Cary Institute
of Ecosystem Studies

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Jane M. Lucas, Community Ecologist

Research mission:

- Examine how soils will respond in the face of multiple global change factors
- Promote sustainable agriculture guided by transdisciplinary collaboration
- Examine ecological effects of antibiotics and resistance

Summary:

Jane Lucas studies microbial communities, which exist in nearly every environment and play a key role in nutrient cycling. These tiny and abundant microorganisms help fertilize plants and recycle organic debris, with important implications for agriculture and ecosystem health. Lucas is working to uncover the hidden complexity of microbial life, primarily in soils, from tropical forests to farmlands around the world. A central question: How are people impacting the composition and function of microbial communities?

Lucas' current research is investigating how soils and carbon cycling will be affected by anthropogenic activity and global climate change. In particular, Lucas is exploring how warming, drought and livestock practices shape soil microbiota and antibiotic resistance. Antibiotics given to livestock inject biologically active compounds into the environment – with unknown consequences. Using field studies and new molecular tools, Lucas will determine how changes in climatic variables and inputs of antibiotics affect soil microbes, soil carbon storage, nitrogen cycling, and antibiotic resistance.

The 'One Health' approach is central to Lucas' work. This is the idea that agriculture, the environment, and public health are inextricably linked. Lucas aims to work with farmers and government agencies to encourage sustainable agricultural practices that support healthy ecosystems, meet global food demands, and maximize soil carbon storage.

Before coming to Cary, Lucas completed a USDA Postdoctoral Fellowship at the University of Idaho. She received her PhD in ecology and evolutionary biology at the University of Oklahoma, where she studied how nutrient availability and antibiotics influence tropical soil communities. Past work has looked at how antifungal and antibacterial compounds affect decomposition in soils, and how activities of a tropical ant impact microorganisms and nutrient cycling in its environment.

Select publications:

Lucas, Jane M., BS Sone, D Whitmore, and MS Strickland. 2021. **Antibiotics and temperature interact to disrupt soil communities and nutrient cycling.** *Soil Biology and Biochemistry.*

Lucas, J.M.*, McBride, S.*, and M. Strickland. 2020. **Trophic structure mediates soil microbial community composition and function**. *Soil Biology and Biochemistry.*

Wepking, C., B. Badgley, J. Barrett ... J.M. Lucas, et al. 2019. **Prolonged exposure to manure from livestock-administered antibiotics decreases ecosystem carbon-use efficiency and alters nitrogen cycling**. *Ecology Letters.*

Lucas, J.M., E.M. Gora, A. Salzberg, and M. Kaspari. 2019. **Antibiotics as chemical warfare across multiple taxonomic domains and trophic levels**. *Proceedings of the Royal Society B.*

Lucas, J.M., N.A. Clay, and M. Kaspari. 2018. **External myrmecotrophy benefits host plants of dominant canopy ant, Azteca trigona**. *Ecological Entomology.*

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