1527, 1994.

Nanny, M.A.; Kim, S.; Gadomski, J.E.; Minear, R.A. "Aquatic Soluble Unreactive Phosphorus: Concentration by Ultrafiltration and Reverse Osmosis", *Water Research*, 28(6), 1355-1365, 1994.

Buchanan, R.M.; Mashuta, M.S.; Richardson, J.F.; Oberhausen, K.J.; Hendrickson, D.N.; Webb, R.J.; Nanny, M.A. "Synthesis, Structure, and Properties of a Novel Heterobimetallic $\text{Fe}^{3+} \text{Mn}^{2+}$ Complex Containing a Septadentate Polyimidazole Ligand," *Inorg. Chem.*, 29, 1301-1302, 1990.

Vincent, J.B; Huffman, J.C; Christou, G.; Li, Q.; Nanny, M.A.; Hendrickson, D.N.; Fong, R.H.; Fish, R.H. "Modeling the Dinuclear Sites of Iron Biomolecules: Synthesis and Properties of $\text{Fe}_2\text{O}(\text{OAc})_2\text{Cl}_2(\text{bipy})_2$ and Its Use as an Alkane Activation Catalyst," *J. Am. Chem. Soc.*, 110, 6898-6900, 1988.

Himmelsbach, M.; Lintvedt, R.L.; Zehetmair, J.K.; Nanny, M.A.; Heeg, M.J. "Neutral Bimetallic Macrocyclic Complexes. 1. Investigation of Mono- and Bimetallic Complexes of Tetraiminato Macrocyclic Complexes Derived from 1,3,5-Triketones," *J. Am. Chem. Soc.*, 109, 8003-8011, 1987.

SCIENTIFIC JOURNAL ARTICLES UNDER REVIEW (1)

Siripornprasarn, A.; Luepromcha, E.; Nanny, M.A. "Mechanisms by which Dissolved Humic Substances Alter the Kinetics of Pentachlorophenol Degradation" submitted to *Soil Biology and Biochemistry*, 2009

BOOK CHAPTERS (8)

Suflita, J.M., Davidova, I.A., Geig, L.M., Nanny, M., and Prince, R.C. "Anaerobic hydrocarbon biodegradation and the prospects for microbial enhanced energy production" in Petroleum Biotechnology: Developments and Perspectives – Studies in Surface Science and Catalysis 151, Vazquez-Duhalt, R. and Quintero-Ramirez, R. Eds., 283-305, 2004. Elsevier B.V. 2004. The Netherlands.

- Minear, R.A.; Nanny, M.A. "The Role of Chemical Indices in Environmental Program Evaluation", in Environmental Program Evaluation: A Primer, Knaap, G.J.; Kim, T.J.; Fittipaldi, J. eds., University of Illinois Press, Urbana, IL, 129-147, 1998.
- Nanny, M.A.; Minear, R.A. "³¹P FT-NMR of Concentrated Lake Water Samples" in NMR Spectroscopy in Environmental Chemistry, Nanny, M.A.; Minear, R.A.; Leenheer, J.A. Eds., Oxford University Press, New York, New York, 221-246, 1997.
- Knicker, H.; Nanny, M.A. "Nuclear Magnetic Resonance Spectroscopy - Basic Theory and Background", in NMR Spectroscopy in Environmental Chemistry, Nanny, M.A., Minear, R.A., Leenheer, J.A., eds., Oxford University Press, 3-18, 1997.
- Nanny, M.A. "Sorption Processes in the Environment: Nuclear Magnetic Resonance Spectroscopy as a New Analytical Method" in NMR Spectroscopy in Environmental Chemistry, Nanny, M.A., Minear, R.A., Leenheer, J.A., eds., Oxford University Press, 19-25, 1997.
- Minear, R.A.; Nanny, M.A. "Solution and Condensed Phase Characterization", in NMR Spectroscopy in Environmental Chemistry, Nanny, M.A., Minear, R.A., Leenheer, J.A., eds., Oxford University Press, 123-129, 1997.
- Nanny, M.A.; Minear, R.A.; Leenheer, J.A. "Research Needs for Environmental NMR", in NMR Spectroscopy in Environmental Chemistry, Nanny, M.A., Minear, R.A., Leenheer, J.A., eds., Oxford University Press, 313-316, 1997.
- Nanny, M.A.; Minear, R.A. "Organic Phosphorus in the Hydrosphere: Characterization via ³¹P FT-NMR" in Environmental Chemistry of Lakes and reservoirs, Advances in Chemistry Series, 161 - 191, Baker, L. ed., American Chemical Society, Washington D.C., 1993

SCIENTIFIC REPORTS (4)

- Pham, T.; Nanny, M. "Spent Catalyst Adsorption of Naphthenic Acids from Aqueous Waste Streams" Report for ConocoPhillips, 2008.
- Nanny, M.A.; Philp, R.P.; Andrusevich, V.E. "A Continuation: Humate-Induced Remediation of Petroleum Contaminated Surface Soils" Report for Integrated Petroleum Environmental Consortium, 2004.
- Nanny, M.A.; Philp, R.P.; Andrusevich, V.E. "Humate-Induced Remediation of Petroleum Contaminated Surface Soils" Report for Integrated Petroleum Environmental Consortium, 2001.
- Nanny, M.A.; Minear, R.A. "Analysis and Characterization of Dissolved Organic Phosphorus in the Mississippi River by HPLC and ³¹P FT-NMR". Report for the United States Geological Survey at Denver, Colorado, 1993.

