Sarah A. Batterman

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Education:

2013 Ph.D. Department of Ecology and Evolutionary Biology, Princeton University
2009 M.A. Department of Ecology and Evolutionary Biology, Princeton University
2006 B.A. Biology, Grinnell College (with honors)
2004 Semester Abroad Program, Organization for Tropical Studies, Costa Rica

Professional Positions:

2018 – present Research Fellow, Cary Institute of Ecosystem Studies, New York, U.S.A.
2018 – present Associate Professor, School of Geography, University of Leeds, U.K.
2020 – 2023 Research Associate, Smithsonian Tropical Research Institute, Panama
2015 – 2020 Natural Environment Research Council Independent Research Fellow, School of Geography, University of Leeds, U.K.
2017 – 2020 Research Associate, Smithsonian Tropical Research Institute, Panama
2015 – 2017 University Academic Fellow in Tropical Ecology and Global Change, School of Geography, University of Leeds, U.K.
2014 – 2015 Carbon Mitigation Initiative Young Investigator, Department of Ecology and Evolutionary Biology and Princeton Environmental Institute, Princeton University
2013 – 2014 Postdoctoral Research Associate, Department of Ecology and Evolutionary Biology, Princeton University

Selected Professional Honors:

Philip Leverhulme Prize in Geography, 2019-2022 (£100,000)
Princeton Environmental Institute Carbon Mitigation Initiative Young Investigator Award, 2014 – 2015 ($50,000)
Ecological Society of America's Biogeosciences Section Elizabeth Sulzman Outstanding Publication Award for Batterman, *et al*., *Nature* 2013, 2014 ($250)
Princeton Environmental Institute Carbon Mitigation Initiative best paper award for Batterman, *et al*., *Nature* 2013, 2014 ($5,000)
Organization for Tropical Studies student paper award honorable mention for Batterman, *et al*., *Nature* 2013, 2014
Sigma Xi Poster Exposition Poster Award, Princeton University, 2011
Princeton Research Symposium Poster Award, Princeton University, 2010
National Science Foundation Graduate Research Fellowship, Honorable Mention, 2009

Research Interests and Activities:

One of the greatest challenges facing us today is to understand how biodiversity relates to ecosystem function and the ecosystem services it provides, especially in light of climate change. My research aims to address this problem using large-scale ecosystem experiments, field observations and modeling to analyze how the biodiversity of tropical tree species, their microbial

environmental change and future as a carbon sink. I am also turning to the past to understand how the evolution of plant symbioses with fungi and nitrogen-fixing bacteria changed earth's long-term climate.

Selected Publications:

Wurzburger, N., **Batterman, S. A**., Nitrogen-fixing symbioses, chapter in A starting guide to root ecology: towards standardization of root classification, sampling, processing and trait measurements. *In press. New Phytologist* book. Editor: Gregoire Freschet.

Kalamandeen, M., Gloor, E., Johnson, I., Agard, S., Katow, M., Vanbrooke, A., Ashley, D., **Batterman, S. A**., Ziv, G., Collins-Holder, K., Phillips, O. L., Brondizio, E. S., Vieira, I., Galbraith, D. *in press*. Limited biomass recovery from gold mining in Amazonian forests. *Journal of Applied Ecology*.

Sullivan, M.J.P., ~100 other authors including **Batterman, S. A.**, Phillips, O. L. Biome-wide variation in tropical forest carbon stocks and dynamics shows long-term resilience to increasing high temperatures. *Science* 869-874.

Levy-Varon, J. H., **Batterman, S. A.**, Medvigy, D. *et al.* 2019. Tropical carbon sink accelerated by symbiotic dinitrogen fixation. *Nature Communications* **10,** 5637.

Stanton, D. E., **Batterman, S. A.**, Von Fischer J., and Hedin, L. O. 2019. Rapid nitrogen fixation by canopy microbiome in tropical forest determined by both phosphorus and molybdenum. *Ecology* **100**(9):e02795.

