

Owen Duckworth

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EXPERIENCE

- 2007-Pres. Assistant Professor of Soil Biogeochemistry
Department of Soil Science
North Carolina State University, Raleigh, North Carolina
- 2010 Visiting Professor
Department of Environmental Geosciences
University of Vienna, Vienna, Austria
- 2003-2007 Postdoctoral Scholar
Division of Ecosystem Sciences
University of California, Berkeley, California
Advisor: Garrison Sposito

EDUCATION

- Ph.D.** *Engineering and Applied Sciences, 2003*
Harvard University, Cambridge, Massachusetts
Dissertation Title: “*Macroscopic and Microscopic Perspectives on the Dissolution of Carbonate Minerals*”
Advisor: Scot T. Martin
- M.S.** *Environmental Sciences and Engineering, 2000*
University of North Carolina, Chapel Hill, North Carolina
Master’s Thesis Title: “*Ligand-Promoted Dissolution of Hematite: Relationships between Surface Complexation Structures and Dissolution Rate Constants*”
Advisor: Scot T. Martin
- B.S.** *Chemistry and Geology, cum laude, 1997*
College of William and Mary, Williamsburg, Virginia
High-Honors Thesis Title: “*The Environmental History of the Upper Lake Matoaka Delta Drainage Basin*”
Advisors: Gary W. Rice and Gerald H. Johnson

AWARDS/HONORS

- 2008 NCSU Faculty Research and Professional Development Award
- 2001-2003 Sandia National Laboratories Campus Executive Fellow
- 2000 Student Poster Prize, Environmental Division, ACS Fall National Meeting
- 1998-2001 USEPA STAR Fellow
- 1997 University of North Carolina B.B. Parker Fellow

- 1997-1998 North Carolina Board of Governors' Fellow
 1997 High-Honors Bachelor's Thesis
 College of William and Mary Department of Geology Alumni Prize
 Baldwin- Speece Environmental Award
 1996 William and Mary Parents' Association Scholarship for Domestic Research
 1993-1997 Monroe Scholar
 Dow Chemical Scholar

PEER-REVIEWED PUBLICATIONS (22)

1. Saal, L.B., and **Duckworth, O.W.** (2010) Synergistic Dissolution of Manganese Oxides as Promoted by Siderophores and Small Organic Acids, *Soil Science Society of America Journal*, **74**, 2021-2031.
2. Bi, Y., Hesterberg, D. L., and **Duckworth, O.W.** (2010) Siderophore-Promoted Dissolution of Cobalt from Hydroxide Minerals, *Geochimica et Cosmochimica Acta*, **74**, 2915-2925.
3. Kim, D., **Duckworth, O.W.**, and Strathmann, T.J. (2010) Reactions of aqueous iron-DFOB (desferrioxamine B) complexes with flavin mononucleotide in the absence of strong iron(II) chelators, *Geochimica et Cosmochimica Acta*, **74**, 1513-1529.
4. Smits, M.M., Herrmann, A. M., Duane, M., **Duckworth, O.W.**, Bonneville, S., Benning, L., and Lundström, U. (2009) The fungal-mineral interface: Challenges and considerations of micro-analytical developments, *Fungal Biology Reviews*, **23**, 122-131.
5. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. (2009) Coupled Biogeochemical Cycling of Iron and Manganese as Mediated by Microbial Siderophores, *BioMetals*, **22**, 605-613.
6. **Duckworth, O.W.**, Bargar, J.R., Jarzecki, A.A., Oyerendi, O. Spiro, T.G., and Sposito, G. (2009) An Exceptionally Stable Cobalt(III)–Desferrioxamine B Complex. *Marine Chemistry*, **113**, 114-122.
7. Kim, D., **Duckworth, O.W.**, and Strathmann, T.J. (2009) Hydroxamate Siderophore-Promoted Reduction of Nitroaromatic Contaminants by Iron(II), *Geochimica et Cosmochimica Acta*, **73**, 1297-1311.
8. **Duckworth, O.W.**, Holmström, S.J.M., Peña, J., and Sposito, G. (2009) Biogeochemistry of Iron Oxidation in a Circumneutral Freshwater Habitat. *Chemical Geology*, **260**, 149-158.
9. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. (2009) Quantitative-Structure Activity Relationships for Aqueous Metal-Siderophore Complexes. *Environmental Science and Technology*, **43**, 343–349.
10. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. (2008) Sorption of Ferric Iron from Ferrioxamine B to Synthetic and Biogenic Layer Type Manganese Oxides, *Geochimica et Cosmochimica Acta*, **72**, 3371-3380.
11. Peña, J., **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. (2007) Dissolution of Hausmannite in the Presence of the Trihydroxamate Siderophore Desferrioxamine B. *Geochimica et Cosmochimica Acta*, **71**, 5661-5671.
12. **Duckworth, O.W.** and Sposito, G. (2007) Siderophore-Promoted Dissolution of Synthetic and Biogenic Layer Type Mn Oxides. *Chemical Geology*, **242**, 500-511.

