

M. Scott Demyan

Associate Professor

School of Environment and Natural Resources, The Ohio State University

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Professional experience

- 2023- **Associate professor** The Ohio State University (Columbus, Ohio, USA)
2017- **Core faculty** Sustainability Institute, The Ohio State University (Columbus, Ohio, USA)
2017-2023 **Assistant professor** The Ohio State University (Columbus, Ohio, USA)
2013-2016 **Postdoctoral Researcher** University of Hohenheim (Stuttgart, Germany)

Education

- 2013 **PhD. Agricultural Sciences** University of Hohenheim (Stuttgart, Germany)
2006 **M.S. Soil Science** The Ohio State University (Columbus, Ohio, USA)
2003 **B.S. Environmental Science, Soil Science Specialization** The Ohio State University (Columbus, Ohio, USA)

Publications

1. Deiss, L., Demyan, M. S., Fulford, A., Hurisso, T., & Culman, S. W. (2023). High-throughput soil health assessment to predict corn agronomic performance. *Field Crops Research*, 297. <https://doi.org/10.1016/j.fcr.2023.108930>
cited By 2
2. Doležalová-Weissmannová, H., Malý, S., Brtnický, M., Holátko, J., Demyan, M. S., Siewert, C., Tokarski, D., Kameníková, E., & Kučerík, J. (2023). Practical applications of thermogravimetry in soil science: Part 5. Linking the microbial soil characteristics of grassland and arable soils to thermogravimetry data. *Journal of Thermal Analysis and Calorimetry*, 148(4), 1599-1611. <https://doi.org/10.1007/s10973-022-11709-6>
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3. Morton, L. W., Nguyen, N. K., & Scott Demyan, M. (2023). Salinity and acid sulfate soils of the Vietnam Mekong Delta: Agricultural management and adaptation. *Journal of Soil and Water Conservation*, 78(4), 85A-92A. <https://doi.org/10.2489/jswc.2023.0321A>
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4. Safanelli, J. L., Sanderman, J., Bloom, D., Todd-Brown, K., Parente, L. L., Hengl, T., Adam, S., Albinet, F., Ben-Dor, E., Boot, C. M., Bridson, J. H., Chabriat, S., Deiss, L., Dematté, J. A. M., Scott Demyan, M., Dercon, G., Doetterl, S., Egmond, F. van, Ferguson, R., ... Želazny, W. R. (2023). An interlaboratory comparison of mid-infrared spectra acquisition: Instruments and procedures matter. *Geoderma*, 440. <https://doi.org/10.1016/j.geoderma.2023.116724>
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5. Demyan, M. S., & Smeck, N. (2022). Chemical, physical-temporal and spatial changes in 25-year-old mine soils in Southeast Ohio. *Land Degradation and Development*, 33(2), 294-307. <https://doi.org/10.1002/lrd.4150>
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6. Mirzaetalarpoushti, R., Shafizadeh-Moghadam, H., Taghizadeh-Mehrjardi, R., & Demyan, M. S. (2022). Digital Soil Texture Mapping and Spatial Transferability of Machine Learning Models Using Sentinel-1, Sentinel-2, and Terrain-Derived Covariates. *Remote Sensing*, 14(23). <https://doi.org/10.3390/rs14235909>
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7. Weber, T. K. D., Ingwersen, J., Högy, P., Poyda, A., Wizemann, H.-D., Demyan, M. S., Bohm, K., Eshonkulov, R., Gayler, S., Kremer, P., Laub, M., Nkwain, Y. F., Troost, C., Witte, I., Reichenau, T., Berger, T., Cadisch, G., Müller, T., Fangmeier, A., ... Streck, T. (2022). Multi-site, multi-crop measurements in the soil-vegetation-atmosphere continuum: A comprehensive dataset from two climatically contrasting regions in southwestern Germany for the period 2009–2018. *Earth System Science Data*, 14(3), 1153–1181. <https://doi.org/10.5194/essd-14-1153-2022>
cited By 3
8. Burgos Hernández, T. D., Deiss, L., Slater, B. K., Demyan, M. S., & Shaffer, J. M. (2021). High-throughput assessment of soil carbonate minerals in urban environments. *Geoderma*, 382. <https://doi.org/10.1016/j.geoderma.2020.114778>
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9. Deiss, L., Sall, A., Demyan, M. S., & Culman, S. W. (2021). Does crop rotation affect soil organic matter stratification in tillage systems? *Soil and Tillage Research*, 209. <https://doi.org/10.1016/j.still.2021.104932>

