

Christine D. Springer

The Ohio State University
School of Environment and Natural Resources
1680 Madison Ave.
Wooster, OH 44691

Phone: 330-263-3916
Email: sprunger.29@osu.edu
Fax: 330-263-3658

Education

Ph.D. in Crop and Soil Sciences Dec. 2015
and Ecology, Evolutionary Biology, and Behavior
Michigan State University

B.S. in Forest Resources, with Honors June 2010
University of Washington

B.A. Program on the Environment, Minor in Human Rights June 2010
University of Washington

Appointments

Assistant Professor of Soil Science and Rhizosphere Processes Aug. 2018-Present
School of Environment and Natural Resources, The Ohio State University
InFACT Discovery Theme

Post-doctoral Research Scientist Jan-July 2018
School of Environment and Natural Resources, The Ohio State University

NSF Post-doctoral Fellow in Biology 2016-2018
Agriculture and Food Security Center, Columbia University

Publications

Sprunger, C.D., E. Lin, J. Hwang. Under Revision. The Farmer's Battlefield: Local agro-ecological knowledge of unexploded ordnances from the Vietnam War and its relationship to farmer risk perception at the Cambodia-Vietnam border. *Agriculture and Human Values*.

Sprunger, C.D., S.W. Culman, Peralta, A.L. DuPont, S.T., Lennon, J.T., and Snapp, S.S. 2019. Perennial grain crop roots and nitrogen management shape soil food webs and soil carbon dynamics. *Soil Biology and Biochemistry*, 137:107573.

Sprunger, C.D., S.W. Culman, M. Thuita, C.A. Palm, B. Vanlauwe. 2019. Long-term application of low C:N residues enhances maize yield and soil nutrient pools across Kenya. *Nutrient Cycling in Agroecosystems*, 114:261-276.

Pugliese, J.Y., S.W. Culman, **C.D. Sprunger**. 2019. Grain and forage harvest of a perennial grain crop, Kernza (*Thinopyrum intermedium*), increases its productivity and soil nutrient cycling. *Plant and Soil*, 437:1-2, 241-254.

Sprunger, C.D., S.W. Culman, G.P. Robertson, and S.S. Snapp. 2018. How does nitrogen and perenniality influence belowground biomass and nitrogen use efficiency in small grain cereals? *Crop Science* 58, 2110-2120.

Sprunger, C.D., S.W. Culman, G.P. Robertson, and S.S. Snapp. 2018. Perennial grain on a Midwest Alfisol shows no sign of early soil carbon gain. *Renew Agric Food Syst* 33, 360–372.

Sprunger, C.D. and G.P. Robertson. 2018. Early accumulation of active fraction soil carbon in newly established cellulosic biofuel systems. *Geoderma* 318, 42-51.

Sprunger, C.D., L.G. Oates, R.J. Jackson and G.P. Robertson. 2017. Plant community composition influences fine root production and biomass allocation in perennial bioenergy cropping systems of the upper Midwest, USA. *Biomass and Bioenergy* 105, 248-258.

In Preparation:

B.E. O'Neill, **Sprunger, C.D.**, and G.P. Robertson. Do total soil carbon tests meet farmer management needs? Measures of active carbon versus static soil organic matter pools. *To be submitted to Journal of Soil and Water Conservation*.

Sprunger, C.D., S.W. Culman, L. Deiss, D. Jackson-Smith. Perenniality is more important for maintaining soil health than crop diversification in organic corn production. *To be submitted to Agronomy Journal*.

Sprunger, C.D., N. Hoekstra, T. Martin, Mann, M. Variable precipitation impacts on root production and soil health in corn and cover crop systems. *To be submitted to PlosOne*.

Sprunger, C.D. Is perenniality or diversity most effective for enhancing soil health along an intensive biofuel gradient? *To be submitted to Agriculture and Environmental Letters*.

Culman, S.W., S.S. Snapp, **C.D. Sprunger**, M.H. Ollenburger, B. Basso, L.R., DeHaan. Revise and Resubmit. Perennial grain kernza wheatgrass impacts water quality more rapidly than soil quality. *Agriculture and Environmental Letters*.

Published Datasets

Sprunger, C. D. and G. P. Robertson. 2018. Data from: Early accumulation of active fraction soil carbon in newly established cellulosic biofuel systems. Dryad Digital Repository. <https://doi.org/10.5061/dryad.7jq46> doi: 10.5061/dryad.7jq46.

