

Curriculum Vitae

Yushu Xia

EDUCATION

- Ph.D., Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, 2016 – 2021
- M.S., Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, 2014 – 2016
- B.S., Environmental Science, Zhejiang University, 2010 – 2014

CURRENT RESEARCH PROJECTS

- Implementing process-based modeling of rangeland productivity and soil carbon using remote sensing imagery and high-performance computing (HPC) platform
- Developing a carbon monitoring plan for National Fish and Wildlife Foundation (NFWF)'s portfolio ranches across the Northern Great Plains
- Developing an optimized field sampling strategy for the monitoring of soil carbon and soil health using a HPC platform-based digital soil mapping approach
- Calibrating plant functional type-specific parameters using flux tower data for the modeling of rangeland productivity and soil organic carbon stocks
- Machine learning based estimation of daily, gap-free, high spatial resolution soil moisture for the Western and Midwestern U.S.
- Developing a web-based interactive app for visualizing management and climate associated soil carbon changes in U.S. rangelands

SELECTED PREVIOUS RESEARCH PROJECTS

- Process-based modeling of U.S. county-level soil N₂O emissions and soil carbon stocks from corn production
- Management zone-based estimation of post-rain soil N₂O emission fluxes from organic corn fields
- Meta-analysis of fertilizer and manure-induced soil N₂O emissions from U.S. croplands and grasslands
- Developing county-level fertilizer and manure nitrogen input data for U.S. corn production
- Investigating soil hydraulic properties under long-term organic management

- Quantifying soil organic carbon at broad spatial scale using environmental covariates
- Remote sensing and site covariates-based estimation of multi-site cover crop biomass and nitrogen credits
- Meta-analytical review of the responsiveness of biochemical soil health indicator to conservation practices
- Investigation of the relationship between biochemical soil health indicators and ecosystem service outcomes
- Developing a web application-based survey for improving cover crop management for Illinois organic farmers
- Rapid assessment of soil quality indicators in Illinois using the spectroscopic method

RESEARCH POSITIONS

- Postdoctoral Researcher, Woodwell Climate Research Center (formerly Woods Hole Research Center), since 2021 (supervised under Dr. Jonathan Sanderman)
- Graduate Research Assistant, University of Illinois at Urbana-Champaign, 2014 – 2021 (supervised under Dr. Michelle Wander)

TEACHING EXPERIENCE

- Teaching Assistant, NRES 102: Introduction to NRES, University of Illinois at Urbana-Champaign, Spring 2019
- Teaching Assistant, NRES 201: Introductory Soils, University of Illinois at Urbana-Champaign, Fall 2016

SELECTED HONORS AND AWARDS

- The 1st place in student oral presentation, Soil C and GHG emissions, ASA-CSSA-SSSA International Annual Meeting, 2019.
- Teachers Ranked as Excellent by their Students, University of Illinois at Urbana-Champaign, 2017.
- Graduate with Honor of Zhejiang Province, Educational Office of Zhejiang Province, 2014.
- National Scholarship (TOP 1%), Ministry of Education in China, 2013.
- First-class scholarship for outstanding students, Zhejiang University, 2011-2013.

MAJOR GRANTS

- Robust Monitoring, Reporting and Verification for Climate-Smart Range Management (Co-PI), awarded by NFWF, 2022.

- Global Hotspots and Hot Moments of Nitrous Oxides (Co-PI), awarded by Woodwell Climate Fund for Climate Solution, 2022.
- Woodwell's Rangeland Program for Ecosystem Carbon Monitoring and Management (Co-PI), awarded by J.M. Kaplan Fund, 2022.
- ACES Graduate Student International Research Grant (PI), University of Illinois at Urbana-Champaign, 2018.
- Soil Health Institute Literature Review Grant for Graduate Students (PI), Soil Health Institute, 2017.