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10. Laub, M., Ali, R. S., Demyan, M. S., Nkwain, Y. F., Poll, C., Högy, P., Poyda, A., Ingwersen, J., Blagodatsky, S., Kandeler, E., & Cadisch, G. (2021). Modeling temperature sensitivity of soil organic matter decomposition: Splitting the pools. *Soil Biology and Biochemistry*, 153. <https://doi.org/10.1016/j.soilbio.2020.108108>
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11. Deiss, L., Culman, S. W., & Demyan, M. S. (2020). Grinding and spectra replication often improves mid-DRIFTS predictions of soil properties. *Soil Science Society of America Journal*, 84(3), 914–929. <https://doi.org/10.1002/saj2.20021>
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12. Deiss, L., Margenot, A. J., Culman, S. W., & Demyan, M. S. (2020). Optimizing acquisition parameters in diffuse reflectance infrared Fourier transform spectroscopy of soils. *Soil Science Society of America Journal*, 84(3), 930–948. <https://doi.org/10.1002/saj2.20028>
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13. Deiss, L., Margenot, A. J., Culman, S. W., & Demyan, M. S. (2020). Tuning support vector machines regression models improves prediction accuracy of soil properties in MIR spectroscopy. *Geoderma*, 365. <https://doi.org/10.1016/j.geoderma.2020.114227>
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14. Kučerík, J., Svatoň, K., Malý, S., Brtnický, M., Doležalová-Weismannová, H., Demyan, M. S., Siewert, C., & Tokarski, D. (2020). Determination of soil properties using thermogravimetry under laboratory conditions. *European Journal of Soil Science*, 71(3), 415–419. <https://doi.org/10.1111/ejss.12877>
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15. Laub, M., Scott Demyan, M., Funkuin Nkwain, Y., Blagodatsky, S., Kätterer, T., Piepho, H.-P., & Cadisch, G. (2020). DRIFTS band areas as measured pool size proxy to reduce parameter uncertainty in soil organic matter models. *Biogeosciences*, 17(6), 1393–1413. <https://doi.org/10.5194/bg-17-1393-2020>
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16. Tokarski, D., Wiesmeier, M., Doležalová Weissmannová, H., Kalbitz, K., Scott Demyan, M., Kučerík, J., & Siewert, C. (2020). Linking thermogravimetric data with soil organic carbon fractions. *Geoderma*, 362. <https://doi.org/10.1016/j.geoderma.2019.114124>
cited By 11
17. Wade, J., Culman, S. W., Logan, J. A. R., Poffenbarger, H., Demyan, M. S., Grove, J. H., Mallarino, A. P., McGrath, J. M., Ruark, M., & West, J. R. (2020). Improved soil biological health increases corn grain yield in N fertilized systems across the Corn Belt. *Scientific Reports*, 10(1). <https://doi.org/10.1038/s41598-020-60987-3>
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18. David, J., Weissmannová, H. D., Steinmetz, Z., Kabelíková, L., Demyan, M. S., Šimečková, J., Tokarski, D., Siewert, C., Schaumann, G. E., & Kučerík, J. (2019). Introducing a soil universal model method (SUMM) and its application for qualitative and quantitative determination of poly(ethylene), poly(styrene), poly(vinyl chloride) and poly(ethylene terephthalate) microplastics in a model soil. *Chemosphere*, 225, 810–819. <https://doi.org/10.1016/j.chemosphere.2019.03.078>
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19. Poyda, A., Wizemann, H.-D., Ingwersen, J., Eshonkulov, R., Högy, P., Demyan, M. S., Kremer, P., Wulfmeyer, V., & Streck, T. (2019). Carbon fluxes and budgets of intensive crop rotations in two regional climates of southwest Germany. *Agriculture, Ecosystems and Environment*, 276, 31–46. <https://doi.org/10.1016/j.agee.2019.02.011>
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20. Rostami, M., Talarposhti, R. M., Mohammadi, H., & Demyan, M. S. (2019). Morpho-physiological Response of Saffron (*Crocus Sativus L.*) to Particle Size and Rates of Zinc Fertilizer. *Communications in Soil Science and Plant Analysis*, 50(10), 1250–1257. <https://doi.org/10.1080/00103624.2019.1614602>
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21. Tokarski, D., Šimečková, J., Kučerík, J., Kalbitz, K., Demyan, M. S., Merbach, I., Barkusky, D., Ruehlmann, J., & Siewert, C. (2019). Detectability of degradable organic matter in agricultural soils by thermogravimetry. *Journal of Plant Nutrition and Soil Science*, 182(5), 729–740. <https://doi.org/10.1002/jpln.201800516>
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22. Wade, J., Culman, S. W., Sharma, S., Mann, M., Demyan, M. S., Mercer, K. L., & Basta, N. T. (2019). How does phosphorus restriction impact soil health parameters in midwestern corn-soybean systems? *Agronomy Journal*, 111(4), 1682–1692. <https://doi.org/10.2134/agronj2018.11.0739>
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23. Ali, R. S., Kandeler, E., Marhan, S., Demyan, M. S., Ingwersen, J., Mirzaetalarpoushi, R., Rasche, F., Cadisch, G., & Poll, C. (2018). Controls on microbially regulated soil organic carbon

