

Shelby C. McClelland, Ph.D.
Section of Soil & Crop Sciences
School of Integrative Plant Science
Cornell University
915 Bradfield Hall
Ithaca, NY 14853
<https://scmclelland.com>

Education

Ph.D., Ecology, Colorado State University, Fort Collins, CO, USA 04/2021
Thesis Title: *The Ecology of Natural Climate Solutions – Quantifying Soil Carbon and Biodiversity Benefits*
Advisor: Meagan E. Schipanski, Ph.D.

B.S., International Agriculture & Rural Development (*Cum Laude*), Cornell University, Ithaca, NY, USA 12/2014

Postdoctoral Training

Postdoctoral Associate 03/2022–Present
Supervisors: Dominic Woolf, Ph.D.; Johannes Lehmann, Ph.D.
Section of Soil & Crop Sciences, School of Integrative Plant Science, Cornell University, Ithaca, NY, USA

Other Positions and Employment

Livestock Production and Climate Change Specialist 04/2021–03/2022
Food and Agriculture Organization of the United Nations
Supervisor: Timothy Robinson, Ph.D.
Livestock Information, Sector Analysis, and Policy Branch, Rome, Italy

Research Analyst 06/2015–05/2017
Environmental Defense Fund
Supervisor: Lisa Moore, Ph.D.
Office of the Chief Scientist, San Francisco, CA, USA

Honors and Awards

Sustainability Leadership Fellow, School of Global Environmental Sustainability 2020 – 2021

Gary “Pete” Peterson Dryland Scholarship (Award: \$4,000) 2019

Colorado State University Graduate Student Council Travel Award 2019

Graduate Degree Program in Ecology Travel Award 2019

American Society of Agronomy, Cover Crop Division, Oral Presentation, 3rd place 2019

Front Range Student Ecology Symposium Oral Presentation, 2nd place 2019

Annie’s Sustainable Agriculture Scholarship (Award: \$10,000) 2018

Aurora Organic Dairy Academic Scholarship (Award: \$1,000) 2018

Front Range Student Ecology Symposium Poster Contest, 1st place 2018

NSF Graduate Research Fellowship, Honorable Mention 2016

Meinig Family Cornell National Scholar 2011 – 2014

Educational Activities

Teaching Activities in Programs and Courses

General Crops, Graduate Teaching Assistant, 20 students (annually)	2017 – 2020
Introduction to Field Crops, Undergraduate Teaching Assistant, 30 students	2014

Education for the Public/Community Education

Volunteer, Graduate Women in Science, Science Communication Outreach	2017 – 2018
--	-------------

Advising and Mentoring

Students

Victoria Swiler, Boyce Thompson Institute NSF REU Program, Social Mentor <i>Undergraduate Student at Ohio University</i>	2022
Yajun Peng, Research Mentor <i>Graduate Student at University of Guelph</i>	2022
Oliver Hoffman, Graduate Student Research Mentor <i>Undergraduate Student at Colorado State University</i>	2021
Sandra Bustillos, USDA NIFA REEU Program, Graduate Student Mentor <i>Undergraduate Student at University of Texas</i>	2019
Jessica Jackman, USDA NIFA REEU Program, Graduate Student Mentor <i>Undergraduate Student at Colorado State University</i>	2018

Investigation

Grants

Current

Environmental Defense Fund	2022 – 2024
----------------------------	-------------

Dominic Woolf (PI), Johannes Lehmann and Jonathan Sanderman (Co-PIs)
Integrated Nitrogen and Soil Organic Carbon Management

This proposal aims to understand how interactions between soil N-optimization and SOC management affect the net GHG balance in global croplands over decadal, multi-decadal, and centennial timescales with a process-based model.

Total, direct & indirect costs: \$260,000

**In eligible to serve as Co-PI as per University policy, but co-authored proposal*

Current Unfunded Projects

Long-term Observational Data of Cover Crops and Soil Health Responses. In collaboration with Yajun Peng, PhD Student, University of Guelph.	2022
Food Agriculture Organization of the United Nations Technical Advisory Group, Methane.	2021 – 2022
A Soil Carbon Sequestration Primer for U.S. Agricultural Policy. In collaboration with Erika Foster, Postdoctoral Associate, PointBlue Conservation Science	2020 – 2022

Scholarship

Peer-reviewed publications

14. **McClelland, S.C.**, Haddix, J.D., Azad, S., Boughton, E., Boughton, R., Miller, R.S., Swain, H., and Dillon, J.A. (*accepted*). Quantifying biodiversity impacts in livestock using life cycle perspectives. *Frontiers in Ecology and the Environment*.
13. *Hughes, H.M., **McClelland, S.C.**, Paustian, K., Schipanski, M.E., and Hillier, J. (*under review*).