EDUCATION PUBLICATIONS AND CONFERENCE PROCEEDINGS (8)

- Hardree, P.; Slater, J.; Nanny, M.A. "Redesigning and Aligning Assessment and Evaluation for a Federally-funded Science Teacher Education Program" *Evaluation and Program Planning*, in press, 2009.
- Hardree, P.; Nanny, M.A. Refai, H.; Slater, J. "Re-Engineering a Dynamic Science Learning Environment for K-12 Teachers" *Teacher Education Quarterly*, in press, 2009.
- Nanny, M.A., Brown, C., and Murphy, T.J. "Turning techno-savvy into info-savvy: Authentically integrating information literacy into the science curriculum," *Extended Abstracts of the 232th American Chemical Society Meeting, San Francisco, CA, September, 2006*.

Goudar, C.T., and Nanny, M.A. "A MATLAB Toolbox for Solving Acid-Base Chemistry Problems in Environmental Engineering Applications" *Computer Applications in Engineering Education* 13(4), 257-265, 2005.

Fry, T.L.; Reed Rhoads, T.; Nanny, M.A.; and O'Hair, M.J. "A Survey of Authentic Teaching in Secondary Math and Science Classrooms" *2003 American Society for Engineering Education Annual Conference, Conference Proceedings*

Brown, C.; Murphy, T.J.; Nanny, M.A., "Turning Techno-Savvy into Info-Savvy: Authentically Integrating Information Literacy into the Science Curriculum" *The Journal of Academic Librarianship*. 29(6), 386-398, 2003.

Reed-Rhoads, T., Nanny, M.A., and O'Hair, M.J. "A Combined Engineering and Education Class at the University of Oklahoma: Preparing Authentic Science and Math Educators, *2002 American Society for Engineering Education Annual Conference & Exposition, Conference Proceedings*

Nanny, M.A.; Proto, C.; Fedick, J. "Integrating the University and Hands-On Activities into the High School Science Curriculum: A Research-Based Outreach Program," *ASEE 34th Midwest Section Conference Proceedings*, April 16, 1999.

EDUCATION JOURNAL ARTICLES UNDER REVIEW OR IN REVISION (1)

Goudar, C.T.; Nanny, M.A. "Effective Solution Chemistry Instruction by Integrating Live pC-pH Diagrams in PowerPoint" *Computer Applications in Engineering Education*, in review, 2009.

OTHER PUBLICATIONS (1)

Nanny, M.A. "100 Years of Planetary Chemistry in Science Fiction", in Chemistry in Science Fiction, Jack Stockard ed., American Chemical Society Books, 1998. (Book chapter)

EXTERNAL SCIENTIFIC RESEARCH FUNDING – PAST AND PRESENT (16)

Total external funding: \$6,359,661 (Individual credit: \$2,090,298)

PENDING – MSB: Inventory of Microbial Diversity at Hot Springs National Park, AR: Influence of Temperature and Geochemistry, National Science Foundation, CoPI 33% credit; \$695,624, Paul Lawson, Bradley Stevenson.

PENDING – Acquisition of X-Ray Nano Tomography System for 3D Microstructural Characterization of Heterogeneous Materials, DOD-OSR, U.S. Department of Defense, Air Force Office of Scientific Research, AFOSR-BAA-2009-5; DURIP: Defense University Research Instrumentation, Total \$564,800; CoPI 16.2% credit; \$91,418; Mrinal Saha, Daniel Resasco, M. Altan, and James Baldwin.

Removal of Aqueous Phase Naphthenic Acids by Absorption to Solid-Phase and Colloidal Mineral Oxide Sorbants, ConocoPhillips; PI: 100% credit; \$253,000 total; 01/01/08 – 12/31/09.

Public Perception of Noise Barriers in Oklahoma, State of Oklahoma, Dept. of Transportation, \$67,500, Nanny, M.A.PI (50% of credit); and Zaman, Musharraf. 3/17/05-3/16/07.

Oklahoma NASA EPSCoR, NASA, Renewal Years 4 & 5, \$83,220, Duca-Snowden, V.; Butler, E.; Nanny, M.A.; Dickens, M.; Furneaux, J. 06/30/04- 08/31/07.

