Erika J. Foster, PhD

Postdoctoral Researcher in Soil Ecology, Point Blue Conservation Science
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OBJECTIVES:

- Leverage my analytical skillset in ecology and biogeochemistry to develop strategies for climate change mitigation and the preservation of biodiversity.
- Implement my facilitation and networking abilities to promote community-based socially and environmentally just natural resource management.

EDUCATION

2018	Ph.D., Ecology, Colorado State University
2012	B.S. Resource Conservation (Terrestrial Ecology), University of Montana Presidential Leadership Fellow, High Honors, Davidson Honors College
2012	B.S. Environmental Studies (Environmental Science), University of Montana Minor: Wilderness Studies, Wilderness & Civilization Program 2009-2010

RESEARCH SUMMARY

As an ecologist I examine how belowground soil biogeochemistry and biodiversity impact ecosystem function and aboveground communities. I use soil and plant indictors to assess fluxes and pools of nutrients and carbon in response to environmental and management changes.

PUBLICATIONS (peer-reviewed, students* and teachers† indicated)

1. Ramson, J.S.R., León-Salas, W.D, Brecheisen, Z., **Foster, E.J**., Johnston, C.T., Schulze, D.G., Filley, T., Rahimi, R., Villalta Soto, M.J.C, Lopa Bolivar, J.A., Postigo Málaga, M. 2021. A self-powered, real-time, LoRaWAN IoT-based soil health monitoring system. IEEE. 10.1109/JIOT.2021.3056586
2. Brecheisen, Z., Hamp-Adams*, N., Tomasek, A., **Foster, E.J.,** Filley, T., Villata Soto, M., Zuniga Reynoso, L.*, de Lima Morales, A. Schulze, D. G., 2020. Using remote sensing to discover historic context of human-environmental interaction. J Contemp Water Res Educ.
3. **Foster, E.J.**, Baas, P., Wallenstein, M.D., Cotrufo, M.F. 2020. Precision biochar and inoculum applications shift bacterial community structure and increase specific nutrient availability and maize yield. Appl. Soil Ecol. 151, 103541. https://doi.org/10.1016/j.apsoil.2020.103541
4. Li, M., **Foster, E.J.**, Le, P.V. V., Yan, Q., Stumpf, A.J., Hou, T.*, Thanos Papanicolaou, A.N., Wacha, K.M., Wilson, C.G., Wang, J., Kumar, P., Filley, T.R., 2020. A new dynamic wetness index (DWI) predicts soil moisture persistence and correlates with key indicators of surface soil geochemistry. Geoderma 368, 114239. https://doi.org/10.1016/j.geoderma.2020.114239
5. Pressler, Y., Hunter-Laszlo, M. †, Bucko, S. †, Covitt, B.A. †, Urban, S., Benton, C. †, Bartholomew, M. †, Morrison, A.J., **Foster, E.J.**, Parker, S.D. †, Cotrufo, M.F., Moore, J.C., 2019. Teaching Authentic Soil & Plant Science in Middle School Classrooms with a Biochar Case Study. Am. Biol. Teach. 81, 256–268. https://doi.org/10.1525/abt.2019.81.4.256
6. Ramlow, M., **Foster, E.J.**, Del Grosso, S.J., Cotrufo, M.F., 2019. Broadcast woody biochar provides limited benefits to deficit irrigation maize in Colorado. Agric. Ecosyst. Environ. 269, 71–81. https://doi.org/10.1016/j.agee.2018.09.017
7. **Foster, E.J.,** Fogle, E.J., Cotrufo, M.F., 2018. Sorption to Biochar Impacts β-Glucosidase and Phosphatase Enzyme Activities. https://doi.org/10.3390/agriculture8100158