PUBLICATIONS

Peer-reviewed Research Articles

- **Xia, Y.**, Watts, J. Machmuller, M., and Sanderman, J. 2022. Machine Learning Based Estimation of Field-Scale Daily, High Resolution, Multi-Depth Soil Moisture for the Western and Midwestern United States. *PeerJ*. 10: e14275. doi: 10.7717/peerj.14275.
- **Xia, Y.**, M. Wander, S. Quiring, S. Yuan, and H. Kwon. 2022. Process-based Modeling of Soil Nitrous Oxide Emissions from United States Corn Fields under Different Management and Climate Scenarios Coupled with Evaluation using Regional Estimates. *Frontiers in Environmental Science*. 9: e971261. doi: 10.3389/fenvs.2022.971261.
- **Xia, Y.**, M. Wander, and K. McSweeney. 2022. Digital Mapping of Agricultural Soil Organic Carbon Using Soil Forming Factors: A Review of Current Efforts at the Regional and National Scales. *Frontiers in Soil Science*. 7: e890437. doi: 10.3389/fsoil.2022.890437
- **Xia, Y.** and M. Wander. 2022. Management Zone-based Estimation of Positive and Negative Nitrous Oxide Flux in Organic Corn Fields. *Soil Science Society of America Journal*. 86: 1043-1057. doi: 10.1002/saj2.20416
- **Xia, Y.** and M. Wander. 2021. Evaluation of Indirect and Direct Scoring Methods to Relate Biochemical Soil Quality Indicators to Ecosystem Services. *Soil Science Society of America Journal*. 86: 678-702. doi: 10.1002/saj2.20370
- **Xia, Y.** and M. Wander. 2021. Responses of β -Glucosidase, Permanganate Oxidizable Carbon, and Fluorescein Diacetate Hydrolysis to Conservation Practices. *Soil Science Society of America Journal*. 85(5): 1649-1662. doi: 10.1002/saj2.20261
- **Xia, Y.**, Kwon, H., and M. Wander. 2021. Developing County-level Data of Nitrogen Fertilizer and Manure Inputs for Corn Production in the United States. *Journal of Cleaner Production*. 309: e126957. doi: 10.1016/j.jclepro.2021.126957
- **Xia, Y.**, Guan, K., Copenhaver, M., and M. Wander. 2020. Estimating Cover Crop Biomass Nitrogen Credits with Sentinel-2 Imagery and Sites Covariates. *Agronomy Journal*. 113: 1-18. doi: 10.1002/agj2.20525
- **Xia, Y.**, Ugarte, C., Guan, K., Pentrak, M., and M. Wander. 2018. Developing Near- and Mid-infrared Spectroscopy Analysis Methods for Rapid Assessment of Soil

Quality in Illinois. *Soil Science Society of America Journal*. 82: 1415-1427. doi: 10.2136/sssaj2018.05.0175

Reports

- **Xia, Y.**, Sanderman, J., Watts, J., Carr, C., and E. Stephanie. 2023. Robust monitoring, reporting and verification for climate smart range management. Report for National Fish and Wildlife Fund.
- Wander, M., Darby, H., Marriott, E., Heleba, D., **Xia, Y.**, Kwon, H., and L. Ruhl. 2019. Organic decision tools to manage N for production and climate. Report for National Institute of Food and Agriculture.
- **Xia, Y.** and M. Wander. 2018. Review of novel soil indicators and environmental impacts of soil health promoting management practices. Soil Health Institute.
- **Xia, Y.**, Kwon, H., and M. Wander. 2017. Adding U.S. domestic N₂O emission factors to the Greenhouse gases, Regulated Emissions, and Energy use in Transportation (GREET) model. Final report for Argonne National Lab.

Datasets

- **Xia, Y.**, M. Wander, and H. Kwon. 2021. County-level data of nitrogen fertilizer and manure inputs for corn production in the United States. University of Illinois at Urbana-Champaign Data Bank. doi: 10.13012/B2IDB-3112432_V1
- **Xia, Y.** and M. Wander. 2018. Response of Tier 2 Soil quality indicators β -glucosidase, fluorescein diacetate hydrolysis and permanganate oxidizable carbon. University of Illinois at Urbana-Champaign Data Bank. doi: 10.13012/B2IDB-2865725_V3
- **Xia, Y.** and M. Wander. 2018. Correlation between Tier 2 soil quality indicators β -glucosidase, fluorescein diacetate hydrolysis and permanganate oxidizable carbon and plant productivity and greenhouse gas emissions. University of Illinois at Urbana-Champaign Data Bank. doi: 10.13012/B2IDB-4693684_V2

