

MELISSA S. LUCASH

Department of Environmental Science and Management
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EDUCATION

Ph.D. in Forest and Natural Resources Management, 2005

SUNY College of Environmental Science and Forestry, Syracuse, NY

Methods for measuring nutrient uptake rates of intact roots of seedlings and mature trees.

M.S. in General Science; Minor in Rangeland Resources, 1996

Oregon State University, Corvallis, OR

Growth and physiological responses of *Sitanion hystrix*, *Artemisia tridentata*, and *Stipa thurberiana* to changes in CO₂ and soil temperature.

B.S. in Environmental and Forest Biology, Minor in Plant Ecology, 1993

SUNY College of Environmental Science and Forestry, Syracuse, NY

RESEARCH INTERESTS

Forest ecology, biogeochemistry, soils, landscape ecology, tree physiology, root physiology, climate change, ecological modeling, forest management, integrating research into K-12 education

PROFESSIONAL EXPERIENCE

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| 2011 – present | Research Faculty
<i>Portland State University, Portland, OR</i>
Simulating the effects of climate change, wind and forest management on vegetation and soils of northern Minnesota using LANDIS-II. |
| 2008 – 2010 | Postdoctoral Research Analyst
<i>SUNY-ESF, Syracuse, NY</i>
Studied relationship between foliar and soil nutrients, specifically focusing on using Ca/Sr ratios to track soil sources of Ca for trees in the northeastern US. |
| 2001 - 2004 | Graduate Research Assistant
<i>SUNY-ESF, Syracuse, NY</i>
Tested methodologies for measuring nutrient uptake of trees. Estimated the seasonality of uptake in mature trees and the effects of disturbance on uptake. |
| 1996 – 2000 | Plant Physiologist, Research Assistant
<i>Dynamac Corp., US EPA Laboratory, Corvallis, OR</i>
Participated in field projects studying forest soils and tree physiology. |
| 1996 - 97 | Webber Outreach Program Supervisor
<i>Willamette University, Salem, OR</i>
Helped college students design hands-on activities for elementary-aged girls. |
| 1994 - 95 | Graduate Research Assistant
<i>Oregon State University, Corvallis, OR</i>
Examined the effects of climate change on rangeland plants. |

TEACHING EXPERIENCE

- 2012-2014** **Guest Lecturer**
Forest Ecology (ESM 410/510), Life of the Forest (BI 141)
Portland State University and Portland Community College, Portland, OR
 Taught classes in Forest soils (2), Biogeochemistry (2), and Forest management (2) .
- 2010-2011** **Adjunct Teaching Faculty**
Investigating Forest Ecosystems (SCI 338), fall 2011
Energy and Society (SCI321), winter and spring 2012
Portland State University, Portland, OR
 Introduced upper-level undergraduates (non-majors) to forest management, climate change and field techniques. Supervised student-led research in both courses.
- 2003 - 04** **NSF GK-12 Teaching Fellow, Global Environment (EFB 120)**
SUNY-ESF, Syracuse, NY
 Co-taught a college-level course in environmental science for high school seniors. Helped students conduct independent research projects.
- 2001** **Instructor, Introductory Soils (FOR 345/545)**
SUNY-ESF, Syracuse, NY
 Lectured on a semiweekly basis and supervised three laboratory sections.
- 2000** **Graduate Teaching Assistant/ Guest Lecturer, Introductory Soils (FOR 345)**
SUNY-ESF, Syracuse, NY
 Taught labs in soils and guest lectured on soil colloids.
- 1996 - 97** **Chemistry Lab Instructor, Introductory Chemistry (Chem 115, Chem 116)**
Willamette University, Salem, OR
 Taught chemistry labs.
- 1993 - 96** **Graduate Teaching Assistant, General Biology (BI 101, 102, 103)**
Oregon State University, Corvallis, OR
 Taught labs and recitations in general biology for non-majors.

COMMUNITY SERVICE AND OUTREACH

- Monthly volunteer at Ridgewood Elementary School, Portland, OR 2012- present.
- Co-instructor of science at the Center For Inquiry Program, Beaverton, OR, 2012-2014.
- Weekly volunteer at City View Charter School, Hillsboro, OR, 2010- 2012.
- Panelist for Pacific University's Center for Gender Equity and the Hillsboro/Forest Grove branch of the American Association of University Women (AAUW) Annual Banquet, Feb. 2012.
- Instructor at Science Club, City View Charter School, Hillsboro, OR, Jan 2011 and Dec 2011.
- Participant in Portland Metro STEM Partnership Intel STEMposium. Apr 2012.
- Science Fair Judge. Ridgewood Elementary School, Portland, OR; City View Charter School, Hillsboro, OR; Ed Smith Elementary School, Syracuse, NY, 2002-2003, 2011-2014.
- Summer Camp Counselor, SMILE (Science and Math Investigative Learning Experiences) Summer Camp for middle school students typically underrepresented in science and math. Oregon State University, Corvallis, OR, June 1992.

