

Claire Louise Phillips, BS MS PhD

Department of Crops and Soil Science, Oregon State University
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EDUCATION

Ph.D. Oregon State University, Forest Science, 2009

M.S. Stanford University, Biological Sciences, 2002

B.A.S. Stanford University, Biological Sciences and Anthropology, 2002

WORK EXPERIENCE

May 2013-Present, Sustainability Instructor and Soils Research Associate

Dept of Crops and Soil Science, Oregon State University, Corvallis, OR 97330

Supervisors: Russ Karow (Dept Head) and Kate Lajtha (Sustainability Program Director)

Responsibilities: Curriculum development and on-campus and e-campus instructor for the Sustainability Double Degree program. Mentor undergraduate sustainability research and internships. Conduct research on forest soils and global change.

May 2011-May 2013, Post-doctoral Research Fellow

Center for Accelerator Mass Spectrometry, Lawrence Livermore National Laboratory, Livermore, CA 94550

Supervisor: Graham Bench, *Post-doc mentor:* Karis McFarlane

Responsibilities: Managed project “Land-use impacts on belowground carbon storage” utilizing radiocarbon to assess soil carbon destabilization and impacts on atmospheric CO₂. Assisted with operation of tandem accelerator mass spectrometer and graphite sample preparation.

Sept 2010-May 2011, Post-doctoral Research Fellow

Dept. of Earth Science, St. Francis Xavier University, Antigonish, Nova Scotia, Canada B2G B27

Supervisor: David Risk

Responsibilities: Participate in research on soil respiration dynamics, and leak detection from subsurface CO₂ injection sites in Southern Saskatchewan. Mentor graduate and undergraduate student researchers.

Oct 2009-Aug 2010, Post-doctoral Research Associate

Terrestrial Ecosystems Research Associates, 200 SW 35th Street, Corvallis, OR 97333

Supervisor: Jillian Gregg

Responsibilities: Participate in ecosystem warming study using sunlit, automated, high-precision environmental chambers. Assist with operations, data management, and undergraduate supervision.

Sept 2007-Oct 2009, Graduate Research Assistant

Dept of Forest Ecosystems and Society, 321 Richardson Hall, Oregon State University, Corvallis, OR 97331

Supervisor: Barbara J. Bond

Responsibilities: Conduct dissertation research on forest carbon cycling, soil respiration, carbon tracing with stable isotopes, and rhizosphere biology.

Oct 2002-Aug 2005 Laboratory Manager

Center for Agroecology and Sustainable Food Systems, University of California Santa Cruz, 1156 High St., Santa Cruz, CA, 95064

Supervisor: Marc Los Huertos

Responsibilities: Participate in monitoring study of nutrient loading in the Pajaro Elkhorn watersheds through contracts with Regional Water Quality Control Boards. Analyze soil and water samples, manage

a large team of undergraduate assistants, manage database and QA/QC procedures, participate in proposal development, prepare technical reports and outreach materials.

June-October 2002, Research Technician

Carnegie Institution of Washington, Dept. of Plant Biology, 260 Panama Street, Stanford, CA 94305

Supervisor: Christopher Field

Responsibilities: Assist with fieldwork and maintenance of a grassland global change experiment at Jasper Ridge Biological Preserve.

June-October 2002, Research Technician

Center for Conservation Biology, Stanford University, Department of Biological Sciences,

Stanford, CA 94305-5020

Supervisor: Sean Anderson

Responsibilities: Assist with fieldwork related to grassland restoration and native plant conservation

June 2001-June 2002, Student Researcher

Dept. of Biological Sciences, Stanford University, Stanford, CA 94305-5020

Supervisor: David Ackerly

Responsibilities: Assist with several projects related to plant water relations and fire ecology. Complete an independent project on the germination cues of chaparral seeds.