Anaerobic Biodegradation of Petroleum Hydrocarbons: Fundamental Science to Determine In Situ Rates of Metabolism, National Science Foundation, Suflita, J.; Gieg, L. and Nanny, M., \$500,000, 09/01/03 – 08/31/06

Humate Induced Remediation of Petroleum Contaminated Surface Soils in Siberia, Russia: Behavior of Different Crude Oil Components in Various Soils, National Academy of Sciences and Collaboration in Basic Science and Engineering (COBASE), Nanny, M.A (PI, 50% credit), and Andrusivich, V. \$7,400. 09/03/03 – 09/02/04.

Bioavailability of Aromatic Hydrocarbons and Dynamics of Their Interactions with Humic and Fulvic Acids: Linking Molecular- and Microbial-Scale Interactions, National Science Foundation, BES-0210839, Nanny, M.A. (PI 50% credit), Duncan K., and Eastman, M., \$850,000 (Individual credit \$425,000), 10/01/02 – 09/30/09.

A Continuation: Humate-Induced Remediation of Petroleum Contaminated Surface Soils, Integrated Environmental Petroleum Consortium, 14-2-1201270-94843, Nanny, M.A. (PI), Andrusivich, V. and Philp, R.P., \$133,136 (Individual credit \$66,568) 09/04/02 – 09/03/03.

Oklahoma NASA EPSCoR” NASA, Duca-Snowden, V.; Butler, E.; Nanny, M.A.; Dickens, M.; Furneaux, J. \$2,099,007, (Individual credit \$251,881) 07/01/01 – 06/30/04.

Sequestration Mechanisms and Bioavailability of Tetrachloroethene and Toluene in Solid Waste, National Science Foundation, subcontracted to North Carolina State University, Drs. Barlaz, M. and Knappe, D., Nanny, M.A. \$137,345, (Individual credit \$137,345) 06/01/01 – 05/31/04.

REU Supplement to “Molecular-Level Characterization of Bonding and Bioavailability of Monoaromatic Pollutants Associated with Dissolved Organic Carbon, National Science Foundation CAREER Award BES9732969, Nanny, M.A., “, \$5,000, 2000.

Humate-Induced Remediation of Petroleum Contaminated Surface Soils, Integrated Petroleum Environmental Consortium, Nanny, M.A. (PI), and R.P. Philp, \$102,228 with OU matching \$62,200, and Surbec ART matching \$15,000. (Individual credit: \$89,714), 7/01/00 – 6/30/01.

Development of an Improved Photocatalytic Oxidation Process for the NASA Advanced Water Recovery System, NASA EPSCoR Research Initiation Grant, Nanny, M.A., Harris, T. M., and E. Butler, \$18,854, 9/15/00 – 12/15/00.

Intrinsic Anaerobic Bioremediation of Hydrocarbons in Contaminated Marine Sediments, U.S. Department of Defense, Office of Naval Research, N00014-99-1-0076, Nanny, M.A., Suflita, J.M., and R.P. Philp, \$450,486, 1999 – 2001

Intrinsic Anaerobic Bioremediation of Hydrocarbons in Contaminated Marine Sediments, U.S. Department of Defense, Office of Naval Research, N00014-99-1-0076, Nanny, M.A. and Suflita, J.M., \$606,170, (Individual credit \$228,004) 10/01/98 – 09/30/02.

Molecular-Level Characterization of Bonding and Bioavailability of Monoaromatic Pollutants Associated with Dissolved Organic Carbon, National Science Foundation CAREER Award BES9732969 Nanny, M.A., \$196,245 (plus OU matching of \$71,500), 1998 – 2002.

The Chemistry, Toxicity, and Bioavailability of Sediments and Soils Contaminated with Landfill Leachate. AZUR Environmental Corporation, PI: M. Nanny; Co-PI D. Nelson, R. Nairn, \$10,000, 6/01/97

INTERNAL RESEARCH FUNDING - PAST AND PRESENT (5)

Total Internal Funding: \$59,846 (Individual Credit: \$25,447)

Request for Funds to Purchase a Fluorescence Spectrometer Thermostat, OU Research Council; PI: 100% credit; \$2,847; 8/15/07.

Regents Match for the Oklahoma NASA EPSCoR” NASA, Renewal Years 4 & 5, \$42,999, Duca-Snowden, V.; Butler, E.; Nanny, M.A.; Dickens, M.; Furneaux, J., 06/30/04- 08/31/07.

Over \$750 Request Program “Request for Funds for a Gas Chromatograph / Mass Spectrometer” PI: M. Nanny, OU - Office of Research Administrat., 5/98, \$6,000

Over \$750 Request Program “Request for Funds for a MICROTOX Bioassay Analyzer to Examine the Chemistry, Toxicity, and Bioavailability of Sediments and Soils Contaminated with Landfill Leachate” PI M. Nanny, CoPI D. Nelson & R. Nairn. OU - Office of Research Administrat., \$6,000, 6/97

Junior Faculty Research Program. “Dismantling the Black-Box of Pollutant Fate and Transport: Identifying and Characterizing Chemical Interactions Between Aromatic Compounds and Dissolved Organic Matter,” PI: M. Nanny, OU - Office of Research Administrat. \$6,000, 06/01/97 to 08/31/97

EXTERNAL EDUCATIONAL FUNDING – PAST AND PRESENT (12)

Total Internal Funding: \$6,470,091 (Individual Credit: \$2,796,594)

PENDING – Teachers in the University Learning Engineering Research, NSF-RET, \$588,310, 20% credit \$117,662; Chen Ling, Randa Shehab, Hazem Refai, and Patricia L. Hardré, 1/01/2010 – 12/31/2012.