13. **Duckworth, O.W.**, and Sposito, G. (2005) Siderophore-Manganese(III) Interactions I. Air-Oxidation of Manganese(II) Promoted by Desferrioxamine B. *Environmental Science and Technology*, **39**, 6037-6044.
14. **Duckworth, O.W.**, and Sposito, G. (2005) Siderophore-Manganese(III) Interactions II. Manganite Dissolution Promoted by Desferrioxamine B. *Environmental Science and Technology*, **39**, 6045-6051.
15. Perry, T.D., **Duckworth, O.W.**, Kendall, T.K., Martin, S.T., and Mitchell, R. (2005) Chelating Ligand Alters the Microscopic Mechanism of Mineral Dissolution. *Journal of the American Chemical Society*, **127**, 5744-5745.
16. Perry, T.D., **Duckworth, O.W.**, McNamara, C.J., Martin, S.T., and Mitchell, R. (2004) The Effects of the Biologically Produced Polymer Alginic Acid on Macroscopic and Microscopic Calcite Dissolution Rates. *Environmental Science and Technology*, **38**, 3040-3046.
17. **Duckworth, O.W.**, Cygan, R.T., and Martin, S.T. (2004) Linear Free Energy Relationships between Dissolution Rates and Molecular Modeling Energies of Rhombohedral Carbonates. *Langmuir*, **20**, 2938-2946.
18. **Duckworth, O.W.**, and Martin, S.T. (2004) Dissolution Rates and Pit Morphologies of Rhombohedral Carbonate Minerals. *American Mineralogist*, **89**, 554-563.
19. **Duckworth, O.W.**, and Martin, S.T. (2004) Role of Molecular Oxygen in the Dissolution of Siderite and Rhodochrosite. *Geochimica et Cosmochimica Acta*, **68**, 607-621.
20. **Duckworth, O.W.**, and Martin, S.T. (2003) Connections between Surface Complexation and Geometric Models of Mineral Dissolution Investigated for Rhodochrosite. *Geochimica et Cosmochimica Acta*, **67**, 1787-1801.
21. **Duckworth, O.W.**, and Martin, S.T. (2001) Surface Complexation and Dissolution of Hematite by C₁-C₆ Dicarboxylic Acids at pH = 5.0. *Geochimica et Cosmochimica Acta*, **65**, 4289-4301.
22. Martin, S.T., Schlenker, J.C., Chelf, J.H., and **Duckworth, O.W.** (2001) Structure-Activity Relationships of Mineral Dusts as Heterogeneous Nuclei for Ammonium Sulfate Crystallization from Supersaturated Aqueous Solutions. *Environmental Science and Technology*, **35**, 1624-1629.

PROFESSIONAL ACTIVITIES

Reviewer for the three federal funding agencies, a private foundation, 15 scientific journals, and a national laboratory.

Proposal review panel member for two federal agencies.

Symposium Organization:

Roles of Speciation and Molecular Structure in Soil Processes (Co-organizer: A.T. Stone) at the Joint Meeting of the GSA and the Tri-Societies, Houston, TX October 5-9, 2008.

Structure and Reactivity of Organic Species at Mineral Surfaces (Co-organizers: S. M. Kraemer and A.T. Stone) at the Goldschmidt Annual Meeting in Davos, CH June 21-26, 2009.

Nanogeology: How Nanoparticle Structure and Composition Lead to Function and Reactivity (Co-organizers: P.A. Maurice, A.N. Quicksall, C. Na, T.A. Kendall) at the Goldschmidt Annual Meeting in Knoxville, TN June 13-19, 2010.