MENTORING ACTIVITIES

Sustainability Research, Sean Dimeo and Daniel Hodges, Oregon State University

Sustainability Internship, Emily Weiglin, Oregon State University

PhD Committee Member, Nick Nickerson, Dalhousie University

PhD Committee Member, Jocelyn Egan, Dalhousie University

Mentor, MS student Virginia Murphy, Oregon State University, 2013-14

Mentor, MSc student Gordon McArthur, St. Francis Xavier University, 2010-2011

Mentor, MSc student Jocelyn Egan, St. Francis Xavier University, 2011-2013

Mentor, LLNL STAR summer research program for Middle and High School Teachers, 2012

TEACHING ACTIVITIES

Oregon State University

NR 350: Sustainable Communities (60 students, 4 hours/week), Fall 2013 and Winter 2014

SOIL 102: Introduction to Environmental Science, E-Campus (40 students) Winter 2014, On-campus

(100 students, 3 hours lecture and 4 laboratory sections) Spring 2014

SUS 304: Sustainability Assessment (40 students, 4 hours/week, Co-instructor), Spring 2014

CSS 306: Problem Solving in Soil Science (20 students), Winter 2009

Laboratory Instructor and Guest Lecturer—FS 561—Physiology of Woody Plants, Fall 2007, Fall 2009

Laboratory Instructor and Teaching Assistant—CSS 305—Introduction to Soil Science, Winter 2008

Mentor, NSF-REU student Julia Pedersen, Summer 2007

Mentor, DOE Global Change Education Program, SURE student Shane Easter, Summer 2008

St. Francis Xavier University

Lecturer—Quantitative Methods in Earth Sciences, Fall 2010

University of California, Santa Cruz

Guest Lecturer—ENVS-133-01—Agroecology Practicum, Spring 2005

Stanford University

Instructor—BIOSCI 44Y—Core Experimental Laboratory, Ecology Unit, January-June 2001.

Other

Instructor, “Introduction to R”, a three-part workshop at CAMS/LLNL

Public outreach

Guest lecturer—"Cellular Respiration and Global Climate Change", Walter Helms Middle School 7th grade life science (2012)

Guest lecturer—College of Menominee Nation/ UW-Madison Teaching Partnership, Forest Soils and Water, September 2011

Teaching education

Workshop attendee, "Teaching Earth's Climate History," December 2011, San Francisco, CA

Workshop attendee, "Ideas and Strategies for Undergraduate Education," September 2007, Center for Teaching and Learning, Oregon State University

PUBLICATIONS

In prep

1. **Phillips, C.L.** McFarlane, K.J., LaFranchi, B., Desai, A.E., Miller, J.B., Lehman, S.J., Observations of ¹⁴CO₂ in ecosystem respiration from a temperate deciduous forest in Northern Wisconsin
2. **Phillips, C.L.** Murphy, V., Lajtha, K., Gregg, J., Whole-ecosystem warming alters soil inputs and losses with no net effect on soil carbon storage.
3. **Phillips, C.L.**, Torn, M.S., Koven, C.D., Predicted response of soil temperature to climate change in the CMIP5 Earth System Models.
4. LaFranchi, B.W., McFarlane, K.J. Guilderson, T.P., **Phillips, C.L.**, Miller, J.B.; Lehman, S.J.; Andrew, A.E.; Chen, H.; Tans, P.P. Strong regional signature of boreal soil CO₂ emissions observed from a tall tower over mid-western United States
5. Nickerson, N., **Phillips, C.L.**, Risk, D., Martin, J., A new method to determine the Q₁₀ of heterotrophic soil respiration.
6. **Phillips, C.L.**, Wharton, S. Widespread mismatch between soil respiration and whole-ecosystem respiration from eddy covariance data.