Modelling the soil carbon impacts of cover crops in temperate regions. *Environmental Modelling and Software*.

12. Todd-Brown, K.E.O, Abramoff, R.Z., Beem-Miller, J., Blair, H.K., Earl, S., Frederick, K.J., Fuka, D.R., Guevara Santamaria, M., Harden, J.W., Heckman, K., Haren, L.J., Holmquist, J.R., Hoyt, A.M., Klinges, D.H., LeBauer, D.S., Malhotra, A., **McClelland, S.C.**, Nave, L.E., Rocci, K.S., Schaeffer, S.M., Stoner, S., van Gestel, N., von Fromm, S.F., Younger, M.L. (2022). Review and Synthesis: The promise of big soil data, moving current practices towards future potential. *Biogeosciences*, 19(14), pp.3505-3522.
11. Tedeschi, L.O., Abdalla, A.L., Alvarez, C., Anuga, S.W., Arango, J., Beauchemin, K.A., Becquet, P., Berndt, A., Burns, R., De Camillis, C., Chara, J., Echazarreta, J.M., Hassouna, M., Kenny, D., Mathot, M., Mauricio, R.M., **McClelland, S.C.**, Niu, M., Onyango, A.A., Parajuli, R., Pereira, L.G.R., del Prado, A., Tieri, M.P., Uwizeye, A., Kebreab, E. (2022). Quantification of methane emitted by ruminants: A review of methods. *Journal of Animal Science*.
10. Moore, J., Manter, D.K., Bruner, E., Bowman, M., Hunter, M., and **McClelland, S.C.** (accepted). Applying Decision Support Tools to Estimate Current and Future Climate Mitigation Potential for US Agriculture. *Journal of Soil and Water Conservation*.
9. **McClelland, S.C.**, Cotrufo, M.F., Haddix, M.L., Paustian, K., and Schipanski, M.E. (2022). Infrequent organic amendment applications increased plant productivity and Soil organic carbon in irrigated but not dryland perennial pastures. *Agriculture, Ecosystems, and Environment*. <https://doi.org/10.1016/j.agee.2022.107969>
8. Arndt, C., Hristov, A. N., Price, W. J., **McClelland, S. C.**, Pelaez, A. M., Cueva, S. F., Oh, J., Bannink, A., Bayat, A. R., Crompton, L. A., Dijkstra, J., Eugène, M. A., Kebreab, E., Kreuzer, M., McGee, M., Martin, C., Newbold, C. J., Reynolds, C. K., Schwarm, A., Shingfield, K. J., Veneman, J. B., Yáñez-Ruiz, D. R., Yu ZhongTang (2022). Full Adoption of The Most Effective Strategies to Mitigate Methane Emissions by Ruminants Can Help Meet the 1.5°C Target by 2030 but Not 2050. *Proceedings of the National Academy of Sciences*. <https://www.pnas.org/doi/10.1073/pnas.2111294119>
7. **McClelland, S.C.**, Paustian, K., Williams, S., and Schipanski, M.E. (2021). Modeling cover crop biomass production and related emissions to improve farm-scale decision support tools. *Agricultural Systems*, 191, p.103151.
6. Jabbour, R., **McClelland, S.C.**, and Schipanski, M.E. (2021). Use of decision-support tools by students to link crop management practices with greenhouse gas emissions: A case study. *Natural Sciences Education*, p.e20063
5. **McClelland, S.C.**, Paustian, K., Schipanski, M.E. (2020). Management of cover crops in temperate climate influences soil organic carbon stocks – A meta-analysis. *Ecological Applications*. <http://doi.org/10.1002/eap.2278>
4. Garbowski, M., Avera, B, Bertram, J., Courkamp, J., Gray, J., Hein, K., Lawrence, R., McIntosh, M., **McClelland, S.C.**, Post, A., Slette, I., Winkler, D., Brown, C. (2020). Getting to the root of restoration: Considering root traits for improved restoration outcomes under drought and competition. *Restoration Ecology*.
3. Niu, M., Kebreab, E., Hristov, A. N., Oh, J., Arndt, C., Bannink, A.,..., **McClelland, S.C.**,... & Crompton, L. A. (2018). Prediction of enteric methane production, yield and intensity in dairy cattle using an intercontinental database. *Global Change Biology*. <https://doi.org/10.1111/gcb.14094>
2. McClelland, S.C., Arndt, C., Gordon, D.R., Thoma, G. (2018). Type and number of environmental impact categories used in livestock life cycle assessment: A systematic review. *Livestock Science*. ISSN 1871-1413
1. Wezel, A., Soboksa, G., **McClelland, S.C.**, Delespesse, F. Boissau, A. (2015). The blurred boundaries of ecological, sustainable, and agroecological intensification. A review. *Agronomy for Sustainable Development*. DOI 10.1007/s13593-015-0333-y