O'Sullivan, M., Spracklen, D. V., **Batterman, S. A.**, Arnold, S. A., Gloor, M., Buermann, W. 2019. Have synergies between nitrogen deposition and atmospheric CO_2 driven the recent enhancement of the terrestrial carbon sink? *Global Biogeochemical Cycles*. 33, 163-180.

Wang, Y., Ziv, G., Adami, M., Mitchard, E., **Batterman, S. A.**, Buermann, W., Marimon, B. S., Marimon Junior, B.H. , Matias Reise, S. M., Rodrigues, D., David Galbraith, D. 2019. Mapping tropical disturbed forests using multi-decadal 30 m optical satellite imagery. *Remote Sensing of Environment*. 221:474-488. doi:10.1016/j.rse.2018.11.028

Batterman, S. A., Hall, J. S., Turner, B., Hedin, L. O. and van Breugel, M. 2018. Phosphatase activity and nitrogen fixation reflect species differences, not nutrient trading or nutrient balance, across tropical rainforest trees. *Ecology Letters*. 21: 1486-1495. doi:10.1111/ele.13129

Batterman, S. A. 2018. Fixing tropical forests. *Nature Ecology and Evolution*. 2: 1059–1060. doi:10.1038/s41559-018-0583-6

Lai, H. R., Hall, J. S., **Batterman, S. A.**, Turner, B. L., van Breugel, M. 2018. Nitrogen fixer abundance has no effect on the biomass recovery during tropical secondary forest succession. *Journal of Ecology*. doi:10.1111/1365-2745.12979

Mills, B.*, **Batterman, S. A.*,** Field, K.* 2018. Nutrient acquisition by symbiotic fungi governs Palaeozoic climate transition. *Philosophical Transactions B.* 373. *All authors contributed equally. doi:10.1098/rstb.2016.0503

Menge, D. N. L., **Batterman, S. A.,** Hedin, L. O., Liao, W., Pacala, S., Taylor, B. 2017. Why are nitrogen-fixing trees rare at higher compared to lower latitudes? *Ecology.* 98:3127-

Epihov, D., **Batterman, S. A.,** Hedin, L. O., Leake, J. R., Smith, L. M., Beerling, D. J. 2017. N_2-fixing tropical legume evolution: a contributor to enhanced weathering through the Cenozoic? *Proceedings of the Royal Society B* 284(1860) doi:10.1098/rspb.2017.0370

Menge, D. N. L., **Batterman, S. A.**, Liao, W., Taylor, B. N., Lichstein, J. W. and Ángeles-Pérez, G. 2017. Nitrogen-fixing tree abundance in higher-latitude North America is not constrained by diversity. *Ecology Letters*. doi:10.1111/ele.12778

Sheffer, E., **Batterman, S. A.**, Levin, S. A., Hedin, L. O. 2015. Biome-scale nitrogen fixation strategies selected by climatic constraints on nitrogen cycle. *Nature Plants* 1, 15182. doi:10.1038/nplants.2015.182

Batterman, S. A., Hedin, L. O., van Breugel, M., Ransijn, J., Craven, D. J., and Hall, J. S. 2013. Key role of symbiotic dinitrogen fixation in tropical forest secondary succession. *Nature* 502, 224–227. DOI: 10.1038/nature12525
—Covered by *Christian Science Monitor, ClimateWire, Yale 360, Mongabay.com* and *Natural History* magazine

Batterman, S. A., Wurzburger, N., and Hedin, L. O. 2013. Nitrogen and phosphorus interact to control tropical symbiotic N_2 fixation: A test in *Inga punctata*. *Journal of Ecology* 101: 1400–1408. DOI: 10.1111/1365-2745.12138

Batterman, S. A. 2013. Symbiotic N_2 fixation in tropical forests: Scaling from individuals to ecosystems. Ph.D. Thesis. Princeton University. 109 pages.

Batterman, S. A., and Larsen, K. S. 2011. Integrating empirical studies and global models to improve climate change predictions. *Eos*: 92(4):353.