PENDING - Creating Critical Connections in Math and Science through Engineering, OK State Department of Education, Putnam City Schools; \$70,000 50% credit; PI 50% credit \$35,000; CoPI Susan Walden, 04/01/10-05/31/11.

PENDING - Promoting Research Opportunities for Students (PROFS): Engaging STEM Faculty and Students through Pods of Authentic Research Experiences; Howard Hughes Medical Institute, \$2,192,500, CoPI 20%, \$438,500, Gordon Uno, Mark Morvant, Barbara Greene, Jean Cate, and Linda Atkinson, 8/15/10 – 8/14/14.

Creating Critical Connections in Math and Science through Engineering, OK State Department of Education, Putnam City Schools; PI: 50% credit; \$65,684 total; with Susan Walden, 04/01/09-05/31/10.

Workshop for Conversations Related to Motivating Interest in Science, Mathematics, and Engineering among Oklahoma K12 Students, National Science Foundation, Susan Walden, Mark Nanny, Simin Pulat, Deborah Trytten, Randa Shehab, \$49,996, 4/1/08 – 9/30/10.

NSF Supplement - Type 2 -- GK-12--Engineering in Practice for a Sustainable Future; PI: 20% \$98,865 total; with M.J. O’Hair, S. Walden, D. Trytten, L. Williams; 1/1/08-4/30/11.

Engineering in Practice for a Sustainable Future, National Science Foundation; PI: 20% credit; \$2,000,000 total; with M.J. O’Hair, S. Walden, D. Trytten, L. Williams; 5/01/06 – 4/30/11.

RET SITE: Teachers in the University Learning Engineering Research, NSF; 20% credit; \$449,995 total; with H. Refai (PI); 6/1/06 – 8/29/08.

Teacher Quality and Student Success: Testing the K20 Science Professional Development Model (K20 Science) for Rural Science Teachers; National Science Foundation; 10% credit; \$994,297 total; with M.J. O’Hair (PI), B. Greene; S. Walden; J. Cate; G. Uno; D. O’Hair; L. Atkinson; 10/01/06 – 9/30/09.

GAANN Doctoral Fellowships, US DoEd, 2003 – 2006, (Individual credit < \$10,000)

OK-ACTS and OETT: Development Professional Learning Communities in Oklahoma” Oklahoma Educational Technology Trust, \$5,250,000, O’Hair, M.J.; Maiden, J.; Nanny, M.A.; and Garn, G., 08/01/02 – 07/31/06

Oklahoma Leadership and Technology Development: A Gates Partnership, The Bill and Melinda Gates Foundation, O’Hair, M.J.; Maiden, J.; Nanny, M.A.; and Garn, G. \$1,320,000, (Individual credit \$330,000) 07/01/01 – 06/30/04.

GK-12 - The Authentic Teaching Alliance, The National Science Foundation, Nanny, M.A. (PI); Reed-Rhoads, T.; and O' Hair, M.J. \$1,491,154, (Individual credit \$497,051) 03/01/01 – 02/28/05

Research Experience for Undergraduates in GeoEnvironmental Systems. NSF REU Site Award, Year 3, 3/1/00 to 2/28/05 (Individual credit < \$10,000)

Enhancing Environmental Education for High School Students, Instructors, and Undergraduates: Student Research and the Closed Norman Landfill, Environmental Protection Agency – Environmental Education, Award NE98608-01-0, Nanny, M.A., \$5,000 (plus OU matching \$5,589), 08/17/98 to 08/16/99

ENGINEERING EDUCATION PROGRAMS

Director of the Sooner Engineering Education Center (2008 – present) and **Boggs Professor of Engineering Education** (2009 – present). As part of the College of Engineering's efforts to become a prominent leader in engineering education, the Sooner Engineering Education Center (SEED) was developed in 2008. SEED encompasses engineering education related to K-12 outreach, undergraduate education, graduate education, and educational research. SEED's mission is dedicated to recruiting, nurturing and retaining diverse students within the engineering pipeline ranging from elementary school students to graduate students. Specifically, SEED is dedicated to the creation and application of innovative engineering education initiatives and research leading to: 1) effective K-12 outreach to increase the quantity of prepared students entering engineering and for community engagement of engineering students and faculty; 2) enhanced educational experiences generating highly-prepared and motivated engineering graduates, and 3) innovative research to enhance undergraduate engineering student diversity and retention. In 2009, SEED was specifically included in the College of Engineering's new 5-year strategic plan. For the efforts in establishing and directing SEED, the Boggs Professor of Engineering Education was bestowed in 2009.