*Denotes under review

Policy Statements, White Papers, Reports

2. FAO. 2022. Prioritizing the reduction of methane in livestock climate actions in East Africa – Policy brief. Rome. <https://doi.org/10.4060/cc0714en>
1. FAO, CCAC, NZAGRC and Global Research Alliance on Agricultural Greenhouse Gases. 2021. Ambición climática en el sector ganadero de América Latina y el Caribe – Construcción de redes para su revisión e implementación. Roma, FAO. <https://doi.org/10.4060/cb7332es>

Non-print / Online materials

1. McClelland, S.C. (30 March 2021). "Moving beyond climate 'silver bullets' in agriculture." Human Nature Blog. School of Global and Environmental Sustainability. <https://sustainability.colostate.edu/humannature/shelby-mcclelland/>

Invited Presentations

International

- McClelland, S.C.** "Statement to the Koronivia Joint Work on Agriculture Workshop 'Improved nutrient use and manure management towards sustainable and resilient agricultural systems' on behalf of the Research and Independent NGOs." 25th Conference of the Parties. *United Nations Framework Convention on Climate Change*. Madrid, Spain. December 2-13, 2019
- McClelland, S.C.**, Wroten, K., Trejo, M., de Jong, N., McCormick, G., Tomlin, H. "Food for Our Future." 24th Conference of the Parties. *United Nations Framework Convention on Climate Change*. Katowice, Poland. December 2-14, 2018.

National

- McClelland, S.C.** "When is cover cropping an effective practice to increase soil carbon?" *International Soil Carbon Network, American Geophysical Union, and United States Department of Agriculture Climate Hubs Webinar Series*. Online. September 29, 2021

Local

- McClelland, S.C.** "Compost improves soil health and food productivity." State of the Science: Looking forward to 2030 and beyond. *School of Global Environmental Sustainability*. Colorado State University. Fort Collins, CO. February 19, 2020
- McClelland, S.C.** "You, Me, and the UNFCCC – An ecologist's experience at COP 24." ECOL 592. *Graduate Degree Program in Ecology*. Colorado State University. Fort, Collins, CO. October 02, 2019
- McClelland, S.C.** "You, Me, and the UNFCCC – An ecologist's experience at COP 24." Departmental Seminar Series. *Department of Soil and Crop Sciences*. Colorado State University. Fort, Collins, CO. April 04, 2019
- McClelland, S.C.** and Leach, A. "The Environmental Impacts of Food Production." *Eat for Your Life*. Fort Collins, CO. September 15, 2018
- McClelland, S.C.** "EDF & Agriculture: How we work." *Cornell Dairy Science Club*. San Francisco, CA. January 21, 2017

Other Presentations, Posters & Abstracts

Oral

International

- McClelland, S.C.**, Cotrufo, M.F., Haddix, M. L., Paustian, K., and Schipanski, M.E. "Rethinking soil carbon sequestration – accounting for soil inorganic carbon stocks." *Soil Science Society of America*. Salt Lake City, UT. November 7-10, 2021

