

CHRISTOPHER WARREN SCHADT

Molecular Microbial Ecology Group

Biosciences Division

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Primary Research interests

- Soil and subsurface microbiology as it relates to biogeochemical cycling and bioremediation
- Plant-Microbe interactions in the rhizosphere
- Development of molecular methodologies for the study of the ecology of microorganisms
- Identification of the interrelationships between genomics and environmental niche definitions of microorganisms
- Use of genomics enabled methods for inferring and tracking the functional abilities and activities of microorganisms in the environment

Education

University of Colorado, Biology, Ph.D., May 2002

University of Washington, Botany, B.S., March 1996

Professional Positions

Group Leader, Molecular Microbial Ecology Group, ORNL, 2007- Present

Staff Scientist, ORNL, 2007- Present

Adjunct Professor, University of Tennessee, Dept. of Microbiology, 2007-Present

Associate Staff Scientist, ORNL, 2005-2006

Postdoctoral Research Associate, Oak Ridge National Laboratory, 2003-2005

Postdoctoral Research Associate, University of Colorado, 2002-2003

Graduate Research Assistant, University of Colorado, 1998-2002

Grants and awards

PI, ORNL-LDRD Program – 2007

"Carbon Drivers of the Microbe Switchgrass Rhizosphere Interface"

Co-PI, DOE-ERSP program (Lead PI: Jardine) – 2007

"Multiscale Investigations on the Rates and Mechanisms of Targeted Immobilization and Natural Attenuation of Metal, Radionuclide and Co-Contaminants in the Subsurface"

Co-PI, DOE-GTL Program (Lead PIs: Hazen & Arkin, LBNL) – 2006

"Virtual Institute for Microbial Stress and Survival"

Co-PI, ORNL-LDRD Program (Lead PI: Norby) – 2006

"Disentangling Soil Respiration Using Genomic Techniques"

Co-PI, DOE-PER Program (Lead PI: Wullschleger) – 2005

"Hierarchical Experimental Responses at Macromolecular to Ecosystem Scales"

Co-PI, DOE-NABIR Program (Lead PI: Palumbo) - 2004

"An Integrated Assessment of Geochemical and Community Structure Determinants of Metal Reduction Rates in Subsurface Sediments"

Co-PI, DOE-TCP Program (ORNL Lead PI: Graham) - 2004

"Consortium for enhancing Carbon Sequestration in Terrestrial Ecosystems"
University of Colorado Graduate Student Travel Grants - 1998 & 2000
Beverly Sears Graduate Student Research Grants - 1997 & 1999
Edna Bailey Sussman Graduate Student Research Grant - 1998

Professional service

BESD Seminar Committee - 2008 to Present
Steering Committee, NSF - Fungal Environmental Sampling and Informatics Network – 2007 to present
Steering Committee, LSP-JGI Fungal Genome Sequencing Program – 2006 to 2008
Panel Member, National Science Foundation, Polar Programs - 2006
Occasional Reviewer for the journals below:
Arctic, Alpine and Antarctic Research, Applied and Environmental Microbiology, Environmental Microbiology, Science, Microbial Ecology, Molecular Ecology, Mycorrhiza, Oecologia, New Phytologist, Soil Biology and Biogeochemistry, Soil Science Society of America Journal.
Univ. of Colorado, United Government of Graduate Students Representative – 1998 & 1999

Professional Societies

American Society for Microbiology
Ecological Society of America
Mycological Society of America
Soil Ecology Society

Student and Postdoctoral Mentoring and Committees

Dissertation Advisor for Emily Austin, University of Tennessee
Graduate committee member for Enid Rodriguez (MS Student, University of Puerto Rico Mayaguez); Emily Hollister (PhD Student, Texas A&M University); Sean Berthrong (PhD Student, Duke University); Katherine Sides (Ph.D Student, University of Tennessee) & Mellissa Cregger (Ph.D Student, University of Tennessee)
Postdoctoral Advisor for Hector Castro, Marie-Anne De Graaff, Sanghoon Kang, Amudhan Venkateswaran, Tingfen Yang, Gengxin Zhang
Hosted and Advised 18 Undergraduate students, 2 High School Science Teachers, 2 Visiting Faculty & 3 high school students for Research Internships through the Oak Ridge Institute for Science and Education (ORISE)