Master of Education with a Concentration in STEM Education (2010 – 2012) This collaborative graduate program between the College of Engineering and the College of Education will start in Fall 2010 and will be housed in the Instructional Leadership and Academic Curriculum Department (ILAC), College of Education. I have developed it in collaboration with Dr. Jon Pederson (Associate Dean, College of Education; now at the University of Nebraska), Dr. Tim Laubach, Dr. Stacy Reeder and several other ILAC faculty. This program is the first of its kind in the nation. It will provide an avenue for students with a BS, MS, and Ph.D. degree in science, technology, engineering or mathematics (STEM) to earn a Masters of Education (M.Ed.) graduate degree in *STEM education*, specialization in teaching at either: 1) the middle or secondary school level or 2) the college /university level. The first specialization track will lead to full teacher certification in the State of Oklahoma. Both specialization tracks provide substantial mentoring and co-teaching opportunities with exemplary science /mathematics teachers or STEM faculty at a college or university. The initial efforts for this program are supported by the funding of NSF GK-12 renewal grant "Type 2 -- GK-12--Engineering in Practice for a Sustainable Future" that started March 2006 (5 years, \$2M). This 2-year degree program is being used as a prototype for the College of Education as it develops additional M.Ed. programs in other areas such as language arts and the social sciences.

ENGR 4113/5113 Science, Engineering, and Mathematics Educational Outreach for STEM Majors (2001 – present) This course was originally designed for graduate students participating in our NSF GK-12 program, but due to great interest from upper undergraduate and graduate students in STEM outside of the GK-12 program, the College of Engineering made it a formal course in 2008. This course is designed for STEM majors interested in educational outreach at any age level. This course introduces the fundamentals of cognition, educational psychology and pedagogy, and shows how these topics relate to learning. Critical review and analysis of STEM education in light of best teaching practices, school cultural issues, gender issues, and ethnic cultural issues are explored. Two authentic, guided inquiry-based STEM lessons are developed and taught in K-12 classrooms or similar education venues. Field site observations and interactions with educational professionals are used to emphasize practical application of learning theory. Writing skills are emphasized through short papers, a final journal article for submission to a teaching journal, an educational reflection journal, and a teaching portfolio.

Engineering in Practice for a Sustainable Future (2006-2011) – This is a renewal NSF GK-12 grant originating from the Authentic Teaching Alliance. It implements a sustainable engineering education program engaging

graduate STEM students with rural high school students and teachers through classroom interactions, summer academies, and a dual graduate degree in engineering and education, along with an education minor for engineering undergraduate students.

Summer Engineering Academy (2007-present) - This annual two-week Academy is funded by the NSF GK-12 grant "Engineering in Practice" and is a collaboration between the College of Engineering and the K20 Center. The first week is a Teacher-only academy and is designed for current and future EiP cooperating teachers. We investigate one authentic, guided inquiry lesson per day with the EiP graduate Fellows leading the sessions. After each lesson, we discuss the theoretical underpinnings of inquiry teaching as related to each lesson. By experiencing these lessons and the subsequent pedagogical discussions, EiP cooperating teachers develop a better sense of how and why our graduate Fellows follow a specific approach to lesson development. We then take a field trip as an application activity for each lesson in the afternoon. In the second week, the Teacher-Student academy is held at the K20 Center. This academy is designed for those current and future EiP cooperating teachers who attended the Teacher-Only academy and 30 students. Each teacher along with the assistance of the Fellows leads students through a chosen lesson that was experienced the previous week. After each lesson, the Fellows and teachers will conduct a brief lesson study to enhance the implementation of each lesson. The field trips experienced during the Teacher-Only academy also occur in the afternoon sessions of the Teacher-Student academy.

International Engineering Academy – K-12 Collaboration with the Prince of Songkla University, Hat Yai, Thailand (2008 – present) This program is currently supported by NSF, \$98,865, 2 year supplemental awarded Feb. 2008. In March 2009, four OU graduate students, one OK high school teachers, along with 2 EiP staff and myself, traveled to Hat Yai, Thailand for three weeks to work with 30 Thai high school STEM teachers, several STEM faculty from Prince of Songkla University, and 60 Thai high school students, implementing authentic, guided inquiry STEM lessons related to: 1) Treatment of Drinking Water and Water Quality Parameters, 2) Wind Energy, and 3) Coastal Erosion and Wave Energy. In addition, the K-20 Center provided \$5K funding to bring 4 Thai STEM faculty and high school science teachers to OU for two weeks to participate in our Summer Engineering Academy 2008, as well as 2 Thai STEM high school teachers to OU SEA in 2009. A second trip to PSU is in planning. The next phase of the International Engineering Academy is the implementation of a web-based platform allowing web camming, blogging, collaboration on projects and documents between teachers and students from Oklahoma and Thailand. Once this is established, we desire to include teachers and students from other countries. This program utilizes the INSPIRE web project developed at the K20 Center.