Member of the American Chemical Society, American Geophysical Union, Geological Society of America, Soil Science Society of North Carolina, and the Geochemical Society.

Invited Discussion Leader: *Separate and combined contributions of fungi and bacteria to weathering*, Geomycology workshop, Uppsala, Sweden, May 7-9, 2008.

INVITED PRESENTATIONS (25)

1. **Duckworth, O.W.**, Bi, Y., Harrington, J., Saal, L.B., Jarzecki, A. A., and Bargar, J.R., *New Roles for Siderophores in the Biogeochemical Cycling of Transition Metals*, presented at the Department of Environmental Geosciences, University of Vienna, November 9, 2010.
2. **Duckworth, O.W.**, Bi, Y., Harrington, J., Saal, L.B., Jarzecki, A. A., and Bargar, J.R., *New Roles for Siderophores in the Biogeochemical Cycling of Transition Metals*, presented at the Department of Biology, Appalachian State University, September 1, 2010.
3. **Duckworth, O.W.**, Bi, Y., Jarzecki, A. A., and Bargar, J.R., *The structure and reactivity of cobalt-siderophore complexes*, presented at the Goldschmidt Annual Meeting, June 13-19, 2010.
4. **Duckworth, O.W.**, *The Biogeochemistry of Natural and Anthropogenic Nanoparticles*, presented at the Nanotechnology Integration Forum , North Carolina State University, March 23, 2010.
5. **Duckworth, O.W.**, Bargar, J.R., Bi, Y., Peña, J., Saal, L.B., and Sposito, G. *Effects of Rhizosphere Exudates on Trace Metal Biogeochemistry*, presented at the Department of Crop Science, North Carolina State University, October 29, 2009.
6. **Duckworth, O.W.**, Bargar, J.R., Bi, Y., Peña, J., Saal, L.B., and Sposito, G. *New Roles for Siderophores in Metal Speciation and Transport*, presented at the Department of Geography and Environmental Engineering, Johns Hopkins University, October 13, 2009.
7. **Duckworth, O.W.**, Bargar, J.R., Peña, J., Saal, L.B., and Sposito, G. *The Reactivity of Siderophores at Manganese Oxide Surfaces*, presented at the American Chemical Society National Meeting, Salt Lake City, Utah, March 22-26, 2009.
8. **Duckworth, O.W.**, Peña, J., Bargar, J.R., Jarzecki, A.A., Spiro, T.G., and Sposito, G. *Siderophore-Mediated Biogeochemical Cycling of Transition Metals*, presented at the Department of Environmental Engineering and Earth Sciences, Clemson University, September 26, 2008.
9. **Duckworth, O.W.**, Peña, J., Bargar, J.R., Martin, S.T., and Sposito, G. *Environmental Science at the Earth's Surface: the Dirt on Soil Biogeochemistry*, presented at the Department of Geology at the College of William and Mary, September 17, 2008
10. **Duckworth, O.W.**, Peña, J., Bargar, J.R., Jarzecki, A.A., Spiro, T.G., and Sposito, G. *Siderophore-Mediated Biogeochemical Cycling of Transition Metals*, Presented at the Department of Environmental Sciences and Engineering, California Institute of Technology, March 5, 2008.