Invited lectures in past three years

Soil Ecology Society Meeting, May 2005 (*Keynote Address for Day 3*)
Mycological Society of America, August 2005
Ecological Society of America, Annual Meeting, August 2005
Appalachian State University, Departmental Seminar, October 2005
University of Puerto Rico-Mayaguez, Departmental Seminar, May 2006
University of Oklahoma, Departmental Seminar, June 2006
Long Term Ecological Research Network Meeting, Estes Park Colorado, Sept 2006
University of Tennessee, Dept. of Microbiology, December 2006
American Society of Microbiology General Meeting, May 2007

Ecological Society of America Meeting, Annual Meeting, Aug 2007
FESIN Meeting, Copenhagen Denmark, Sept 2007
Ecological Society of America Meeting, Annual Meeting, Aug 2008

Publications (published or in press)

1. Zhou JZ, Kang S, **Schadt CW**, and CT Garten. (2008) Spatial Scaling of Functional Gene Diversity across Various Microbial Taxa. *Proceedings of the National Academy of Sciences*, **105**:7768-7773.
2. Baker SE, Thykaer J, Adney WS, Brettin TS, Brockman FJ, D'haeseleer P, Diego A Martinez, Miller RM, Rokhsar DS, **Schadt CW**, Torok T, Tuskan G, Bennett J, Berka RM, Briggs SP, Heitman J, Taylor J, Turgeon BG, Werner-Washburne M and ME Himmel. (2008) Fungal Genome Sequencing and Bioenergy. *Fungal Biology Reviews*. **22**:1-5.
3. Porter TM*, **Schadt CW***, Rizvi L, Martin AP; Schmidt SK; Scott-Denton L; Vilgalys R, and JM Moncalvo. (2008) Widespread occurrence and phylogenetic placement of a soil clone group adds a prominent new branch to the fungal tree of life. *Molecular Phylogenetics and Evolution*. **46**:635-644 (*Equal Contribution)
4. Madden AS, Palumbo AV, Ravel B, Vishnivetskaya TA, Phelps TJ, **Schadt CW**, and CC Brandt (2008) Donor-dependent extent of uranium reduction for bioremediation of contaminated sediment microcosms, *Journal of Environmental Quality*, IN PRESS.
5. Schmidt SK, Wilson K, Meyer AF, **Schadt CW**, Porter TM and JM Moncalvo. (2008) The Missing Fungi – New Insights from Culture-Independent Molecular Studies of Soil. In: *Accessing Uncultivated Microorganisms* (K. Zengler, ed) American Society for Microbiology Press, Washington DC.
6. Keller M, **Schadt CW** and AV Palumbo. (2008) Single Cell Genomics. In: *Accessing Uncultivated Microorganisms* (K. Zengler, ed) American Society for Microbiology Press, Washington DC.
7. Schmidt SK, Sobieniak–Wiseman LC, Kageyama SA, Halloy SRP and **CW Schadt**. (2008) Mycorrhizal and dark-septate fungi in plant roots above 4720 meters elevation in the Andes and Rocky Mountains. *Arctic, Antarctic and Alpine Research*. IN PRESS
8. Nemergut DR, Townsent AR, Sattin SR, Freeman KR, Fierer N, Neff JC, Bowman WD, **Schadt CW**, Weintraub MN and SK Schmidt. (2008) The effects of chronic nitrogen fertilization on alpine tundra soil microbial communities: Implications for carbon and nitrogen cycling. *Environmental Microbiology*, IN PRESS.
9. He Z, Gentry TJ, **Schadt CW**, Wu L, Liebich J, Chong SC, Wu WM, Gu B, Jardine P, Criddle CS, and J-Z Zhou. (2007) GeoChip: A novel comprehensive microarray for investigating biogeochemical and environmental processes. *ISME Journal* **1**:67-77
10. Garten CT, Kang SH, **Schadt CW**, Brice DJ, and J-Z Zhou. (2007) Variability in Forest Soil Properties and Processes at Spatial Scales from One Meter to One Kilometer. *Soil Biology and Biogeochemistry*, **39**:2621-2627
11. Gao H, Yang ZK, Gentry TJ, Wu L, **Schadt CW**, and J-Z Zhou. (2007). Microarray-based Analysis of Microbial Community RNAs by Whole Community RNA Amplification (WCRA). *Applied and Environmental Microbiology*, **73**:563-571.
12. Gentry TJ, **Schadt CW**, He Z, and J Zhou. (2007) Functional Gene Arrays for Microbial Community Analysis. In: *Manual of Environmental Microbiology* (Crawford et al., eds) American Society for Microbiology Press, Washington DC.
13. **Schadt CW**, Classen AT. (2007) Book Review: Soil Microbiology, Ecology and