Teachers in The University: Learning Engineering Research (2006-2008) This NSF RET program at the University of Oklahoma will develop a successful model for: 1) engaging high school science and mathematics teachers in engineering research at the university-level; 2) assisting teachers with integrating their research experiences into authentic, inquiry-based curricula and using action research to evaluate their progress; and, 3) building a sustainable network of teachers and faculty who will facilitate these goals.

Oklahoma Science Project (2004 – 2007) - The K20 OSP Model links rigorous STEM content, particularly science and technology, with authentic learning strategies to enhance 7-12 STEM education in rural schools. Intense year-long professional development for 75 teachers over 5 years includes 4-week summer research institutes; quarterly meetings to share learning with additional 150 teachers through lesson study, teacher networking and technological curriculum resources.

Oklahoma Achievement through Collaboration and Technology Support (2001 – 2006) - OK ACTs is a \$6.45 million educational technology program supported by the Bill and Melinda Gates Foundation and the Oklahoma Education Technology Trust. The goal of OK ACTs is to educate principals and superintendents how to incorporate technology into their schools and districts, as well as provide funds (up to \$79,000) to purchase technology equipment and provide technology training for teachers. To date, over 600 Oklahoman principals and superintendents have participated in Phase I of the program, and just this year, 21 schools moved to Phase II, being awarded \$79,000 to implement their proposed educational technology plans. In the next two years of OK-ACTs, 21 new schools per year will be awarded grants and move into Phase II. Dr. Nanny is a Co-P.I. of OK-ACTs. (http://www.ou.edu/center/oklahomaacts/oklahomaacts_info.htm).

The Authentic Teaching Alliance (2001-2005) - The Authentic Teaching Alliance (ATA) is an interdisciplinary program between the College of Engineering and the Center for Educational and Community Renewal at the University of Oklahoma. This NSF-funded program focuses on developing authentic activities, emphasizing technology, for secondary science and math curricula. ATA's goal is to develop these authentic activities by incorporating undergraduate and graduate students (i.e., Fellows) from science, engineering, math, and math and science education into secondary classrooms. NSF GK-12 award (DGE0086415). Dr. Nanny is the director of ATA. (www.coe.ou.edu/ata).

Enhancing Environmental Education (1998 – 2001) – A high school outreach program linking university faculty and students with high school students and science instructors by conducting research on environmental problems that are relevant to the local community. Intended to enhance secondary science education by incorporating real-world environmental science issues into the curriculum. Dr. Nanny organized and directed this program, which was funded by his NSF-CAREER award (BES9732969).

TEACHING - COURSES TAUGHT

Course	Times taught	Dates taught	# of students	Notes
<u>University of Oklahoma</u>				
ES 1112 - Intro. to Environmental. Science	3	Fall 97 Fall 98 Fall 00	20 10 6	Developed this new ES course for freshman; team-taught w/ Dr. Nairn; some group-learning; emp. learning skills, tool, & scientific knowledge. In 2000, interfaced with senior Microbiology lab course.
ES 2111 – Environmental Science Seminar	1	Sp. 00	6	Freshman level seminar
CEES 2323 – Environmental Fate & Transport	5	Sp. 02 Sp. 04 Sp. 07 Sp. 08 Sp. 09	5 7 14 12 6	Sophomore level core course; real application using data from hydrocarbon contaminated field sites and interaction with engineers and hydrologists from the Petroleum Tank Storage Division of the Oklahoma Corporation Commission
ES 3603 – Environmental Protection	1	Fall 01	4	Junior level ES core course
CEES 4473 – Soil Science	4	Fall 99 Sp. 03 Sp. 05 Fall. 06	8 5 5 5	Laboratory portion emphasized analysis of different Oklahoma soils.
CEES 4114 - Chemical Aspects of Environmental Science	3	Fall 96 Fall 97 Sp. 99	15 12 31	Senior-level environ. chemistry Implemented group learning; emp. scientific writing skills & analytical instrumentation in labs
CEES 5114 - Principles of Environmental Chemistry (Fall 2000 - renamed Aquatic Chemistry CEES 4114/5114)	8	Sp. 97 Sp. 98 Fall 98 Fall 99 Fall 03 Fall 05 Fall 07 Fall 09	12 10 5 12 10 14 19	Grad.-level environ. chemistry; team based learning; emp. scientific writing skills & analytical instrumentation in labs
CEES 5020 - Instrumentation for Environmental Analysis	1	Fall 97	8	Developed new grad. course
CEES 5020 - Chemical Limnology	1	Su. 98	8	Field course at OU Biological Station, Lake Texoma; develop new course