11. **Duckworth, O.W.** *Bioavailability and Bioremediation of Contaminant Metals*, Presented at the Annual Soil Science Society of North Carolina Meeting, Raleigh, North Carolina, January 22-23, 2008.
12. **Duckworth, O.W.**, Holmström, S.J.M., Peña, J., Zacharias, E.H. and Sposito, G. *Biogeochemistry of Iron Oxidation in a Circumneutral Freshwater Habitat*. Presented at the American Geophysical Union National Meeting, San Francisco, California, December 10-14, 2007.
13. **Duckworth, O.W.**, and Sposito, G. *Nature's Own Nanoparticles: Bacteriogenic Manganese Oxides as Agents of Biogeochemical Change*. Presented at the 2007 Geological Society of America National Meeting, Denver, Colorado, October 28-31, 2007.
14. **Duckworth, O.W.**, Peña, J., Bargar, J.R., Jarzecki, A.A., Spiro, T.G., and Sposito, G. *The Role of Siderophores in the Biogeochemical Cycling of Transition Metals*. Presented at the Department of Plant and Soil Sciences, University of Delaware, September 27, 2007.
15. **Duckworth, O.W.** *Molecular and Nanoscale Approaches to Soil Biogeochemical Processes*. Presented at the Department of Soil Science, North Carolina State University, November 30, 2006.
16. **Duckworth, O.W.**, and Sposito, G. *The Effects of the Adsorption of Biogenic Ligands on the Dissolution of Manganese Oxides*. Presented at the 2006 Geological Society of America National Meeting, Philadelphia, Pennsylvania, October 22-25, 2006.
17. **Duckworth, O.W.**, and Sposito, G. *Mn(III)-Siderophore Complexes: Formation, Stability, and Reactivity*. Presented at the 2006 Gordon Research Conference on Environmental Bioinorganic Chemistry, Andover, New Hampshire, June 18-23, 2006.
18. **Duckworth, O.W.** *Novel Approaches to Environmental Mineral Surface Chemistry*. Presented at the Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, April 11, 2006.
19. **Duckworth, O.W.** *Interfacial Environmental Chemistry of Reactive Minerals*. Presented at the Department of Chemical and Environmental Engineering, University of California-Riverside, Riverside, California, March 1, 2006.
20. **Duckworth, O.W.** *Scratching the Surface: Dissolution of Reactive Mineral Phases*. Presented at the Department of Chemistry, Physics, and Geology, Winthrop University, February 13, 2006.
21. **Duckworth, O.W.**, and Sposito, G. *Formation of Manganese-Desferrioxamine B Complexes by Dissolution of Manganese Oxides*. Presented at the annual Goldschmidt Conference, Moscow, Idaho, May 20-25, 2005.
22. **Duckworth, O.W.**, Cygan, R.T., and Martin, S.T. *Relationships between Molecular Modeling Energies and Dissolution Rates of Rhombohedral Carbonates*. Presented at the Telluride Workshop: Chemical Reactivity of Aqueous Species at Mineral Surfaces, Telluride, Colorado, June 24-27, 2003.

23. **Duckworth, O.W.**, Cygan, R.T., and Martin, S.T. *Physical and Chemical Perspectives on Carbonate Dissolution*. Presented at the Geochemistry Department, Sandia National Laboratories, Albuquerque, New Mexico, May 20, 2003.
24. **Duckworth, O.W.**, Cygan, R.T., and Martin, S.T. *Physical and Chemical Perspectives on Carbonate Dissolution*. Presented at the Department of Geosciences, The State University of New York, Stony Brook, New York, March 13, 2003.
25. **Duckworth, O.W.**, and Martin, S.T. *Ligand-Promoted Dissolution of Hematite: Relationship between Surface Complexation Structures and Dissolution Rate Constants*. Presented at the Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, Massachusetts, October 2, 2000.

CONTRIBUTED PRESENTATIONS AND CONFERENCE PROCEEDINGS (34)

1. Wu, L., Osmond, D.L., Graves, A.K., Burchell, M.R., and **Duckworth, O.W.** *Dentrification and Molecular Detection in Riparian Buffer Soils*, presented at the Society of Wetland Scientist Meeting, Salt Lake City, Utah, June 27- July 2, 2010.
2. Wu, L., Osmond, D.L., Graves, A.K., Burchell, M.R., and **Duckworth, O.W.** *Dentrification and Molecular Detection in Riparian Buffer Soils*, presented at the Annual Soil Science Society of North Carolina Meeting, Raleigh, North Carolina, January 19-20, 2010.
3. D. Kim, **Duckworth, O.W.**, and Strathmann, T.J.. *Reactions of Aqueous Iron-DFOB (Desferrioxamine B) Complexes with Flavin Mononucleotide in the Absence of Strong Iron(II) Chelators*, presented at the American Chemical Society National Meeting, San Francisco, CA, March 21-25, 2010.
4. **Duckworth, O.W.** and Saal, L.B. *Synergistic Effects of Siderophores and Small Organics at Manganese Oxide Surfaces*, presented at Goldschmidt Annual Meeting, Davos, SUI, June 21-26, 2009.
5. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. *Sorption of Iron from Siderophore Complexes by Mn Oxides*, Presented at the at the Joint Meeting of the Geological Society of America, American Society of Agronomy, Crop Science Society of America, Soil Science Society of America, Gulf Coast Association of Geological Societies, Houston, Texas, 5-9 October, 2008.
6. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. *Sorption of Iron from Siderophore Complexes by Mn Oxides*, Presented at the American Chemical Society National Meeting, Philadelphia, Pennsylvania, August 17-21, 2008.
7. Bi, Y. and **Duckworth, O.W.** *Siderophore-mediated dissolution of Co-substituted goethite*, presented at the American Chemical Society National Meeting, Salt Lake City, Utah, March 22-26, 2009.
8. Bi, Y. and **Duckworth, O.W.** *Siderophore-promoted dissolution of Co-bearing minerals*, presented at the Annual Soil Science Society of North Carolina Meeting, Raleigh, North Carolina, January 19-20, 2009.
9. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. *Sorption of Iron from Siderophore Complexes by Mn Oxides*. Presented at annual Goldschmidt Conference, Vancouver, British Columbia, July 13-18, 2008.