- decomposition at the regional scale. *Soil Biology and Biochemistry*, 118, 59–68. <https://doi.org/10.1016/j.soilbio.2017.12.007>
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24. Kučerík, J., Tokarski, D., Demyan, M. S., Merbach, I., & Siewert, C. (2018). Linking soil organic matter thermal stability with contents of clay, bound water, organic carbon and nitrogen. *Geoderma*, 316, 38–46. <https://doi.org/10.1016/j.geoderma.2017.12.001>
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25. Nkwain, F. N., Demyan, M. S., Rasche, F., Dignac, M.-F., Schulz, E., Kätterer, T., Müller, T., & Cadisch, G. (2018). Coupling pyrolysis with mid-infrared spectroscopy (Py-MIRS) to fingerprint soil organic matter bulk chemistry. *Journal of Analytical and Applied Pyrolysis*, 133, 176–184. <https://doi.org/10.1016/j.jaap.2018.04.004>
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26. Tokarski, D., Kučerík, J., Kalbitz, K., Demyan, M. S., Merbach, I., Barkusky, D., Ruehlmann, J., & Siewert, C. (2018). Contribution of organic amendments to soil organic matter detected by thermogravimetry. *Journal of Plant Nutrition and Soil Science*, 181(5), 664–674. <https://doi.org/10.1002/jpln.201700537>
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27. Mirzaeitalarposhti, R., Demyan, M. S., Rasche, F., Cadisch, G., & Müller, T. (2017). Mid-infrared spectroscopy to support regional-scale digital soil mapping on selected croplands of South-West Germany. *Catena*, 149, 283–293. <https://doi.org/10.1016/j.catena.2016.10.001>
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28. Demyan, M. S., Ingwersen, J., Funkuin, Y. N., Ali, R. S., Mirzaeitalarposhti, R., Rasche, F., Poll, C., Müller, T., Streck, T., Kandeler, E., & Cadisch, G. (2016). Partitioning of ecosystem respiration in winter wheat and silage maize-modeling seasonal temperature effects. *Agriculture, Ecosystems and Environment*, 224, 131–144. <https://doi.org/10.1016/j.agee.2016.03.039>
cited By 20
29. Kucerk, J., Demyan, M. S., & Siewert, C. (2016). Practical application of thermogravimetry in soil science: Part 4. Relationship between clay, organic carbon and organic matter contents. *Journal of Thermal Analysis and Calorimetry*, 123(3), 2441–2450. <https://doi.org/10.1007/s10973-015-5141-8>
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30. Mirzaeitalarposhti, R., Demyan, M. S., Rasche, F., Cadisch, G., & Müller, T. (2016). Overcoming carbonate interference on labile soil organic matter peaks for midDRIFTS analysis. *Soil Biology and Biochemistry*, 99, 150–157. <https://doi.org/10.1016/j.soilbio.2016.05.010>
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31. Ali, R. S., Ingwersen, J., Demyan, M. S., Funkuin, Y. N., Wizemann, H.-D., Kandeler, E., & Poll, C. (2015). Modelling in situ activities of enzymes as a tool to explain seasonal variation of soil respiration from agro-ecosystems. *Soil Biology and Biochemistry*, 81, 291–303. <https://doi.org/10.1016/j.soilbio.2014.12.001>
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32. Mirzaeitalarposhti, R., Demyan, M. S., Rasche, F., Poltoradnev, M., Cadisch, G., & Müller, T. (2015). MidDRIFTS-PLSR-based quantification of physico-chemical soil properties across two agroecological zones in Southwest Germany: Generic independent validation surpasses region specific cross-validation. *Nutrient Cycling in Agroecosystems*, 102(2), 265–283. <https://doi.org/10.1007/s10705-015-9698-1>
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33. Demyan, M. S., Rasche, F., Schütt, M., Smirnova, N., Schulz, E., & Cadisch, G. (2013). Combining a coupled FTIR-EGA system and in situ DRIFTS for studying soil organic matter in arable soils. *Biogeosciences*, 10(5), 2897–2913. <https://doi.org/10.5194/bg-10-2897-2013>
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34. Giacometti, C., Demyan, M. S., Cavani, L., Marzadori, C., Ciavatta, C., & Kandeler, E. (2013). Chemical and microbiological soil quality indicators and their potential to differentiate fertilization regimes in temperate agroecosystems. *Applied Soil Ecology*, 64, 32–48. <https://doi.org/10.1016/j.apsoil.2012.10.002>
cited By 133
35. Demyan, M. S., Rasche, F., Schulz, E., Breulmann, M., Müller, T., & Cadisch, G. (2012). Use of specific peaks obtained by diffuse reflectance Fourier transform mid-infrared spectroscopy to study the composition of organic matter in a Haplic Chernozem. *European Journal of Soil Science*, 63(2), 189–199. <https://doi.org/10.1111/j.1365-2389.2011.01420.x>
cited By 182
36. Siewert, C., Demyan, M. S., & Kučerík, J. (2012). Interrelations between soil respiration and its thermal stability. *Journal of Thermal Analysis and Calorimetry*, 110(1), 413–419. <https://doi.org/10.1007/s10973-011-2099-z>
cited By 35
37. Rhoades, J. L., Demyan, M. S., & Orr, B. (2011). Impacts of Deforestation and Land Cover Change on Mountain Soils in Hrazdan, Armenia. *Journal of Sustainable Forestry*, 30(7),