PROFESSIONAL PRESENTATIONS

Conference presentations

- **Xia, Y.**, Sanderman, J., Watts, J., Hernandez, H., Machmuller, M., and E. Stephanie. 2023. Woodwell's Rangeland Carbon Program. JBS Beef Sustainability Summit.
- **Xia, Y.**, Sanderman, J., Watts, J., Hernandez, H., Machmuller, M., and E. Stephanie. 2022. Developing a Rangeland Carbon Tracking and Monitoring (RCTM) tool using remote sensing imagery and process-based modeling approach. AGU Meeting
- Sanderman, J., **Xia, Y.**, Hernandez, H., Watts, J., Francesca, C., Stephanie, E., and M. Machmuller. 2022. Measuring soil organic carbon on the range: Challenges and Emerging Approaches. Society for Range Management Meeting

- **Xia, Y.**, Kwon, H., and M. Wander. 2020. Spatially explicit nitrogen input data generated for corn production with a data fusion approach. ASA, CSSA, & SSSA Annual Meeting
- **Xia, Y.**, M. Wander, and Kwon, H. 2020. Downscaling process-based soil organic matter model and N input data for estimation of soil N losses. AGU Meeting
- **Xia, Y.**, Kwon, H., and M. Wander. 2019. Estimation and modeling of field-scale soil nitrous oxide emissions based on strategic sampling plans. ASA, CSSA, & SSSA Annual Meeting
- **Xia, Y.**, Xu, H., Wander, M., and H. Kwon. 2019. Spatial crop-soil data to parameterize modeling of nitrous oxide emissions from corn production for biofuel. ASA, CSSA, & SSSA Annual Meeting
- Wander, M., Darby, H., Marriott, E., Ruhl, L., Kwon, H., and **Y. Xia**. 2019. Tools to manage nitrogen organically for crops, soils and the environment. ASA, CSSA, & SSSA Annual Meeting
- Kwon, H., Xu, H., Cai, H., **Xia, Y.**, and M. Wander. 2019. Nitrogen fertilizer-induced N₂O emission factors for corn ethanol life-cycle analysis. Bioenergy Sustainability Conference
- Wander, M., Darby, H., Kwon, H., **Xia, Y.**, Aves, K. Marriott, E., Ruhl, L., and P. Hobbs. 2019. Where is the N going on your farm? A workshop to help organic farmers manage nitrogen for crops, soils and the environment. Organic Grain Conference
- **Xia, Y.**, Kwon, H., and M. Wander. 2017. Use of Rapid Assessment of U.S. Soil Carbon dataset to calibrate a surrogate Century model. ASA, CSSA, & SSSA Annual Meeting
- **Xia, Y.**, Ugarte, C., Guan, K., and M. Wander. 2015. Rapid assessment of soil quality in Illinois using near- and mid-infrared spectroscopic method. ASA, CSSA, & SSSA Annual Meeting

SKILLS

- Programming languages: R, Python, SAS, C, Visual Basic, Mathematica, Javascript, Matlab, Julia
- Computer software skills: ArcMap, QGIS, Google Earth, ENVI, STELLA, AutoCAD, OriginLab, Adobe Premiere Pro
- Cloud computing platforms: Google Earth Engine, Google Cloud Platform, Google Colab, Jupyter notebook, R virtual machine
- Website design platforms: Google Earth Engine app, Wolfram, R markdown
- Database skills: Microsoft Access, Github
- Field skills: soil and plant biomass sampling, greenhouse gas measurements
- Lab skills: spectroscopy, elemental analyzer, gas chromatograph, soil health assessment through the test of soil physical, chemical, and biological indicators

SERVICE

- Reviewed for *Global Change Biology, Environmental Research Letters, Journal of Environmental Management, Ecological Indicators, Soil Science Society of America Journal, Agronomy Journal, Applied Soil Ecology, Soil Use and Management, PLOS ONE, Sustainability, Remote Sensing, Agronomy, Agriculture, Energies, International Journal of Environmental Research and Public Health, Applied Sciences, Journal of Ambient Intelligence and Smart Environments, Environmental Research: Ecology, and Current Research in Environmental Sustainability.*
- Reviewed for the Foundation for Food & Agriculture Research (FFAR) Seeding Solutions Program Grants
- Guest Editor for Urban Agriculture & Regional Food Systems
- Postdoctoral liaison for Woodwell Climate Research Center