In review

7. Lavoie, M., **Phillips, C.L.**, Risk, D., A practical approach for uncertainty quantification of high frequency soil respiration using Forced Diffusion chambers. *Journal of Geophysical Research—Biogeochemistry* (submitted August 2014)

Refereed publications

4. Egan, J., Nickerson, N.R., **Phillips, C.L.**, Risk, D. A numerical examination of soil ¹⁴CO₂ chamber methodologies for sampling at the soil surface. (2014) *Radiocarbon*, Vol.56, Nr.4, p.1-14, DOI: 10.2458/56.17771
5. **Phillips, C.L.**, McFarlane, K.J., Risk, D., Desai, A.E., Biological and physical influences on soil ¹⁴CO₂ seasonal dynamics in a temperate hardwood forest (2013) *Biogeosciences*, 10, 7999-8012, doi:10.5194/bgd-10-10721-2013
6. Risk, D., McArthur, G.S., Nickerson, N.R., **Phillips, C.L.**, Hart, C.J., Egan, J., Lavoie, M. Bulk and isotopic characterization of biogenic CO₂ sources and variability in the Weyburn injection area (2013). *International Journal of Greenhouse Gases*, 16: S263-S75
7. **Phillips, C.L.**, Kluber, L., Pedersen, J., Caldwell, B. A., Bond, B.J. Contributions of Ectomycorrhizal Fungal Mats to Forest Soil Respiration. (2012) *Biogeosciences*, 9, 2099-2110: doi: 10.5194/bg-9-2099-2012

8. Risk, D., Nickerson, N., **Phillips, C.L.**, Bourlon, E., Kellman, L., Moroni, M., (2012) Drought alters respired $\delta^{13}\text{C}$ from autotrophic, but not heterotrophic soil respiration. *Soil Biology and Biochemistry*, 50, 26:32, doi:10.1016/j.soilbio.2012.01.025
9. Martin, J., **Phillips, C.L.**, Irvine, J., Schmidt, A., Law, B.E., (2012), High Frequency Analysis of the Complex Linkage between Soil CO_2 Fluxes, Photosynthesis, and Environmental Variables. *Tree Physiology*, doi: 10.1093/ treephys/tpr134
10. Righetti T.L., Dalthorp D., Lambrinos J., Strik B., Sandrock, D., **Phillips C.L.** (2012): Scaling confounds the interpretation of isotopic data, *International Journal of Environmental Analytical Chemistry*, 92:1, 1-27, doi: 10.1080/03067319.2010.522236
11. **Phillips, C.L.**, Gregg, J., Wilson, J. (2011) Reduced diurnal temperature does not alter warming impacts on ecosystem carbon balance of Mediterranean grassland mesocosms. *Global Change Biology*, **17**: 3263-3273, doi: 10.1111/j.1365-2486.2011.02483.x
12. **Phillips, C.L.**, Nickerson, N., Risk, D., Bond, B.J. (2011) Interpreting diel hysteresis between soil respiration and temperature. *Global Change Biology*, **17**: 515-527, doi: 10.1111/j.1365-2486.2010.02250.x
13. **Phillips, C.L.**, Nickerson, N., Risk, D. Kayler, Z. Andersen, C., Mix, A.C., Bond, B.J., (2010) Soil Moisture Effects on the Carbon Isotopic Composition of Soil Respiration. *Rapid Communications in Mass Spectrometry*, **24**:1271-1280
14. Pypker, T.G., Hauck, M., Sulzman, E.W., Unsworth, M.H., Mix, A.C., Kayler, Z., Conklin, D., Kennedy, A.M., Barnard, H.R., **Phillips, C.L.**, Bond, B.J., (2008) Toward using $\delta^{13}\text{C}$ of ecosystem respiration to monitor canopy physiology in complex terrain. *Oecologia*, 158(3):399-410

Non-refereed publications

15. Los Huertos, M., **Phillips, C.L.**, Shennan, C.. 2006. Land use and Phosphorous Levels in the Elkhorn Slough and Pajaro River Watersheds. The Center for Agroecology and Sustainable Food Systems, Research Brief #8, University of California Santa Cruz.
16. Los Huertos, M., **Phillips, C.L.**, Fields, A., Gentry, L., Shennan, C. 2004. Nutrient Loading, Eutrophication, and Stream Flow in the Pajaro River Watershed, Final Report for the Regional Water Quality Control Board, Southwest Region. Center for Agroecology and Sustainable Farming Systems, University of California Santa Cruz.