Invited presentations

1. Demyan, M. S., & Lorenz, K. (2023). CFARM study sites in Ohio. 1st annual Carbon Farming Alliance for Research; Management (C-FARM) Conference.
2. Demyan, M. S. (2022). Monitoring, recording, and verification of soil organic carbon for carbon offset projects. Association of Ohio Pedologists, Winter Meeting. Columbus, Ohio.
3. Demyan, M. S., Tepanosyan, G., & Sahakyan, L. (2022). Infrared spectroscopy for rapid soil assessment. International Conference on Agricultural Science 2022, Innovative Agriculture for Sustainable Development under Climate Change Can Tho University, Can Tho, Vietnam.
4. Demyan, M. S. (2021). Characterization of soil organic matter. Brno University of Technology (BUT).
5. Demyan, M. S. (2021). Infrared spectroscopy, a tool for rapid land degradation assessment. American Research Institute of the South Caucasus (ARISC) Spring Lecture Series. Virtual.
6. Demyan, M. S. (2021). Monitoring, recording, and verification; how should soil carbon characterization and modeling play a role in soil carbon markets? Association of Ohio Pedologists, Winter Meeting Virtual.
7. Islam, T., Chen, M. S. Demyan, L., Dick, W., Cadisch, G., Rasche, F., & Müller, T. (2020). Characterizing soil organic matter under long-term no-till: An isotopic natural abundance-continuous density separation method. Carbon Management; Sequestration Center (CMASC) seminar. Columbus, Ohio.
8. Demyan, M. S. (2019). Investigating the use of visible/near infrared spectroscopy for land degradation assessment. Department of Geochemistry, Center for Ecological-Noosphere Studies, National Academy of Science. Yerevan, Armenia.
9. Demyan, M. S. (2019). Visible/near infrared spectroscopy for land degradation assessment; first results. Center for Ecological-Noosphere Studies, National Academy of Science. Yerevan, Armenia.
10. Demyan, M. S. (2019). Minesoil genesis, morphology, and classification. Association of Ohio Pedologists, Fall Workshop. Newark, Ohio.
11. Demyan, M. S. (2017). Characterization and modeling of soil organic matter. Carbon Management; Sequestration Center (CMASC) seminar. Columbus, Ohio.