8. Pressler, Y., **Foster, E.J.,** Moore, J.C., Cotrufo, M.F., 2017. Coupled biochar amendment and limited irrigation strategies do not affect a degraded soil food web in a maize agroecosystem, compared to the native grassland. GCB Bioenergy 9. https://doi.org/10.1111/gcbb.12429
9. **Foster, E.J.,** Hansen, N., Wallenstein, M., Cotrufo, M.F., 2016. Biochar and manure amendments impact soil nutrients and microbial enzymatic activities in a semi-arid irrigated maize cropping system. "Agriculture, Ecosyst. Environ. 233, 404–414. https://doi.org/10.1016/j.agee.2016.09.029
10. Cotrufo, M.F., Boot, C., Abiven, S., **Foster, E.J**., Haddix, M., Reisser, M., Wurster, C.M., Bird, M.I., Schmidt, M.W.I., 2016. Quantification of pyrogenic carbon in the environment: An integration of analytical approaches. Org. Geochem. 100. https://doi.org/10.1016/j.orggeochem.2016.07.007

PUBLISHED DATASETS

1. Foster, E. J., Yeasmin, S., Zuniga, L., Brecheisen, Z., Tomasek, A., Castaneda, M. J., Leon-Salas, W. D., Lopa Bolivar, J., Schulze, D. G., Villalta Soto, M., Johnston, C. T., Filley, T. (2021). Arequipa Peru Agricultural Soil Chemistry with pXRF and VNIR spectroscopy. Purdue University Research Repository. doi:10.4231/MFTM-QC39
2. Foster, E. J., Kelly, C., Filley, T. (2020). A global dataset of agricultural experiments quantifying organic amendment impact on soil carbon. Purdue University Research Repository. doi:10.4231/ABA8-6762

RESEARCH EXPERIENCE

2021-Present	**Postdoctoral Researcher,** Working Lands Program, Point Blue Conservation Science
2018-2021	**Postdoctoral Research Assistant,** *Nexus Institute* Soil Health Team, Purdue University in collaboration with the Universidad Nacional de San Agustin, Peru
2016-2020	**Project Director,** Soil Amendments in Dryland Agriculture, USDA-AFRI Pre-doctoral Fellowship**,** Colorado State University
2016	**Graduate Student,** Plant-growth Promoting Rhizobacteria and Precision Biochar, Partnership with Growcentia and Cool Planet, Colorado State University
2016-2017	**Graduate Student,** Biochar-Enzyme Interactions, Colorado State University
2015	**Graduate Student,** International Black Carbon Characterization Project – NSF CNIC, Colorado State University
2013-2016	**Graduate Research Assistant,** Conservation Innovation Grant Project – USDA, Colorado State University

TECHNICAL & PROFESSIONAL SKILLS

- **Analytical:** R statistical computing, markdown, and data visualization, multivariate and biostatistics, community analysis, QIIME2 genomic analysis pipeline, Microsoft Office Suite, QGIS, ArcGIS (introductory), LaTeX (introductory), Linux (introductory), GitHub
- **Field methods:** IoT microprocessor data logging, basic soil health test kits, neutron probe moisture measurements, steady-state CO_2 flux measurements, bulk density probes, Cornell sprinkler infiltrometer, portable X-Ray fluorescence, visible near-infrared spectroscopy, line-point intercept transects, tree measurement for allometric biomass
- **Laboratory analyses:** bacterial 16S rRNA marker gene analysis, enzyme activities, BET surface area, point of zero charge, hydrogen pyrolysis, C and N isotope ratio mass

spectrometry, inductively coupled plasma-optical emission spectroscopy, soil organic matter size and density fractionation, water retention curves, vegetation (root/shoot) biomass

- **Communication:** COMPASS science journalism communication workshop, Soil Science Society of America Congressional Visits Day, The Learning and Teaching Institute Professional Development workshops (12)
- **Languages:** English (native), French (limited proficiency), Spanish (professional working proficiency)

POLICY & INTERNATIONAL SHORT COURSES

2020	Expedition Leader, No Barriers Youth – Discover the Amazon, Iquitos, Peru
2020	Participant, National Science Foundation Summer Policy Colloquium, American Meteorological Society, Washington, D.C., June-Sept., 2020.
2019	Instructor, Introduction to Statistical Analysis with R, 8 hours, Universidad Nacional de San Agustin, Arequipa, Peru
2019	Instructor & Coordinator, Discovery Park Undergraduate Research Internship, International Research Field Study in Landscape Processes and Management
2014	Student, National Science Foundation MicroTrop Program in Tropical Soil Microbiology, Institute de Recherche pour le Développement, Dakar, Senegal
2011	Summer Student, Sustainable Development and Livelihoods of the Indian Himalaya, University of Montana, Uttarakhand, India
2011	Student, International Exchange, Université des Antilles et de la Guyane, Point-a-Pitre, Guadeloupe, Caribbean