Competitive Grants

Under Review:

Lindsey, A and **C.D. Sprunger**. After the Flood: Impacts on Rhizosphere Biology, Nutrient Cycling, and Corn Growth and Yield. USDA AFRI. \$494,667.

Submitted but unsuccessful:

Jackson-Smith, D., M. Chiavegato, S. Culman, S. Lyon, T. Parker, A. Shah, **C.D. Sprunger**, and H. Wang 2019. Comparing Environmental Tradeoffs and Synergies of Alternative Modes of Integrating Livestock into Cash Grain Cropping Systems. USDA NIFA IDEAS. \$1,000,000. *Pending*.

Current:

Sprunger, C.D., N.C. Kawa, J.E. Doll, P. Singh. How can soil health indicators inform farmers' soil conservation practices and climate adaptation strategies? InFACT Linkage and Leverage Grant. \$34,153. *Submitted Feb 2020*.

Culman, S.W., **Sprunger, C.D.**, M. Sulc, B. Ward, R. Hayden, J. Jungers, M. Ryan, T. Crews, and L. DeHaan. 2019-2023. Organic dual-use perennial grain crops: Pathways to profitability and soil health. USDA OREI. \$2,025,310

Lipschitz, F., B. Flemming, S. Inwood, S. Karle, B. Milligan, Z. Plakias, **C.D. Sprunger**, and P. Summerlin. 2019. Identifying opportunities for Landscape Architectural Engagement with Climate Smart Agriculture. InFACT Linkage and Leverage Grant 2019. \$34,613.

Lindsey, L. E. Hawkins, and **C.D. Sprunger**. 2019. Identifying the cause of soybean self-thinning using Climate FieldView™. Bayer Crop Science. \$68,512.

Sprunger, C.D. 2019-2021. Rainfall extremes and rhizosphere dynamics: Implications for soil health and crop productivity. OARDC Seeds. \$49,987.

Completed:

Baethgaen, W. and **Sprunger, C.D.** 2016. Developing and assessing soil carbon management and restoration recommendations for climate smart agriculture: A pilot study with smallholder farmers in Tanzania. Columbia University, The Earth Institute: Cross-Cutting Initiative. \$30,000.

Sprunger, C.D. and G.P. Robertson. 2015. Biodiversity effects on soil carbon gain in annual and perennial cropping systems. USDA Sustainable Agriculture Research and Education Program; 2014-2015. \$6,382.

Fellowships, Honors, and Awards

National Science Foundation Post-Doctoral Fellowship in Biology, \$138,000 2016,2017

ASA, CSSA, SSSA Graduate Student Leadership Award 2014

| | |
|---|-----------------|
| Kellogg Biological Station Graduate Research Fellowship, \$1000 | 2014 |
| ASA, CSSA, SSSA Future Leaders in Science Award, Washington D.C. | 2014 |
| National Ford Foundation Fellowship, \$66,000 | 2012-2014, 2016 |
| Michigan State University Enrichment Fellowship, \$48,000 | 2010, 2015 |
| Soil Science Society of America Meeting, Cincinnati, OH, Student Poster Award | 2012 |
| Michigan Organic Reporting Session, Graduate Student Poster Award | 2013 |
| National Science Foundation Graduate Research Fellowship (Honorable mention) | 2012 |
| Kellogg Biological Station, Summer Student Fellowship, \$1000 | 2011 |
| Michigan Organic Reporting Session, Graduate Student Poster Award | 2011 |
| Undergraduate Travel Award, Forest Resources, University of Washington, \$400 | 2009 |

Professional Experience

Hazardous Waste Inspector and Compliance Officer 2008-2010
 Supervisor: Jeff KenKnight
 U.S. Environmental Protection Agency, Region 10; Seattle, WA
 Led hazardous waste inspections and extracted samples for evidence. Prepared penalty calculations for enforcement cases. Wrote inspection reports and enforcement documents. Other responsibilities included producing a strategy report focused on inspection targeting. Served as the Alaska State Coordinator from June 2009-Sept. 2010.

Presentations

Hoekstra, N.C. **C.D. Springer**, N.T. Basta, M.M Gardiner, and S.W. Culman. 2019. The impact of Vegetation Management Strategies on Soil Health in Urban Vacant Lots. Soil Science Society of America International Annual Meeting. San Diego, CA.