Research Grants

1. Sivakoff, F., & Demyan, M. S. (2024). Does reclamation legacy compromise future land-use potential? Understanding the impacts of resoil materials on biotic communities and ecosystem function. Office of Surface Mining; Reclamation. Opportunity Name: Science; Technology Projects Related to Coal Mining; Reclamation; Applied Science Projects.
2. Lal, R., Carlarne, C. P., Demyan, M. S., Rich, V., Wilkins, J. K., Williams, R. A., Chiavegato, M. B., & Lorenz, K. E. (2022). Enhanced soil carbon farming as a climate solution. Foundation for Food; Agriculture Research.
3. Davies, G. M., Hattey, J., Culman, S., & Demyan, M. S. (2020). Post-wildfire recovery and restoration of ecosystem productivity and soil health following wildfire in sagebrush rangelands. USDA-NIFA.
4. Demyan, M. S., & Culman, S. (2020). Improved understanding and scaling of biologically relevant dynamic soil properties at the MLRA scale. USDA-NRCS 2020 Soil Science Collaborative Research Grant.
5. Culman, S., & Demyan, M. S. (2020). Quantifying soil health in ohio soybean fields. Ohio Soybean Council.
6. Demyan, M. S., & Davies, G. M. (2020). Development of a restoration framework for human-degraded ecosystems. OARDC SEEDS Partnership Grant.
7. Demyan, M. S. (2019). Investigating the capability for rapid, low-cost spectroscopic-based detection of soil degradation and soil health in armenia. American Research Institute of the South Caucasus. Research Fellowship.
8. Lindsey, L., Shrestha, R., Jacinthe, P., Ren, W., Singh, M., Demyan, M.S., Lal, R., Lorenz, & K. (2019). To research the development and evaluation of pathways to net-zero emission agriculture and cropping systems. Sloan Foundation.

Professional international experience

1. Collaborator, "US" government supported. (2022). Identifying limiting factors for dioxin remediation. NSF-USAID, Can Tho, Vietnam.
2. Expert. (2017). Training and protocol development on advanced use of mid-infrared

- spectroscopy (MIRS) techniques. International Atomic Energy Agency (IAEA) Technical Cooperation Project Strengthening Strategies of Soil; Water Conservation at the Landscape Level in Natural; Agricultural Ecosystems., Departamento de Física, Instituto de Física, Universidade Federal Fluminense (UFF), Gragoatá, Niterói, Brazil.
3. Expert. (2016). To guide in the analysis and interpretation of mid-infrared spectroscopy data of participant countries. IAEA Technical Cooperation Project Strengthening Soil; Water Conservation Strategies at the Landscape Level by Using Innovative Radio; Stable Isotope; Related Techniques (ARCAL CXL), Instituto Nacional de Investigaciones Nucleares, Mexico City, Mexico.
 4. Expert. (2014). Training on mid-infrared spectroscopy techniques and spectral soil library data analysis. Joint IAEA-FAO Technical Cooperation Project training mission., Central University of Venezuela, Caracas, Venezuela.
 5. Expert. (2012). Training mission on mid-infrared spectroscopy for research uses,. Joint IAEA-FAO project., Peru Institute for Nuclear Energy, Lima, Peru.