CEES 5283 - Environmental Organic Chemistry	5	Fall 98 Sp. 01 Sp. 04 Sp. 05 Fall 08	5 4 10 4 5	Created this new course
CEES 5873 Water Quality Monitoring	1	Fall 02	6	Graduate course focusing on the relationship between predictive models and environmental measurements
CEES 6210 Environmental Issues, Community Renewal, and the Future of Education	2	Sp. 05 Sp. 08	18 16	Taught in the K20 Center Masters Degree program
ENGR 4510 – Integrating Authentic Science and Math in Secondary Schools (In 2008, made a permanent course and renamed “ENGR 4113/5113 Science, Engineering, and Mathematics Educational Outreach for STEM Majors”)	7	Fall 01 Fall 02 Fall 03 Fall 06 Fall 07 Fall 08 Fall 09	4 6 8 7 5 5 6	Co-taught with OU science education faculty; for upper undergraduate and graduate engineering and science students interested in teaching
<u>Prince of Songkla University (Hat Yai)</u>				
Aquatic Chemistry	1	Su. 08	12	Upper undergrad course
<u>Chulalongkorn University (Bangkok)</u>				
Environmental Chemistry	6	Fall 03 Fall 04 Fall 05 Fall 06 Su. 07 Su. 09	45 50 38 40 20	Grad.-level environ. chemistry; emphasize problem solving methods & MINTEQL+
Environmental Organic Chemistry	2	Su. 06 Su. 08	27 20	First time offered at Chulalongkorn University as an elective.
<u>Pennsylvania State University</u>				
Introduction to Environmental Science	4	Sp 04 Su 05 Fa 05 Sp 06	20 - 30	Intro. course for students with no science background; emphasized critical thinking & scientific knowledge
<u>University of Illinois</u>				
Freshman Chemistry Laboratory	16		25 - 30	Supervised & taught lab skills
Freshman Chemistry Laboratory Czar	12		25 - 100	Taught lab lectures, assisted in development and

implementation of new experiments.

Graduate and postdoctoral advisors

Roger A. Minear, Professor, University of Illinois, Department of Civil Engineering, Urbana, IL. (Retired)
Patrick G. Hatcher, Professor, Old Dominion University, Dept. of Chemistry, Norfolk, VA.

Postdoctorate Researchers and Visiting Scientists in my Research Laboratory

Dr. Vlad Andrus (2001-2002)
Dr. Taha Elmorsi (2003-2004)
Dr. Hongxia Lei (2004-2005)

Matriculated Master Degree Graduate Students (4)

Jesus Maza – M.S. Environmental Science, 2001, “Chemical Characterization of Humic and Fulvic Acids Isolated from Pristine, Petroleum-Contaminated, and Bioremediated Mollisols”
Cassandra Kontas - M.S. Environmental Science 2002, “Fluorescent Spectroscopic Analysis of Humic and Fulvic Acid Micelle-like Character with 6-propionyl-2-dimethylaminonaphthalene (PRODAN)”
Steven Rice - M.S. Environmental Engineering, 2008, “Humate-Induced Remediation of Crude-Oil Contaminated Surface Soil”
Tu Pham – M.S. Chemistry – Non-thesis topic “Biodegradation of Benzene- d_6 Associated with Various Black Carbon Materials by *Pseudomonas Putida* strain F1: A ^2H NMR study” 2009.

Matriculated Doctorate Degree Graduate Students (5)

Nopawan Ratasuk - Ph.D. Environmental Science, 2004, “Electron mediating capacity of landfill humic acids as a function of landfill age and redox environment.”
Praveen Gadad - Ph.D. Environmental Engineering, 2008, “Noncovalent Interactions between 6-Propionyl-2-dimethylaminonaphthalene (PRODAN) and Dissolved Fulvic Acids and Humic Acids”
Apaporn Siripornprasarn – Ph.D., Hazardous Waste and Environmental Management, 2008, “Role of Humic Substances on the Degradation of Aromatic Compounds by Oxidoreductive Enzymes”
Carolina Salazar - Ph.D. Analytical Chemistry, 2009, “Kinetic Studies on the Role of Hydrogen-bonding Interactions in the TiO_2 Photooxidation of Small Polar Organic Compounds in Aqueous Solution”
Cindy Brothers – Ph.D. Analytical Chemistry, (anticipated graduation date – December 2009), “Molecular Dynamics Studies of Benzene- d_6 Associated with Black Carbon Using Line Shape Analysis of Static Solid-State ^2H Nuclear Magnetic Resonance Spectra”

Current Graduate Students (2)

Keisha Kohler - Ph.D. Environmental Science (Anticipated graduation date – December 2009)
Pummarin Khamdagsag – M.S. Hazardous Waste and Environmental Management, Chulalongkorn University, Co-advisor, 2010

Current Undergraduate Students (3)

Aaron Westbrook – B.S. Chemical Engineering, (B.S. Graduation date, 2009); is applying to the accelerated BS/MS program and will use undergraduate research towards his M.S. degree.
Chad Pape - B.S. History (Graduation date 2010)
Megan Kirby – B.S. Chemistry, (Graduation date, 2011)