Wade, J., S.W. Culman, T.T. Hurisso, and **C.D. Springer**. 2019. Benefits and Limitations of Soil Carbon, Nitrogen and Biological Measures of Soil Health. Soil Science Society of America International Annual Meeting. San Diego, CA.

Springer, C.D., S.W. Culman, C.A. Palm, B. Vanlauwe. (2017). Integrated soil fertility management has altering effects on soil health and crop productivity across sites in Kenya. Soil Science Society of America Meeting. Tampa, Florida. Oral Presentation.

Sprunger, C.D., and G.P. Robertson. (2015). Differences in active, slow, and resistant soil carbon fractions under annual and perennial biofuel crops. Long Term Ecological Science All Scientists Meeting. Estes Park, Colorado. Poster Presentation.

Sprunger, C.D., G.P. Robertson, R.D. Jackson, and L.G. Oates. (2015). Differences in fine root production and C allocation among perennial cropping systems in contrasting soils of the upper Midwest. Ecological Society of America Annual Meetings. Baltimore, Maryland. Oral Presentation.

Sprunger, C.D., and G.P. Robertson (2014). Differences in active and slow soil carbon fractions under annual and perennial biofuel crops. Soil Science Society of America Meeting. Long Beach, CA. Poster Presentation.

Sprunger, C.D., S.S. Snapp, and S.W. Culman (2013). Root production an indicator for belowground nitrogen use efficiency in perennial and annual grain cropping systems. Soil Science Society of America Meeting. Tampa, FL. Oral Presentation.

Sprunger, C.D., S.S. Snapp, and S.W. Culman (2013). Implications for carbon sequestration: Management effects on annual and perennial root production. Michigan Organic Reporting Session, East Lansing, MI. Poster Presentation.

Sprunger, C.D., S.S. Snapp, and S.W. Culman (2013). Implications for carbon sequestration: Management effects on annual and perennial root production. LTER Kellogg Biological Station All Scientist Meeting, East Lansing, MI. Poster Presentation.

Sprunger, C.D., S.S. Snapp, and S.W. Culman (2012). Implications for carbon sequestration: Management effects on annual and perennial root production. Soil Science Society of America Meeting, Cincinnati, OH. Poster Presentation.

Sprunger, C.D., S.S. Snapp, and S.W. Culman (2012). Annual vs. perennial roots: Implications for carbon sequestration in agriculture. Ford Foundation Fellowship Conference, Newport Beach, CA. Poster Presentation.

Sprunger, C.D., S.S. Snapp, and S.W. Culman (2012). Conventional and Organic Management Effects on Annual and Perennial Root Biomass. Michigan Organic Reporting Session, East Lansing, MI. Poster Presentation.

Sprunger, C.D. and D. Zabowski (2011). Organic farming and its effect on soil carbon content. Michigan Organic Reporting Session, East Lansing, MI. Poster Presentation.

Sprunger, C.D. and D. Zabowski (2009). Organic farming and its effect on soil carbon content. Program on the Environment Symposium, University of Washington, Seattle. Oral Presentation.

Sprunger, C.D. and D. Zabowski (2009). Organic farming and its effect on soil carbon content. Soil Science Society of America Meeting, Pittsburgh. Poster Presentation.

Invited Seminars, Extension Workshops, and Media

Sprunger, C.D. 2019. How do soils provide important ecosystem services? Invited Speaker. Environmental Professionals Network. Columbus, Ohio. December 4, 2019.

Sprunger, C.D. 2019. Perenniality or Diversity: Which is most effective at providing ecosystem services within agro-ecosystems? Ames, IA. Invited Speaker. Department of Agronomy seminar series, Iowa State University.

Sprunger, C.D. 2019. Embracing Difficult Conversations: The necessary path to diversifying soil science. Amherst, MA. Bridge Scholar/Invited Speaker. Stockbridge School of Agriculture Seminar Series: Bridge2Impacts, University of Massachusetts.

Sprunger, C.D. 2019. Perenniality or Diversity: Which is most effective at providing ecosystem services within agro-ecosystems? Amherst, MA. Bridge Scholar/Invited Speaker. Stockbridge School of Agriculture Seminar Series: Bridge2Science, University of Massachusetts.

Sprunger, C.D. 2019. Perenniality or Diversity: Which is most effective at providing ecosystem services within agro-ecosystems? Columbus, OH. Invited Speaker. Department of Horticulture and Crop Seminar Series, The Ohio State University.