PRESENTATIONS

Talks

1. **Phillips, C.L.**, McFarlane, K., LaFranchi, B., Desai, A.E. Using radiocarbon to investigate soil respiration impacts on atmospheric CO_2 . AGU Chapman Conference, Biosphere II, AZ, Oct 2013
2. **Phillips, C.L.**, McFarlane, K., LaFranchi, B., Desai, A.E. How old is the carbon that forests respire? Seasonal patterns in soil and ecosystem $^{14}\text{CO}_2$ from a hardwood forest in Northern Wisconsin. American Geophysical Union, San Francisco, CA, Dec 2012
3. (Invited) **Phillips, C.L.**, McFarlane, K., Using radiocarbon to understand forest soil carbon dynamics, Ecological Society of America, Portland, OR, August 2012
4. (Invited) **Phillips, C.L.** What can be learned (and what is missed) by measuring respiration only at the soil surface? Max Plank Institute for Biogeochemistry, Jena, Germany, May 2012

5. (Invited) Risk, D., Hart, C., Nickerson, N., **Phillips, C.L.**, McArthur, G., Creelman, C. What can and cannot yet be explained by high frequency soil respiration data? American Geophysical Union, San Francisco, CA, Dec 2011.
6. **Phillips, C.L.**, Are soil and ecosystem respiration well behaved, poorly behaved, or simply misunderstood? Lawrence Livermore National Laboratory November 2010, and Dept. of Earth Sciences Seminar Series, St. Francis Xavier University, October 2010
7. (Invited) **Phillips, C.L.**, Kluber, L., Pedersen, J., Caldwell, B., Bond, B.J. Contributions of Ectomycorrhizal Fungal Mats to Forest Soil Respiration, Northwest Scientific Association, June 2009, Seattle, WA
8. (Invited) **Phillips, C.L.**, Interpreting, measuring and modeling soil respiration, Department of Crops and Soil Science, March 2009, Oregon State University, Corvallis, OR
9. (Invited) Pypker, TG, Hauck, M., Sulzman, E.W., Unsworth, M.H., Mix, A.C., Kayler, Z., Conklin, D., Kennedy, A., **Phillips, C.L.**, Barnard, H., and Bond, B.J.. Using the $\delta^{13}\text{C}$ of ecosystem respiration to monitor ecosystem metabolism of entire watersheds in complex terrain. *Invited talk*, AGU 2007 Fall Meeting, San Francisco, CA

Select Posters

1. Egan, J., Risk, D., **Phillips, C.L.**, McArthur, G., Soil freeze-thaw causes shift to older respired carbon. American Geophysical Union, San Francisco, CA, Dec 2013.
2. Risk, D., Lavoie M., Brooks B., Goeckede M., Lavoie M., **Phillips C.L.** Multi-Species monitoring for fugitive gases and CO₂ leakage at enhanced oil recovery operations. American Geophysical Union, San Francisco, CA, Dec 2013.
3. Pangle, L., **Phillips, C.L.**, Gregg, J., McDonnell, Climate-warming impacts on water and carbon fluxes in a seasonally semi-arid grassland ecosystem. AGU Chapman Meeting, Biosphere II, AZ, Oct 2013
4. Nickerson, N., **Phillips, C.L.**, Risk, D., Determining the Q₁₀ of heterotrophic respiration. American Geophysical Union, San Francisco, CA, Dec 2012.
5. Risk, D., **Phillips, C.**, Som, N., Goeckede, M. Using biological filters to separate biogenic and leak CO₂ emissions at carbon capture and storage sites. American Geophysical Union, San Francisco, CA, Dec 2011.
6. **Phillips, C.L.**, McFarlane, K., Desai, A., Risk, D. Using ¹⁴C as a high-frequency tracer of forest CO₂ emissions sources: preliminary results from a Northern Wisconsin case study. American Geophysical Union, San Francisco, CA, Dec 2011.
7. McFarlane, K. and **Phillips, C.L.**, Belowground carbon turnover and ecosystem carbon dioxide source attribution: a radiocarbon-based approach. Soil Science Society of America, Cincinnati, OH, October 2011,
8. **Phillips, C.L.**, Gregg, J, Wilson, J., Impacts of diel temperature range on ecosystem carbon balance: an experimental test in grassland mesocosms, American Geophysical Union, San Francisco, CA, Dec 2010. and The 24th New Phytologist Tansley Symposium: Plant respiration and climate change, scaling from mitochondria to the globe, Oxford, UK, April 2010
9. Nickerson, N., **Phillips, C.L.** Risk, D., Bond, B.J. Interpreting diel patterns of soil respiration, American Geophysical Union, San Francisco, CA, Dec 2009