TEACHING EXPERIENCE

2016, 2021	Instructor, Restoration Ecology in the Greater Yellowstone Ecosystem, University of Montana
2018, 2020	Guest lecturer, EAPS 518 Soil Biogeochemistry Lab, Purdue University
2018	Guest lecturer, SOCR 540 Soil-Plant-Nutrient Relations, Colorado State University
2017	Guest lecturer, SOCR 455 Soil Microbiology, Colorado State University
2016	Teaching Assistant, SOCR400 Soils and Global Change, Science and Impacts, Colorado State University
2017	Instructor, Wild Rockies Conservation Biology, University of Montana
2016, 2017	Instructor, Montana Environmental Ethics and Conservation, University of Montana
2016, 2017	Instructor, Environmental Field Studies: Public Lands Issues and Policy in Montana, University of Montana
2016, 2017	Instructor, Environmental Geography of Montana, University of Montana
2016, 2017	Instructor, Montana Native American Studies, University of Montana
2014-2016	Teaching Assistant, SOCR 200 Introduction to Soil Science Semester Laboratory Section, Colorado State University
2014-2015	Instructor, Research Experience for Teachers, Colorado State University

MENTORSHIP (undergraduate and graduate* students)

Lab Manager

2018-2020	Universidad de San Augstin: Diory Cervantes, Jean Llerena, Diego Portilla, Angela Nuñez, Ivette Zevallos, Yessica Medina*

2018-2020 Purdue University: Laura Gustafson, Alaina Gosheff
2018-2019 Purdue University: Kendall Hoback, Sara Diem
2013-2016 Colorado State University: Sean Uhle, Rebecca Even, Leah Carter, Jade Morilha Zanini, Fernando Cruz, Ana Beatrice Coelho, Sam Gallo*, Colorado State University

Research Supervisor

2019-Present Women in Soil Ecology (WISE) Mentor: Courtland Kelly*****
2019-2021 Purdue University: Lucia Zuniga*****
2018-2020 Purdue University, Discovery Park Undergraduate Research Internship: Ally Jacoby, Drew Baldwin, Nick Hamp-Adams, Tess Snyder, AJ Lawrence
2013-2016 Colorado State University, Skills for Participation in Undergraduate Research Course: Avery Baker, Alex Johnson, Michael Snow, Jack VanVleet

COMMUNITY OUTREACH

2022 Field demonstration (2), Climate Farm School, Terra.do, Sonoma County, CA
2020-2021 Guest presentations (3), Soil health and biogeochemistry for Purdue Polytechnic High School Permaculture Classes, Indianapolis, IN. Virtual. Sept. 3.
2019 Sampling Blitz Volunteer, Citizen Science along the Wabash River, Earth Atmospheric and Planetary Science Department, West Lafayette, IN
2017 Research Scientist Guest Presentation, New Castle High School, Fort Collins, CO
2016-2019 Contributing Writer, EcoPress Science Blog (nrelscience.org)
2015 Guest Scientist, Science Enrichment Program, Bennet Elementary, Fort Collins, CO
2015 Mentor, Research Experience for Teachers, Agricultural Research Development and Education Center, Fort Collins, CO
2015, 2016 Science Fair Poster Judge, Greeley Middle School, Fort Collins, CO
2014 Webinar presenter, "Introduction to Biochar", Biofuel Alliance of the Northern Rockies (BANR-USDA), Fort Collins, CO
2013 Science Project Consultant, Poudre School District 6th grade, Fort Collins, CO

ADDITIONAL PROFESSIONAL EXPERIENCE

2019 Expedition Leader, No Barriers Youth – High School Climate Change Program, Sequoia-Kings Canyon National Park, CA
2018-2019 Ecology Instructor, Wild Rockies Field Institute, Missoula, MT
2013-2014 Natural History Guide, Gastineau Guiding, Juneau, AK
2013 Research Assistant, Lab Animal Resources, University of MT, Missoula, MT
2011-2012 Outreach and Planning Assistant, City Hall, Missoula, MT