Sprunger, C.D. 2019. What management practices most influence soil health in corn production? Conservation Tillage and Technology Conference. Ada, OH. Invited Speaker.

Sprunger, C.D. 2019. Sustainable Agriculture: Can we increase crop productivity while reducing agriculture's environmental footprint? Department of Biology Seminar Series, College of Wooster. Wooster, OH. Invited Seminar Speaker.

Sprunger, C.D. and S. W. Culman. 2019. On-farm evaluation of crop diversity effects on soil health and ecosystem function in the Great Lakes Region. Special Session. Soil Science Society of America International Annual Meetings. San Diego, CA. Invited Oral Presentation.

Sprunger, C.D. 2018. Root production and soil carbon dynamics in agroecosystems. Microbial Based Solutions for Agriculture. The Ohio State University. Wooster, OH. Invited Oral Presentation.

Sprunger, C.D. 2018. Root production and soil carbon dynamics in agroecosystems: A biogeochemical and social science approach. School of the Environment and Natural Resources, The Ohio State University. Invited Oral Presentation.

Sprunger, C.D. 2017. Managing soil carbon: Implications for enhanced crop productivity, long-term soil health, and climate change mitigation. Department of Biology Seminar Series, East Carolina University. Invited Seminar Speaker.

Sprunger, C.D. 2017. Diversity and Inclusion in STEM. Department of Biology, East Carolina University. Greenville, North Carolina. Invited Oral Presentation.

Sprunger, C.D. 2017. Soildoc Maproom Climate Tool Application. USAID funded workshop. Morogoro, Tanzania. Extension Talk: Invited Oral.

Sprunger, C.D. 2016. The importance of Active Soil C. Prairie Public: Main Street Radio. Radio Show Interview. Friday, July 22, 2016.

<http://www.prairiepublic.org/radio/mainstreet>

O'Neill, B.E. and **C.D. Sprunger**. 2015. Results of soil health tests on Michigan farms. Farming for the Future Conference. Paw Paw, MI. Extension Talk: Oral.

Sprunger, C.D., S.S. Snapp, and S.W. Culman (2013). Management impacts on belowground carbon dynamics: annual versus perennial cropping systems. Special Session on Managing Belowground Processes in Agroecosystems. Ecological Society of America Annual Meeting, Minneapolis, MN. Oral Presentation.

Sprunger, C.D. and B. Gottshall (2012). Perennialization in Urban and Rural Landscapes to Enhance Ecosystem Services. LTER All Scientist Meeting. Estes Park, CO. Oral Presentation/Workshop Moderator.

Teaching, Advising, and Mentoring

Teaching

Instructor, The Ohio State University, *Root and Rhizosphere Ecology*

2019-Present

Co-Instructor,

Graduate Student Chair

Current: Tvisha Martin (MS, ENR), Prabhojot Singh (MS, ESGP)

Graduate Student Committee Member (6 total)

Current MS Students: Francis Clark (HCS), Jenna Moore (HCS), and Ana Vazquez (Plant Pathology)

Current PhD students: Andrea Leiva Soto (HCS); Jack McCoy (HCS); Sean Fenstemaker (HCS)

Post-Bachelor Technicians

- Nicole Hoekstra
- Meredith Mann
- Louceline Fleuridor

Guest Lecture

- The Rhizosphere: Important for Food production and the Environ. Fall, 2019
- ENR 3000

Guest Lecture

- The Rhizosphere: Important for Food production and the Environ. Summer, 2019
- ENR 3000

Guest Lecture

- Summer Research Opportunities Program Summer, 2019
- How to identify a research question?

Guest Instructor

- Soil Science Graduate Seminar Spring, 2019
- Organized Inaugural OSU Soil Science Symposium

Invited Guest Lecture

November 2018

- Crop rotations, diversity, and perenniality impacts on nutrient cycling
- SENR Soil Fertility Course. Wooster, OH.

Invited Guest Lecture

November 2018

- Sustainable management practices for enhanced yields and ecosystem services
- ATI Soil fertility Course. Wooster, OH.

Invited Guest Lecture

November 2017

- Sustainable management practices for enhanced yields and ecosystem services
- SENR Soil Fertility Course. Columbus, OH.