10. **Phillips, C.L.**, Kluber, L., Pedersen, J., Caldwell, B., Bond, B.J. Contributions of Ectomycorrhizal Fungal Mats to Forest Soil Respiration, Long Term Ecological Research All Scientists Meeting, Estes Park, CO, Sept 2009
11. **Phillips, C.L.**, Nickerson, N., Risk, D., Kayler, Z.E, Rugh, W., Mix, A., Bond, B.J., Soil Drying Effects on the Carbon Isotope Composition of Soil Respiration, American Geophysical Union, San Francisco, CA , Dec 2008
12. Easter, S., **Phillips, C.L.**, Bond, B.J., Biotic and abiotic factors affecting temperature response of soil CO₂ efflux, American Geophysical Union, San Francisco, CA , Dec 2008
13. Pedersen J., **Phillips, C.L.**, Bond, B.J., What lies within: contributions of the organic horizon to forest soil respiration, American Geophysical Union, San Francisco, CA, Dec 2008
14. Risk D., Nickerson, N., **Phillips, C.L.**, Van Pelt, A., Kellman, L., Physical Controls on the Isotopic Composition of Soil Respired CO₂, American Geophysical Union, San Francisco, CA , Dec 2008 and European Geophysical Union, Vienna, Austria 2009
15. **Phillips, C.L.**, Kayler, Z., Bond, B., Andersen, A., Rygiewicz, P., Sulzman, E., Mix, A. 2006. Heterotrophic and autotrophic contributions to the $\delta^{13}\text{C}$ signature of soil respiration at high and low moisture levels, Soil Science Society of America Meetings, Indianapolis, IN, November 2006.

FUNDING

2013

LL Stewart teaching improvement grant, "Bringing the Business Perspective to Sustainability Assessment with GRI Training" (\$3450)

"CMIP5 Soil Temperature Analysis and Radiocarbon Database", Contract from Lawrence Berkeley National Laboratory, (\$4500)

2011

"Surface Containment Monitoring for Carbon Capture and Storage", Natural Resources Canada ecoENERGY Innovation Initiative 2012-2015 (\$756,236, PI David Risk)

"A new approach for reducing uncertainty in Biospheric CO₂ flux", Lab Directed Research and Development, Lawrence Livermore National Lab 2011-2013 (\$500,000, PI Sonia Wharton)

2005-2009

H&M Fowells Fellowship for Forest Science, 2006-2007 & 2009-2010 (\$4000 total)

Dick and Doris Waring Forest Science Student Travel Grant, 2008 (\$1000)

Biosphere-Atmosphere Stable Isotope Network Student Travel grant, 2008 (\$500)

Northwest Scientific Association Graduate Research Fellowship, 2008 (\$1650)

College of Forestry Fellowship, 2005-06 (\$2000)

Richardson Fellowship, 2005-07 (\$42,648)

SERVICE ACTIVITIES

Ad hoc reviewer for JGR-Biogeosciences, New Phytologist, Biogeosciences, Biogeochemistry, PLOS One, Soil Biology and Biogeochemistry, Soil Science Society of America Journal, and Tree Physiology

AWARDS AND HONORS

New Phytologist Tansley Symposium, “Best Poster Presentation” Oxford, UK, 2010

Sulzman Award for best student oral presentation in Biogeosciences, AGU Fall Meeting 2008

Joseph Greenberg Prize for outstanding undergraduate thesis, Stanford University, 2002