GRANTS & FELLOWSHIPS

2020-2021 Co-Investigator, Upcycling Spend Railroad Ties into a Value-Added Biochar to Improve Water Quality, IN Railroad Company, CSX Transportation, Koppers Recovery Resources, LLC, Stella-Jones Corporation, Purdue U ($150,000)
2016-2020 Project Director, USDA -ARFI Graduate Student Predoctoral Fellowship ($94,984)
2017-2018 Sustainability Leadership Fellow, School of Global and Environmental Sustainability Colorado State University
2016 Graduate Degree Program in Ecology Small Grant, Colorado State U ($1,800)
2012 Montana Space Consortium Award & Resource Conservation Thesis Grant ($1,000)

HONORS & AWARDS

2016	Biochar Community Oral Presentation Award, Soil Science Society of America
2014	Biochar Community Poster Presentation Award, Soil Science Society of America
2012	President's Outstanding Senior Recognition Award in Environmental Science, University of Montana
2012	High Honors & Dean's List, University of Montana
2008-2012	Presidential Leadership Scholar, University of Montana

JUSTICE, DIVERSITY, EQUITY, INCLUSION WORK

2019-Present	Mentor, Women in Soil Ecology Network
2022	Co-facilitator, DEI Lunchtime Discussion (3), Point Blue, Petaluma, CA
2021-2021	Member, Undoing Racism in the Geosciences, Action and Discussion Group
2020-2021	Racial Justice Committee Member, Arequipa Nexus Institute, Purdue University
2020-2021	Member, Showing Up for Racial Justice, Lafayette, IN
2020-2021	Member, of Recruitment and Diversity Committee, Purdue University,
2020	Departmental Code of Conduct Committee, Earth, Atmospheric, Planetary Sciences

INVITED PRESENTATIONS

2022	New York Times Event: A New Climate - Food Technology: Solving Food Systems. Beyond sequestration: Soil carbon co-benefits. San Francisco, CA, Oct 12
2022	Keys to Carbon Webinar. Carbon monitoring and stewardship on the ground. GeoRanch Land Leasing and management, Boerne, TX (Virtual), Oct. 12
2020	New Carbon Economy Consortium: Biological Solutions Panel. Paradigms, nuances, and knowledge gaps: Understanding soil carbon vulnerability. Columbia University, New York, NY, Jan. 27-28
2019	Chemistry Departmental Seminar: Stable Isotopes in Soil Biogeochemistry. Universidad Nacional de San Agustín, Arequipa, Peru, April 23.
2017	Eastern Colorado Crop Production Conference. The limited benefits of biochar in CO maize, Eastern Colorado Crop Conference, Fort Morgan, CO, Dec. 5-6.

CONFERENCES (first author presentations - 10 most recent)

1. Foster, E.J., Porzig, E., Taylor, P., Fitzgibbon, M., Paustian, K., Carey, C.J. Collaborative carbon monitoring protocols to support adaptive rangeland management and soil health. American Geophysical Union. Winter 2021. New Orleans, LA (poster presentation).
2. Foster, E. J., Yeasmin, S., Zuniga, L., Brecheisen, Z., Castaneda, M. J., Lopa Bolivar, J., Schulze, D. G., Villalta Soto, M., Johnston, C. T., Filley, T. A Framework of Tradeoffs in Soil Health: A Case Study of Soil Carbon and Salt Accumulation in an Arid Agroecosystem. American Geophysical Union. Winter 2020. Virtual (poster presentation).
3. Foster, E. J., Yeasmin, S., Zuniga, L., Brecheisen, Z., Castaneda, M. J., Lopa Bolivar, J., Schulze, D. G., Villalta Soto, M., Johnston, C. T., Filley, T. Assessment of Arid Land Soil Biogeochemistry with Portable X-Ray Fluorescence and Visible Near Infrared Spectroscopy: A Case Study of Agricultural Expansion in Arequipa, Peru. American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America Conference. Fall 2020. Virtual (oral presentation).