Teaching (Ohio State University)

1. co-instructor. (2024). Soils and Climate Change (ENR 5268). Undergraduate/graduate, taught 2024 (Sp).
2. instructor. (2023). Independent study on advanced methods and theories of soil carbon (ENR 6194). Graduate, taught 2023 (Au).
3. co-instructor. (2022). Introduction to R (ENR 8600). graduate, taught 2022- present (Au).
4. instructor. (2020). Environment and Natural Resource Management (capstone) (ENR 4900.01). Undergraduate, taught 2020-2023 (Sp).
5. instructor. (2020). Soils and Carbon; Stabilization and Permanence (ENR 7530). Graduate, taught 2020, 2022 (Au).
6. co-instructor. (2019). Environment and Natural Resources Seminar (ENR 8980). Graduate, taught 2019-2020 (Au).
7. instructor. (2018). Soil Resource Management (ENR 4260). Undergraduate, taught 2018-present (Sp).
8. instructor. (2018). Soil and Environmental Mineralogy (ENR 7530). Graduate, taught 2018 (Au).
9. contributing lecturer. (2017). Introduction to Ecosystem Restoration (ENR 3500). Undergraduate, taught 2017-present.
10. co-instructor. (2017). Soil Science Graduate Seminar (ENR 8890.04). Graduate, taught 2017-present.

Extension, Outreach and Engagement

1. presenter. (2023). Explanation of lab and field observations of two fragipan soils. Fall Field Day. Association of Ohio Pedologists. Mansfield, Ohio. 45 participants.
2. presenter. (2022). NRCS mine soils field day. 10 participants.
3. organizer. (2022). Soil spectroscopy workshop. Joint Ohio State University, Ohio Super Computer, Natural Resources Conservation Service. 8 participants.
4. presenter. (2022). Peace corps environment programs: CFAES faculty share their experiences. Ohio State University. Columbus, Ohio. 8 participants.
5. presenter. (2022). Demonstration of soil health principles for use in K-12 curricula. STEAMM Rising, Waterman Agriculture & Natural Resources Laboratory, Ohio State University. Columbus, Ohio. 50 participants.
6. presenter. (2022). Horizons, morphology, and classification of a Martisco soil. Fall Field Day. Association of Ohio Pedologists. Logan County, Ohio. 48 participants.
7. presenter. (2019). Professional careers in soil/environmental science. Demonstration and lesson on soil erosion and soil functions and possible careers. Olentangy Orange Middle School. Lewis Center, Ohio. 100 participants.
8. presenter. (2019). Experience in communicating soil science to different audiences. Digging in with Ohio's Soil Experts event. Environmental Professionals Network. Columbus, Ohio. 120 participants.

PhD advisees (Ohio State University)

1. Doohan, T. (2024). Soil organic c stabilization dynamics across a continuum of disturbances and spatial scales. Environment; Natural Resources Graduate Program.
2. Fleuridor, L. (2023). Soil health and fertility, variability and connection to crop productivity. Environment; Natural Resources Graduate Program.

MS advisees (Ohio State University)

1. Pitt, J. (2025). Electrical conductivity and magnetic susceptibility to map soil properties. Environment; Natural Resources Graduate Program.
2. Ogg, A. (2024). Soil mineralogy and carbon sequestration. Environment; Natural Resources Graduate Program.
3. Bush, D. (2023). Possible connections between urban soil health and community wellbeing; a case study of the linden neighborhood, of Columbus, Ohio. Environment & Natural Resources Graduate Program.
4. Dyck, A. (2022). Soil organic matter stabilization under differing long-term tillage management. Environment & Natural Resources Graduate Program.
5. Snyder, A. (2021). Long-term effects of a single biosolids application on soil organic matter. Environmental science graduate program. Environmental Science Graduate Program.
6. Doohan, T. (2020). Impact of mineralogy on soil organic matter stabilization in Ohio soils. Environment & Natural Resources Graduate Program.

Service

1. Planning committee. (2023). Toward an integrated land-based carbon science for decarbonization. Workshop. Sustainability Institute. Ohio State University.
2. Reviewer. (2023). Postdoctoral fellowship panel. USDA National Institute of Food & Agriculture.
3. Chair. (2022-). Agricultural soils working group. The College of Food, Agriculture, & Environmental Science Rattan Lal Carbon Management & Sequestration Center, Ohio State University.
4. Chair. (2022). Soil mineralogy division. Soil Science Society of America.
5. Representative. (2020-). Environmental science & restoration faculty group. Environment & Natural Resources Graduate Program. Ohio State University.
6. Secretary. (2019-). Executive committee. Association of Ohio Pedologists.