10. D. Kim, **Duckworth, O.W.**, and Strathmann. T.J. *Abiotic Reduction of Organic Contaminants by Iron(II)- Siderophore Complexes*. Presented at the American Chemical Society National Meeting, New Orleans, LA, April 6-10, 2008.
11. **Duckworth, O.W.**, Holmström, S.J.M., Peña, J., Zacharias, E.H. and Sposito, G. *Biogeochemistry of Iron Oxidation in a Circumneutral Freshwater Habitat*. Presented at the 2007 Geological Society of America National Meeting, Denver, Colorado, October 28-31, 2007.
12. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. *Sorption of Ferric Iron from Ferrioxamine B to Synthetic and Biogenic Layer Type Manganese Oxides*. Presented at the American Geophysical Union National Meeting, San Francisco, California, December 11-15, 2006.
13. **Duckworth, O.W.**, Bargar, J.R., Jarzecki, A.A., Spiro, T.G., and Sposito, G. *Structure and Stability of Metal-Siderophore Complexes*. Presented at the American Chemical Society National Meeting, San Francisco, California, September 10-14, 2006. (also presented at Sci-Mix session)
14. **Duckworth, O.W.**, Peña, J. and Sposito, G. *Siderophore-Promoted Dissolution of Mn(II,III,IV) oxides*. Presented at the American Chemical Society National Meeting, San Francisco, California, September 10-14, 2006.
15. **Duckworth, O.W.**, Bargar, J.R., and Sposito, G. *Sorption of Ferrioxamine B to Synthetic and Biogenic Layer Type Mn Oxides*. Presented at the American Geophysical Union National Meeting, San Francisco, California, December 5-9, 2005.
16. Martin, S.T., Jun, Y.S., Kendall, T.A., and **Duckworth, O.W.** *Nucleation and growth of manganese oxide films*. Presented at the annual Goldschmidt Conference, Moscow, Idaho, May 20-25, 2005.
17. Oyerinde O.F., Balakrishnan G., **Duckworth O.W.**, Villalobos M., Sposito G., Spiro T.G. *Raman spectroscopic studies of manganese oxides: Structure and reactivity*. Presented at the American Chemical Society National Meeting, San Diego, California, March 17-21, 2005.
18. **Duckworth, O.W.**, and Sposito, G. *Formation and Stability of Manganese-Desferrioxamine B Complexes*. Presented at the American Geophysical Union National Meeting, San Francisco, California, December 13-17, 2004.
19. Martin, S.T. and **Duckworth, O.W.** *Role of molecular oxygen in the dissolution of siderite and rhodochrosite*. 11th International Symposium on Water-Rock Interaction. Saratoga Springs, NY, June 27- July 4, 2004.
20. Perry, T.D., **Duckworth, O.W.**, McNamara, C.J. , Martin, S.T., Breuker, M., and Mitchell, R. *Biologically produced polymers affect calcite dissolution*.
21. **Duckworth, O.W.**, and Sposito, G. *Desferrioxamine B-Promoted Dissolution of Manganite*. Presented at the American Chemical Society National Meeting, Anaheim, California, March 28-April 1, 2004.
22. Martin, S.T. and **Duckworth, O.W.** *Role of molecular oxygen in the dissolution of siderite and rhodochrosite*. Presented at the American Chemical Society National Meeting, Anaheim, California, March 28-April 1, 2004.
23. Perry, T.D., **Duckworth, O.W.**, McNamara, C.J., Martin, S.T., and Mitchell, R. *Alginate Accelerates Calcite Dissolution*. Presented at the American Geophysical Union National Meeting, San Francisco, California, December 8-12, 2003.