4. Foster, E. J., Yeasmin, S., Zuniga, L., Brecheisen, Z., Castaneda, M. J., Lopa Bolivar, J., Schulze, D. G., Villalta Soto, M., Johnston, C. T., Filley, T. Carbon accumulation and heavy metal concentrations in the recently irrigated desert of southern Perú. American Geophysical Union. Winter 2019. San Francisco, CA (poster presentation).
5. Foster, E. J., Yeasmin, S., Zuniga, L., Brecheisen, Z., Castaneda, M. J., Lopa Bolivar, J., Schulze, D. G., Villalta Soto, M., Johnston, C. T., Filley, T. How Can Soil Health Assessments Translate into Best Management Practices for Irrigated Agriculture in the Desert of Southern Peru? American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America Conference. Fall 2019. San Antonio,TX (oral presentation).
6. Foster, E. J., Baas, P. Wallenstein, M.D., Cotrufo, M.F. Paired analysis of soil bacterial amplicon sequence variants and nutrient dynamics in maize after inoculum and biochar addition. American Geophysical Union. Winter 2018. Washington, D.C. (poster presentation).
7. Foster, E.J., Wise, S., Ham, J., Cotrufo, M.F. Disruptive technology in ecological research: IoT and microprocessors for soil moisture sensing. Natural Resource Ecology Lab 'Soup and Science' Lunchtime Seminar. Fall 2017. Fort Collins, CO (oral presentation).
8. Foster, E.J., Fogle, E.J., Cotrufo, M. F. Sorption onto wood biochar impedes enzyme activity: A story of interactions. American Geophysical Union. Winter 2017. New Orleans, LA.
9. Foster, E.J., Baas, P., Wallenstein, M.D., Cotrufo, M.F. Microbial inoculation with engineered biocarbon: effect on nutrient availability and crop yield. International Symposium on Soil Organic Matter. Fall 2017. Harpenden, England.
10. Foster, E.J., Baas, P., Wallenstein, M.D., Cotrufo, M.F. Biocarbon as a microbial inoculum carrier in a maize field trial. Soil Ecology Society. Summer 2017. Fort Collins, CO.

ACADEMIC SERVICE

Purdue University

2021	Board Member, Purdue Postdoctoral Association
2020-2021	Soil Carbon Working Group Lead, New Carbon Economy Consortium
2018-2021	Circular Material Economy – Carbon Taskforce Team Member, Discovery Park Center for the Environment
2019	Undergraduate Research Internship Field Study Abroad Coordinator, Discovery Park Center for the Environment

Colorado State University

2018-2019	Weekly Sustainable Digest Radio Writer & Producer, School of Global Environmental Sustainability
2015-2016	Executive Committee Student Representative, Graduate Degree in Ecology
2014-2015	Fundraising Committee Co-Chair, Front Range Student Ecology Symposium
2015-2016	Belowground Discussion Coordinator, Natural Resource Ecology Lab2013-2014
2013-2014	Outreach Committee Co-Chair, Front Range Student Ecology Symposium
2013-2014	Seminar Speaker Selection Committee Member, Soil and Crop Department

Journal Editor & Reviewer

Review Editor for *Frontiers in Forests and Global Change*
Editorial Board Member for *Ecosphere*

Agriculture, Agrosystems, Geosciences & Environment, Applied Soil Ecology, Agriculture Ecosystems and Environment, Agronomy, Archives of Agronomy and Soil Science, Biology and Fertility of Soils, Geoderma, European Journal of Soil Biology, *Journal of Plant Growth Regulation*, *Soil Science Society of America Journal*

PROFESSIONAL ORGANIZATIONS

2017-Present American Geophysical Union
2015-Present Soil Ecology Society
2014-Present Soil Science Society of America
2014-Present Crop Science Society of America
2014-Present Agronomy Society of America
2013-2015 International Biochar Initiative

ADDITIONAL VOLUNTEERING & INTERESTS

2022 Volunteer, Petaluma Bounty Farms, Petaluma, CA
2022 Block Leader, Cool Petaluma for Resilient Communities, Petaluma, CA
2022 Volunteer, Afghan Family Allies, Petaluma, CA
2020-2021 Board Member, City Foods Co-op Grocery, Lafayette, IN
2017-2021 Wilderness First Responder, National Outdoor Leadership School, Fort Collins, CO