PROFESSIONAL ACHIEVEMENTS AND AFFILIATIONS

Co-Instructor and invited presenter at the annual LANDIS-II Meeting, Madison, WI in January 2014 and Portland, OR in January 2013.

Participant and presenter at the *Next Generation Climate Data Products Workshop*, NCAR, Boulder, CO, July 2013.

Participant and presenter at the *FORECAST Data Assimilation Workshop*, Woods Hole, MA, October 2012

Invited participant and presenter at the *Future Scenarios of Landscape Change: Tools and Tactics*, Harvard Forest, MA, August 2012

Participant and presenter at the *Scaling Root Processes: Global Impacts Workshop*, Washington DC, March 2012

Co-organizer of National Climate Assessment PNW Regional Town Hall. 2013. Co-organized event with Dr. Scheller and staff at US Global Change Research Program (Washington DC) to encourage public participation in the evaluation of the National Climate Assessment, a report describing the impacts of climate change to the President and Congress.

Reviewer, *Global Change Biology*, *Canadian Journal of Forest Research*, *Ecography*, *Environmental Modelling and Software*, *Forest Ecology and Management*, *Soil Science Society of America Journal*, *New Phytologist*, NSF proposal (ad hoc)

Ecological Society of America, Member 1995- 96, 2002- present

Soil Science Society of America, Member 2001-2005, 2013-present

International Association of Landscape Ecologists 2011-present

Hubbard Brook Experimental Forest, LTER Graduate Student Representative, 2000-2002

SUNY-ESF Graduate Student Association Vice-President and Secretary, 2002- 2004

GRANTS

J Thompson, H Epstein, K Anderson-Teixeira, A Miller, R Scheller, **M Lucash** and T Spies. Understanding the potential for a climate change-driven critical transition from forest to chaparral. Total grant: \$965,000.

Scheller RM, EJ Gustafson, **MS Lucash** and BR Sturtevant. 9/1/2012 – 8/31/2015. Integrating climate science into forest management decision-making using a collaborative network approach. USDA Agricultural Food and Research Institute. Total grant: \$717,031.

Scheller RM, M Johnson, S Le Duc and **MS Lucash**. 10/1/2012 – 8/31/2014. Extrapolating LIDAR and carbon data to predict and manage the consequences of climate change in Pacific Northwest Forests. Environmental Protection Agency and Bureau of Land Management. Total grant: \$192,000.

NSF GK-12 Fellowship, National Science Foundation, 2003- 2004. \$30,000/year.