SERVICE

School of Civil Engineering and Environmental Science

Environmental Science Minor Program - developed w/ Dr. Nelson and currently maintain	2004 - present
CEES Student Advising Committee	2003 - present
CEES Scholarship Committee (Chair since 2000)	1999 - present
Faculty Supervisor, CEES Research Equipment Specialist (departmental technician)	1999 - present
Faculty advisor – Environmental Science Student Association	2004 - 2009
Faculty advisor for OU Environmental Chemistry “Oklahoma Water Watch” Student Group	1999 - 2007
We monitored the water quality at Lake Thunderbird (at three shoreline sites) every month for the Oklahoma Water Resources Board (OWRB). Starting in 2004, the Environmental Science Student Association (ESSA) took Water Watch as one of their projects and was successful in recruiting and training several ES and EE students to become certified Water Watch volunteers.	
Organized Environmental Graduate Student Seminar	1998 - 2002

College of Engineering

Director – Sooner Engineering Education Center (SEED)	2008 - present
Search Committee – Manager of Engineering Practice Facility Machine Shop	2009
Course Evaluation Committee	2006
College of Engineering Academic Appeals Committee	2001 -
present	

University of Oklahoma

Planning Committee – Future of K20 Center	2009
OU Education Strategic Research Initiative Task Force, Committee member	2005 - 2006
OU Nanoscale Strategic Research Initiative Task Force, Co-Chair	2004 - 2005
Department of Botany and Microbiology, tenure-track faculty search committee	2004, 2007
College of Education, tenure-track science education faculty search committee	2009
K20 Center, research faculty & assoc. director search committee	2004
Graduate Faculty Academic Misconduct Panel, CoE representative	2002 - present
Board of Advisors - K20 Center for Educational and Community Renewal	2007 - present
Partnership Board Member – K20 Center for Educational and Community Renewal	1999 - present

Professional – National

American Chemical Society, Environmental Chemistry Division	
Environmental Chemistry Division International Committee	
– develop collaborations between ACS, ENVR Division and EuCheMS, Environmental Chemistry Division and Serbian Chemical Society	2009
– develop Environmental Chemistry Education outreach program	2009
Executive Committee-Member at Large	2002 - present
Speaker Expense Committee Chair	2003 - present
Editor of EnvirofACS & Division’s Website (www.envirofacs.org)	2005 - present
Proposal mail-panel review: National Institute of Health, NIH Challenge Grants on STEM Topics	2009
Women in Science Planning Committee - OK EPSCoR	2006
Proposal panel review: National Science Foundation, Environmental Technology Program	2002
Proposal panel review: National Science Foundation, NSF Graduate Teaching Fellows in K-12 Education Program	2002
Brock Symposium on Excellence in Education; Discussion group leader for the topic “Math, Science,	2002

and Engineering Education,” University of Oklahoma Chaired Bioremediation Symposium at IPEC Conference, Houston, TX	2001
Co-editor of special issue of <i>Organic Geochemistry</i> , examining the biogeochemistry of polycyclic aromatic hydrocarbons in the environment.	1999
Co-organizer of the ACS symposium “The Biogeochemistry of Aromatic Hydrocarbons”, presented at 214th 214 th National American Chemical Society Meeting, Dallas, TX	1998
Co-organizer and planner of the symposium, "NMR Spectroscopy in Environmental Science and Technology", 205th National American Chemical Society, Denver, Colorado	1993
Professional – International	
Co-Chair of Hazardous Waste session, International Conference on Hazardous Waste Management for a Sustainable Future, Bangkok, Thailand	2006
Co-Organizer (w. Dr. Morton Barlaz) and Chair of 2 symposia 4 th International Landfill Research Symposium Lapland, Sweden	2005-2006

Past and Present Collaborators

Morton Barlaz, North Carolina State University, Civil and Environmental Engineering
Elizabeth Butler, University of Oklahoma, Civil Engineering & Environmental Science
Kathleen Duncan, University of Oklahoma, Department of Botany and Microbiology
Margaret Eastman, Oklahoma State University, Department of Chemistry and Biochemistry
Puangrat Kajitvichyanukul, King Mongkutt University of Technology, Thonburi, Thailand
Detlef Knappe, North Carolina State University, Civil and Environmental Engineering
Jerry A. Leenheer, United States Geological Survey
Ekawan Luepromchai, Chulalongkorn University, Bangkok, Thailand, Microbiology Department
Mike McInerney, University of Oklahoma, Dept. of Botany & Microbiology
Paul Philp, University of Oklahoma, School of Geology and Geophysics
Pichaya Rachdawong, Chulalongkorn University, Environmental Engineering Department, Bangkok, Thailand
Debra R. Reinhart, University of Central Florida, Department of Civil and Environmental Engineering
Joseph Suflita, University of Oklahoma, Department of Botany and Microbiology
Ralph Tanner, University of Oklahoma, Department of Botany and Microbiology