- Biochemistry.: EA Paul (ed). Soil Sci Soc Am Journal, **71**:1420
14. Rodríguez-Martínez EM, Pérez EX, **Schadt CW**, Zhou J, and A Massol-Deyá. (2006) Microbial Diversity and Bioremediation of a Hydrocarbon-Contaminated Aquifer in Vega Baja, Puerto Rico. *International Journal of Environmental Research and Public Health*, **3**:292-300
 15. Gentry TJ, Wickham, GS, **Schadt CW**, He Z, and J Zhou. (2006) Microarray Applications in Microbial Ecology Research. *Microbial Ecology*, **52**:159-175.
 16. Hwang C, Wu WM, Gentry TJ, Carley J, **Schadt CW**, Carroll SL, Watson D, Jardine PM, Zhou J, Hickey RF, Criddle CS, and MW Fields. (2006) Changes in bacterial community structure correlate with initial operating conditions of a field-scale denitrifying fluidized bed reactor, *Applied Microbiology and Biotechnology*, **71**:748-760
 17. Wu L, Liu X, **Schadt CW**, and J Zhou. (2006) Microarray-based analysis of subpicogram quantities of microbial community DNA. *Applied and Environmental Microbiology*, **72**:4931-4941.
 18. Liebich J., **Schadt CW**, Chong SC, Rhee SK, and J Zhou. (2006) Improvement of oligonucleotide probe design criteria for the development of functional gene microarrays for environmental applications. *Applied and Environmental Microbiology*, **72**:1688-1691
 19. **Schadt CW** and J Zhou. Advances in Microarrays for Soil Microbial Community Analyses. (2006) In *Soil Biology Volume 8: Nucleic Acids and Proteins in Soil* (Nannipieri, P. & Smalla K., eds). Springer-Verlag, Pp189-203.
 20. **Schadt CW**, Leibich J, Chong SC, Gentry TJ, He Z, Pan H, and J Zhou. (2005) Design and Use of Functional Gene Microarrays (FGAs) for the Characterization of Microbial Communities. In *Methods in Microbiology Volume 33: Microbial Imaging* (Savidge & Pothoulakis, eds). Academic Press Pp331-368
 21. Meyer AF, Lipson DA, Martin AP, **Schadt CW**, and SK Schmidt. (2004) Molecular and metabolic characterization of cold tolerant, alpine soil *Pseudomonas sensu stricto*. *Applied and Environmental Microbiology*. **70**:483-489
 22. **Schadt CW**, Martin AP, Lipson DA and SK Schmidt. (2003) Seasonal dynamics of previously unknown fungal lineages in tundra soils. *Science* **301**:1359-1361 (>100 citations)
 23. Lipson DA, **Schadt CW** and SK Schmidt. (2002) Changes in soil microbial community structure and function in an alpine dry meadow following spring snow melt. *Microbial Ecology* **43**:307-314.
 24. **Schadt CW**, Mullen RB and SK Schmidt. (2001) Isolation and phylogenetic identification of a dark septate endophyte of the alpine plant *Ranunculus adoneus*. *New Phytologist* **150**:747-754.
 25. Lipson DA, **Schadt CW**, Schmidt SK and RK Monson. (1999) Ectomycorrhizal transfer of amino acid-nitrogen to the alpine sedge *Kobresia myosuroides*. *New Phytologist* **142**:163-167.