Matthew E. Craig
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Research Areas: terrestrial ecosystem ecology, biogeochemistry, soil carbon

Professional Preparation

Augustana College	Biology	**B.A.** 2011
University of Illinois, Champaign-Urbana	Environmental Science	**M.S.** 2014
Indiana University, Bloomington	Ecology	**Ph.D.** 2019

Appointments

2021 – present	Associate Research Scientist, Environmental Sciences Division and Climate Change Science Institute, Oak Ridge National Laboratory
2019 – 2021	Postdoctoral Research Associate, Environmental Sciences Division and Climate Change Science Institute, Oak Ridge National Laboratory

Publications (10 most recent)

Craig ME, Geyer KM, Biedler KV, Brzostek ER, Frey SD, Grandy AS, Liang C, Phillips RP (***Accepted***) Fast-decaying plant litter enhances soil carbon in temperate forests but not through microbial physiological traits. Nature Communications.

Lin G, **Craig ME**, Jo I, Wang X, Zeng DH, Phillips RP (**2022**) Mycorrhizal associations of tree species influence soil nitrogen dynamics via effects on soil acid-base chemistry. Global Ecology and Biogeography 31:168-182.

Craig ME, Mayes MA, Sulman BN, Walker AP (**2021**) Biological mechanisms may contribute to soil carbon saturation patterns. Global Change Biology 27:2633-2644.

Terrer C, Phillips RP, Hungate BA, Rosende J, Pett-Ridge J, **Craig ME**, van Groenigen KJ, Keenan TF, Sulman BN, Stocker BD, Reich PB, Pellegrini AFA, Pendall E, Zhang H, Evans RD, Carrillo Y, Fisher JB, Jackson RB (**2021**) A global tradeoff between plant and soil carbon storage under elevated CO_2. Nature 591:599-603.

Keller AB, Brzostek ER, **Craig ME**, Fisher JB, Phillips RP (**2021**) Root-derived inputs are major contributors to soil carbon in temperate forests, but vary by mycorrhizal type. Ecology Letters 24:626-635.

Mushinski RM, Payne ZC, Raff JD, **Craig ME**, Pusede SE, Rusch DB, White JR, Phillips RP (**2021**) Nitrogen cycling microbiomes are structured by plant mycorrhizal associations with consequences for nitrogen oxide fluxes in forests. Global Change Biology 27:1068-1082.

Walker et al. (**Craig ME** one of 61 co-authors) (**2021**) Integrating the evidence for a terrestrial carbon sink caused by increasing atmospheric CO_2. New Phytologist 229:2413-2445.

Craig ME, Lovko NL, Flory SL, Wright JP, Phillips RP (**2019**) Impacts of an invasive grass on soil organic matter pools vary across a tree-mycorrhizal gradient. Biogeochemistry

144:149-164.

Zak DR, Pellitier PT, Argiroff WA, Castillo B, James TY, Nave LE, Averill C, Beidler KV, Bhatnagar J, Blesh J, Classen A, **Craig ME**, Fernandez C, Gundersen P, Johansen R, Koide R, Lileskov E, Lindahl B, Nadelhoffer K, Phillips RP, Tunlid A (**2019**) Exploring the role of ectomycorrhizal fungi in soil organic matter dynamics. New Phytologist 223:33-39.

Craig ME, Turner BL, Liang C, Clay K, Johnson DJ, Phillips RP (**2018**) Tree mycorrhizal type predicts within-site variability in the storage and distribution of soil organic matter. Global Change Biology 24:3317-3330.

Selected Research Grants Awarded

ORNL Laboratory Directed Research and Development, Seed Fund, $190,000, 2022 (**contrib.**)

- *Optimizing plant traits for bioenergy and soil carbon storage*

National Science Foundation, DDIG, $20,275, 2017-2019 (**co-PI**)

- *Where plant litter ends and soil carbon begins: The role of microbial physiology in stabilizing soil organic matter*

Smithsonian Tropical Research Institute, CTFS-ForestGEO, $14,999, 2014-2016 (**PI**)

- *A new framework for quantifying drivers of soil carbon dynamics within and among forests*

Synergistic Activities

1. Reviewer

Manuscripts:

Nature, Global Change Biology, Science Advances, Biological Reviews, New Phytologist, Journal of Ecology, Geoscientific Model Development, Biogeochemistry, Biogeosciences, Plant and Soil, Scientific Data, Land Degradation and Development

Grants:

U.S. Department of Energy, Earth System Science program, proposal review panelist; Czech Science Foundation, ad hoc reviewer.

2. Advisory activity

NSF-NEON Technical Working Group Member, Terrestrial Biogeochemistry (2020 – present)

3. Workshops

"Manipulations workshop", Virtual workshop to be hosted by ORNL, March 2022 (planning committee).

"Summit on Decarbonization of the Ag Sector", Virtual workshop hosted by Oak Ridge National Laboratory, September 2021 (planning committee)

"Emerging frameworks for understanding memory in ecological systems", Oak Ridge National Laboratory, September 2019

"Fungal Communities and Soil Carbon Storage", The Energy Institute at the University of Michigan and the Beyond Carbon Neutral Program, May 2018