PEER REVIEWED PUBLICATIONS

1. Smithwick E, **MS Lucash**, ML McCormack and G Sivandran. 2014. Improving the representation of roots in climate change models. *Ecological Modelling* 291: 193-204.
2. Wang F, D Mladenoff, J Forrester, JA Blanco, R Scheller, S Peckham, C Keough, **MS Lucash** and ST Gower. 2014. Multi-model simulations of long-term effects of forest harvesting on ecosystem productivity and C/N cycling. *Ecological Applications*. <http://dx.doi.org/10.1890/12-0888.1>
3. Kretchun A, RM Scheller, **MS Lucash**, KL Clark, J Hom and S Van Tuyl. Predicted effects of gypsy moth defoliation and climate change on forest carbon dynamics in the New Jersey Pine Barrens. *PLoS ONE*. DOI: 10.1371/journal.pone.0102531.
4. Jenny H, J Liem, **MS Lucash** and RM Scheller. In press. 4-D statistical surface method for visual change detection in forest ecosystem simulation time series. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*.
5. **Lucash MS**, RM Scheller, AM Kretchun, K Clark and J Hom. 2014. Impacts of climate change and fire on long-term nitrogen cycling and forest productivity in the New Jersey Pine Barrens. *Canadian Journal of Forest Research* 44: 402-412.
6. Scheller RM, AM Kretchun, S Van Tuyl, KL Clark, **MS Lucash** and J Hom. 2012. Divergent carbon dynamics under climate change in forests with diverse soils, tree species, and land use histories. *Ecosphere* 3(11):110. <http://dx.doi.org/10.1890/ES12-00241.1>
7. **Lucash MS**, RD Yanai, JD Blum and BB Park. 2012. Foliar nutrient concentrations related to soil sources across a range of sites and tree species in the northeastern USA. *Soil Sci. Soc. A. J.* 76: 674–683| doi: 10.2136/ssa2011.0160.
8. Yanai RD, KJ McFarlane, **MS Lucash**, JD Joslin and SE Kulpa. 2009. Similarity of nutrient uptake and root dimensions of Engelmann spruce and subalpine fir at two contrasting sites in Colorado. *For. Ecol. Manage.* 258: 2233-2241.
9. **Lucash MS**, RD Yanai and JD Joslin. 2008. Nitrogen uptake in intact and disturbed roots of loblolly pine seedlings. *Env. and Exp. Bot.* 64:15-20.
10. **Lucash MS**, DM Eissenstat, RD Yanai and JD Joslin. 2007. Estimating nutrient uptake by mature tree roots under field conditions: challenges and opportunities. *Trees* 21:593-603.
11. **Lucash MS**, JD Joslin and RD Yanai. 2005. Temporal variation in nutrient uptake capacity by intact roots of mature loblolly pine. *Plant Soil* 272:253-262.
12. **Lucash MS**, B Farnsworth and WE Winner. 2005. Response of sagebrush steppe species to elevated CO₂ and soil temperature. *W.N.A. Nat.* 65:80-86.
13. Lewis JD, **MS Lucash**, DM Olszyk and DT Tingey. 2003. Relationships between needle nitrogen concentration and photosynthetic responses of Douglas-fir seedlings to elevated CO₂ and temperature. *New Phyt.* 162:355-365.
14. Lewis JD, **MS Lucash**, DM Olszyk and DT Tingey. 2002. Stomatal responses of Douglas-fir seedlings to elevated CO₂ and temperature during the third and fourth years of exposure. *Plant Cell & Env.* 25:1411-21.
15. Lewis JD, **MS Lucash**, DM Olszyk and DT Tingey. 2000. Seasonal patterns of photosynthesis in Douglas-fir seedlings during the third and fourth year of exposure to elevated CO₂ and temperature. *Plant Cell and Env.* 24:539-548.
16. Apple ME, **MS Lucash**, DL Phillips, DT Tingey and D Olszyk. 1999. Elevated temperature and the morphology of *Pseudotsuga menziesii* vegetative buds. *Env. and Exp. Bot.* 41:25-30.
17. Apple ME, **MS Lucash**, DM Olszyk and DT Tingey. 1998. Morphogenesis of Douglas-fir buds is altered at elevated temperature but not at elevated CO₂. *Env. Exp. Bot.* 40:159-175.

OTHER PUBLICATIONS

Scheller, R.M. and **M.S. Lucash**. Editors. 2014. Forecasting Forested Landscapes: An Introduction to LANDIS-II with Exercises. Self-published.

Cloyd ET, **MS Lucash**, NE Hotaling, JH Hornbeck, HN Jensen, BJ Norelius, SH Reynolds and JD Wickham. 2004. Book Review: Diversity and productivity in grassland ecosystems. *Con. Bio.* 18:1171.

Yanai RD, P Sollins and **MS Lucash**. 2003. Book Review: Ecosystem ecology: in pursuit of principles. *Ecology* 84: 1640.

ORAL PRESENTATIONS

Lucash, MS, RM Scheller, H Jenny, J Liem and M Creutzburg. Latest developments of Century Succession: New climate library and visualization tools. LANDIS-II Meeting. January 2014. Madison, WI. Invited speaker.

Lucash MS, RM Scheller, E Gustafson, B Sturtevant. 2013. Evaluating the impact of climate change on midwestern forests. Next Generation Climate Data Products, Boulder, CO.

Scheller RM, **MS Lucash**, AM Kretchun, K Clark and J Hom. 2012. Forests and climate change: Integrating spatial, temporal, and taxonomic heterogeneity. IUFRO Meeting, Concepción, Brazil.

Scheller RM, **MS Lucash**, H Jenny, E Gustafson and B Sturtevant. 2012. Integrating climate change results into forest management plans using a scenario visualization tool. Harvard Forest, MA, Invited speakers.

Lucash MS, RM Scheller, AM Kretchun, KL Clark, J Hom and SK Chapman. 2012. Nitrogen cycling in the New Jersey Pine Barrens as a consequence of insect outbreaks and wildfire. Ecological Society of America, Portland, OR.

Scheller RM, **MS Lucash**, AM Kretchun, K Clark and J. Hom. 2012. Modeling spatial, temporal and taxonomic heterogeneity: landscape-scale estimates of forest C dynamics. Ecol. Soc. Am. Annual Meeting, Portland, OR.

Lucash MS, RM Scheller, A Kretchun, K Clark and J Hom. 2012. Improving N cycling and forest productivity: Application to the NJ Pine Barrens. LANDIS-II Meeting, Madison, WI. Invited.