Mentor to Alessandra Zuniga

Summer 2014

- Research Experience for Undergraduates Program at the Kellogg Biological Station.
- Completed M.S. in Biology from Northern Arizona University (2017)

Mentor to Lazarius Miller

Summer 2014

- Undergraduate Research Apprentice Program at the Kellogg Biological Station

Mentor and Supervisor to Marie-Flore Doyen

Summer 2013

- Undergraduate Exchange Program between the Kellogg Biological Station and Purpan University
- Completed Masters of Agriculture from Purpan University (2016)

Mentor and Tutor to twenty Sexton high school students

2011-2012

- College Ambition Program at Sexton High School, Lansing MI.

Service

The Ohio State University

- SENR Academic Affairs Committee
- Fall 2019-Present

The Ohio State University

- InFACT Strategy, Research and Grant Opportunities
- Fall 2019 (August 22, 2019)

The Ohio State University

- SENR DIJE Taskforce
- Spring 2019-Present

The Ohio State University

- Alpha Zeta Partners
- Spring 2019

The Ohio State University

- MENR Learning Objectives Ad Hoc Committee
- Spring 2019

The Ohio State University

- SENR Hydrology Position Search Committee
- Fall 2018-Spring 2019

The Ohio State University

- SENR Soil Science Curriculum Re-vamp
- Weekly meetings, Fall 2018; Spring 2019; Fall 2019

The Ohio State University

- InFact Discovery Theme Strategic Planning Retreat, Initiative for Food and AgriCultural Transformations, September 6, 2018

Peer Reviewer: PNAS, Biogeochemistry, Agriculture, Ecosystems, and the Environment, Plant and Soil, Soil Science Society of America, Geoderma, Agronomy Journal, Applied Ecology, Nutrient Cycling in Agroecosystems, Global Change Biology

Mentor, The Fairy God-Sister mentoring program, February 2017-April 2018 New York City

Tour Guide, Long Term Ecological Research Site June 2014-2015
Kellogg Biological Station, Michigan State University

Communicating Science Volunteer, Science Festival April 2014
Michigan State University

Graduate Student Representative, Seminar Committee 2014-2015
Kellogg Biological Station, Michigan State University

Graduate Student Representative, Academic Programs Committee, 2013-2014
Kellogg Biological Station, Michigan State University

Communicating Science Volunteer, Share the harvest, Kellogg Oct. 2013
Biological Station, Michigan State University

Graduate Student Representative, Graduate Program Committee, 2011-2013
Department of Plant, Soil, and Microbial Sciences, Michigan State University

Secretary, Crop and Soil Science Graduate Student Organization. 2010-2013
Department of Plant, Soil, and Microbial Sciences, Michigan State University

Co-Chair, Professional Development Committee, 2011-2012
Graduate Women in Science Association, Michigan State University Chapter

Professional Development Training

Teaching Assistant Seminar and Orientation, Michigan State University 2013

Science policy, Communication, and Advocacy training, ASA, CSSA,SSSA 2014

Mentoring workshop, W.K. Kellogg Biological Station 2013

Stable Isotope Biogeochemistry intensive course, Michigan State University 2012

Cropping System Modeling Course (SALUS), Michigan State University 2011

40-hour Hazardous Waste Training, Environmental Protection Agency 2009

Resources Conservation and Recovery Act three-day training, McCoy Associates 2008

Professional Memberships

Ecological Society of America, Soil Science Society of America, Crop and Soil Science Society of America, and Agronomy Society of America, Association for Women Soil Scientists, Graduate Women in Science, Xi Sigma Pi Honor Society.

Outreach and Public Engagement

Soil health in the No-till trial presentation to legislative staffers. CFAES. August 23, 2019.

Designed hands on soil science activities for 5th and 6th grade students as part of the Expanding Your Horizons Girl's Science Day. College of Wooster. April 6th, 2019.

Lin, E., **C.D. Springer**, N. T. Basta. Report on Heavy Metal Contamination from UXO and Landmine Areas in Cambodia. Cambodian government. April 2019.

Springer, C.D. 2019. Feature Interview. Women in Ag Science Organization. April 2, 2019. <https://www.womeninagscience.org/post/christine-springer-soil-science-assistant-professor>.

Soil health testing for organic corn growers across Michigan, Indiana, Ohio, and Pennsylvania. Fall 2018 and Spring 2019.

Generated soil health test results for 200+ farmers across the Great Lakes Region. Fall and Fall 2018 and Spring 2019.