- Arndt, C., Hristov, A.N., Price, W.J., **McClelland, S.C.**, Pelaez, A.M., Welchez, S.F.C., Oh, J., Bannik, A., Bayat, A.R., Crompton, L.A., Dijkstra, J., Eugène, M.A., Krebeab, E., Kreuzer, M., McGee, M., Martin, C., Newbold, C.J., Reynolds, C. K., Schwarm, A., Shingfield, K.J., Veneman, J.B., Yáñez-Ruiz, D.R., Yu, Z. "Successful strategies to reduce enteric methane emission from ruminants: A meta-analysis." *American Dairy Science Association*. June 22-24, 2020
- McClelland, S.C.**, Paustian, K., Schipanski, M.E. "Management of cover crops influences soil organic carbon stocks – A meta-analysis." *American Society of Agronomy*. San Antonio, TX. November 10-13, 2019

Poster

International

- McClelland, S.C.**, Haddix, J.D., Azad, S., Boughton, E., Boughton, R., Lollis, G., Sclater, V., Swain, H., and Dillon, J.A. "Quantifying Biodiversity Co-benefits from Livestock Production – A Case Study of Beef Grazing Management in Central Florida." *American Geophysical Union*. New Orleans, LA. December 13-17, 2021
- McClelland, S.C.**, Schipanski, M.E. "Above and belowground community responses to infrequent compost applications in semi-native and improved pastures." *Ecological Society of America*. Online. August 03-06, 2020
- McClelland, S.C.**, Conant, R., Haddix, M., Schipanski, M.E. "Soil health impacts of infrequent compost application in an irrigated perennial pasture system." *Soil Science Society of America*. San Diego, CA. January 6-9, 2019
- Jackman, J., **McClelland, S.C.**, Schipanski, M.E. "Impact of compost soil amendment on nitrogen availability in grazed perennial grassland." *Soil Science Society of America*. San Diego, CA. January 6-9, 2019.

Regional

- McClelland, S.C.**, Conant, R., Haddix, M., Schipanski, M.E. "Ecosystem productivity and carbon storage under infrequent organic matter amendments." *Front Range Student Ecology Symposium*. Fort Collins, CO. February 27-28, 2019
- McClelland, S.C.**, Paustian, K., Sanderson, J., Schipanski, M.E. "Nitrogen and herbivore induced effects on soil carbon sequestration in the Colorado shortgrass steppe." *Front Range Student Ecology Symposium*. Fort Collins, CO. February 13-15, 2018

Academic Service

Internal Administration and Service

Department

- Executive Committee (Student Representative), Graduate Degree Program in Ecology 2019 – 2020
- Executive Director Hiring Committee (Student Representative), Graduate Degree Program in Ecology 2020
- New Student Welcome Committee, Member, Graduate Degree Program in Ecology 2020 – 2021
- Organizing Committee, Vice President, Front Range Student Ecology Symposium 2019

School

- Volunteer, 2022 – 2023 Campus Move-In, Cornell University 2022

Professional Memberships and Activities

- Soil Science Society of America 2021
- Member, Gary "Pete" Peterson Dryland Scholarship

Soil Science Society of America Member	2015 – 2022
American Society of Agronomy Member	2015 – 2022
American Geophysical Union Member	2021 - 2022
Ecological Society of America Member	2020 – 2022

Editorial Responsibilities (Highlights)

Nature Sustainability, Reviewer	2022
Science of the Total Environment, Reviewer	2022
USDA-NIFA, Food, Agriculture, and Natural Resources Grant Program, Federal Grant Review Panelist	2022
Ecological Applications, Reviewer	2020
Alfred P. Sloan Foundation, Grant Review Panelist	2019

External Professional Service

International

Co-organizer, American Geophysical Union, <i>Soil Science in the Age of Climate Action: Is a Solution Truly Under Our Feet?</i>	2021
Delegate, Colorado State University Delegation, United Nations Framework Convention on Climate Change, Conference of the Parties	2018 – 2019

National

Co-organizer, Biological Solutions Track, Columbia University, <i>Jumpstarting the New Carbon Economy</i> Conference	2020
--	------

Professional Development

Coming to the Table! Building an Equitable and Inclusive College Together. Colorado State University	2020
Summer Soil Institute. Colorado State University	2018

Skills

Software

R

Cloud Computing

GitHub

Google Suite

Microsoft Suite

Languages

French – B2, working professional fluency