24. **Duckworth, O.W.**, and Martin, S.T. *The Effect of Oxygen on Siderite and Rhodochrosite Dissolution*. Presented at the American Chemical Society National Meeting, New York, New York, September 7-11, 2003.
25. Perry, T.D., **Duckworth, O.W.**, McNamara, C.J., Martin, S.T., and Mitchell, R. *Alginic Acid Accelerates Calcite Dissolution*. Presented at the American Chemical Society National Meeting, New York, New York, September 7-11, 2003.
26. **Duckworth, O.W.**, and Martin, S.T. *The Effect of Oxygen on Siderite and Rhodochrosite Dissolution*. Presented at the American Geophysical Union National Meeting, San Francisco, California, December 8-12, 2003.
27. **Duckworth, O.W.**, and Martin, S.T. *Rhodochrosite Dissolution Investigated Simultaneously by Flow-Through Reactor and Atomic Force Microscopy: Quantitatively Linking Surface Complexation Modeling to AFM Observations*. Presented at the 2002 Gordon Research Conference on Environmental Science: Water, Plymouth, New Hampshire, June 23-28, 2002.
28. **Duckworth, O.W.**, and Martin, S.T. *Dissolution and Oxidation of Rhodochrosite and Siderite Investigated by Macroscopic and Microscopic Methods*. Presented at the American Chemical Society National Meeting, Orlando, Florida, April 7-11, 2002.
29. **Duckworth, O.W.**, and Martin, S.T. *Dissolution Rates and Mechanisms of Calcite and Smithsonite Investigated by Macroscopic and Microscopic Methods*. Presented at the 2001 USEPA STAR Fellowship Conference, Washington, District of Columbia, August 20-24, 2001.
30. **Duckworth, O.W.**, and Martin, S.T. *Relationship between Rates of Ligand-Promoted Dissolution of Hematite and the Iron-Ligand Surface Structures of C₁-C₆ Dicarboxylic Acids*. Presented at the American Chemical Society National Meeting, Washington, District of Columbia, August 20-24, 2000.
31. Martin, S.T. and **Duckworth, O.W.** *Dicarboxylate ligands adsorbed to hematite: Surface complexation structures inferred from ATR IR spectra*. Presented at the American Chemical Society National Meeting, Washington, District of Columbia, August 20-24, 2000.
32. **Duckworth, O.W.**, and Martin, S.T. *Ligand-Promoted Dissolution of Hematite: Relationship between Surface Complexation Structures and Dissolution Rate Constants*. Presented at the USEPA STAR Fellowship Conference, Washington, District of Columbia, July 9-12, 2000.
33. **Duckworth, O.W.**, and Martin, S.T. *Ligand-Assisted Dissolution of Hematite*. Presented at the USEPA STAR Fellowship Conference, Washington, District of Columbia, July 17-20, 1999.
34. Bishop, J.W. and **Duckworth, O.W.** *Ammonium affinity of sediments in ENCORE microatolls*. 8th International Coral Reef Symposium, Panama City, Panama, June 24 -29, 1996.

TEACHING AND CURRICULUM DEVELOPMENT

Taught graduate Soil Chemistry (SSC 521), Spring 2008

Developed and taught new undergraduate course: Soil and Environmental Biogeochemistry (SSC 495/442), Spring 2009, 2010

Guest lecturer in Professional Development in Soil Science SSC (609/809), Advanced Soil Chemistry (SSC 722), and Duke University's Introduction on Environmental Engineering (CE24)

AWARDS WON BY STUDENTS

Yuqiang Bi: 2008 *Stevens Graduate Student Fellowship*, 2009 *Outstanding Student Poster Prize at the Soil Science Society of North Carolina Meeting*, 2009 *American Chemical Society Graduate Student Award in Environmental Chemistry*

Lin Wu: 2009 *Society of Wetland Scientists Student Grant*