Lucash MS, J Basta, RD Yanai, DM Eissenstat and JM Scholberg. 2002. Nutrient uptake measured using SUM columns. Hubbard Brook Exp. Forest Cooperators Meeting, Millbrook, NY.

Lucash MS and D McLean. 2001. Methods for estimating nutrient uptake using intact roots of mature trees. Hubbard Brook Exp. Forest Annual Cooperators Meeting, Millbrook, NY.

Lucash MS, R Sherman, JD Joslin and RD Yanai. 2000. Measuring nutrient uptake by intact roots of mature trees. Boyce Thompson Institute Root Symposium, Ithaca, NY.

POSTER PRESENTATIONS

- Lucash MS**, RM Scheller, E Gustafson and B Sturtevant. 2013 Winds of change: How will windstorms and forest harvesting affect C cycling under different climate scenarios? American Geophysical Union.
- Lucash MS**, RM Scheller, AM Kretchun, K Clark and J Hom. 2012. Forecasting changes in belowground productivity and nutrient cycling of soils in the New Jersey Pine Barrens as a consequence of climate change and wildfire. DOE Workshop on Scaling Root Processes: Global Impacts.
- Lucash MS** and RM Scheller. 2012. Challenges of data assimilation for researchers and forest managers. NSF RCN Forecast Meeting.
- Lucash MS**, RD Yanai and JD Blum. 2009. The importance of soil mineralogy to calcium availability in forests. NY State Energy Research and Development Authority (NYSERDA) Environmental Monitoring, Evaluation and Protection Conf. and Rochester Academy of Science Meeting.
- Yanai RD, KJ McFarlane, **MS Lucash**, JD Joslin and SE Kulpa. 2008. Similarity of nutrient uptake and root dimensions of Engelmann spruce and subalpine fir across two sites in Colorado. N. Am. For. Soil Conf.
- Lucash MS**, RD Yanai and JD Joslin. 2004. Respiratory costs of ammonium and nitrate uptake in intact roots of white pine seedlings. Ecol. Soc. Am. Annual Meeting.
- Cloyd ET and **MS Lucash**. 2004. Incorporating research into high school science classrooms. Ecol. Soc. Am. Annual Meeting.
- Yanai RD, **MS Lucash**, SE Kulpa, JD Joslin and KJ McFarlane. 2003. Diameter distributions of fine roots of twelve tree species. Soil Sci. Soc. Am. Annual Meeting.
- Lucash MS**, JD Joslin, O Abelleira, RD Yanai and JM Scholberg. 2003. Measuring nutrient uptake in intact plant-soil systems. Soil Sci. Soc. Am. Annual Meeting.
- Lucash MS**, O Abelleira, JD Joslin, RD Yanai and JM Scholberg. 2003. Effects of disturbance on nitrate uptake of loblolly pine seedlings. Ecol. Soc. Am. Annual Meeting.
- Lucash MS**, RD Yanai, JD Joslin and KJ McFarlane. 2002. Uptake capacity of loblolly pine roots measured in the field varies seasonally. Ecol. Soc. Am. Annual Meeting.
- Yanai RD, RE Sherman, **MS Lucash**, KJ McFarlane and JD Joslin. 2002. What root parameters best predict nutrient uptake? Ecol. Soc. Am. Annual Meeting.
- McFarlane KJ, RD Yanai and **MS Lucash**. 2002. Nutrient uptake by Engelmann spruce and subalpine fir at two Colorado subalpine forests. Ecol. Soc. Am. Annual Meeting.
- Yanai RD, JD Joslin, **MS Lucash** and RE Sherman. 2001. Nutrient uptake estimated by ecosystem budgets and by root-scale models. Soil Sci. Soc. Am. Annual Meeting.
- Joslin JD, MG Johnson, DT Tingey, MH Wolfe, DL Phillips and **MS Lucash**. 2001. Studying forest root systems- an overview of methodological problems. Soil Sci. Soc. Am. Annual Meeting.
- Apple ME, **MS Lucash**, DM Olszyk and DT Tingey. 1997. Morphology and the internal temperature of *Pseudotsuga menziesii* vegetative buds grown at elevated temperature. Ecol. Soc. Am. Annual Meeting.
- Apple ME, **MS Lucash**, DT Tingey and DM Olszyk. 1997. Morphology, development, and temperature of *Pseudotsuga menziesii* vegetative buds at elevated CO₂ and temperature. Am. Assoc. Adv. Sci. Annual Meeting.

POSTER PRESENTATIONS (Continued)

Lucash MS and WE Winner. 1995. Effects of CO₂ and rhizosphere temperature on the growth of *Artemisia tridentata*, *Sitanion hystrix*, and *Stipa thurberiana*. Ecol. Soc. Am. Annual Meeting.