

Quentin D. Read

Using big open data to understand how humans influence the natural world

SESYNC
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Professional appointments

- 2021– **Agricultural Research Service, U.S. Department of Agriculture**, Raleigh, NC (North Carolina State University)
Applied Consulting Statistician, Southeast Area
- 2018-2021 **National Socio-Environmental Synthesis Center**, Annapolis, MD (University of Maryland)
- 2019–2021 Data scientist
- 2018-2020 Postdoctoral fellowship: “Food waste and the environment”
Mentor: Dr. Mary Muth (RTI International, Research Triangle Park, NC)
- 2016-2018 **Michigan State University**, East Lansing, MI
Postdoctoral researcher, Department of Forestry; Ecology, Evolutionary Biology, & Behavior Program
“Intraspecific trait variation and community structure at a continental scale”
Advisors: Dr. Phoebe Zarnetske (MSU) and Dr. Sydne Record (Bryn Mawr College)
Visiting scholar, University of Notre Dame, laboratory of Jason McLachlan

Current roles and responsibilities

- Support USDA researchers by designing experiments, processing and visualizing data, and doing statistical analyses
- Pursue a research program modeling the impacts of the food system on human and natural communities, using techniques from ecology, environmental science, and economics

Education

- 2011-2016 **University of Tennessee**, Knoxville, TN
Ph.D., Ecology & Evolutionary Biology
Dissertation: “Individual variation in plant traits drives species interactions, ecosystem functioning, and responses to global change”
Advisor: Dr. Nathan Sanders
- 2005-2009 **University of North Carolina**, Chapel Hill, NC
B.S. with highest distinction, Environmental Science

Skills and languages

- Data processing, visualizing, and analysis in R, including tidyverse and R Markdown
- Teaching and training students and researchers in data science and statistics
- Developing R packages
- Bayesian modeling with Stan
- Spatial analysis and modeling with GDAL and R
- Working knowledge of Python and Julia
- Bash scripting
- High-performance parallel computing using Linux server
- Using git/GitHub for version control and remote collaborations
- Fluent in spoken and written German; communicate effectively in spoken and written

Grants

- 2019 “Connecting local, regional, and continental scale drivers to biodiversity across NEON through the lens of intraspecific trait variation and disturbance.” NSF Macrosystems Biology, NEON-Enabled Science (senior personnel) \$536,800

Publications

OA = open access; * = first author is an undergraduate whom I mentored

- 2021 Dahlin, K. M., P. L. Zarnetske, **Q. D. Read**, L. Twardochleb, A. G. Kamoske, K. S. Cheruvilil, and P. A. Soranno. 2021. Linking terrestrial and aquatic biodiversity to ecosystem function across scales, trophic levels, and realms. *Frontiers in Environmental Science*, 9, 217. DOI:10.3389/fenvs.2021.692401.
- 2021 Prager, C. M., X. Jing, J. A. Henning, **Q. D. Read**, P. Meidl, S. Lavorel, N. J. Sanders, M. Sundqvist, D. A. Wardle, and A. T. Classen. 2021. Climate and multiple dimensions of plant diversity regulate ecosystem carbon exchange along an elevational gradient. *Ecosphere*. DOI:10.1002/ecs2.3472. (OA)
- 2021 Marston, L. T., **Q. D. Read**, S. Brown, and M. K. Muth. 2021. Reducing water scarcity by reducing food loss and waste. *Frontiers in Sustainable Food Systems* 5. DOI:10.3389/fsufs.2021.651476. (OA)
- 2021 **Read, Q. D.** and M. K. Muth. 2021. Cost-effectiveness of four food waste interventions: is food waste reduction a “win-win?” *Resources, Conservation & Recycling* 168, 105448. DOI:10.1016/j.resconrec.2021.105448.
- 2021 Metson, G. S., A. Chaudhary, X. Zhang, B. Houlton, A. Oita, N. Raghuram, **Q. D. Read**, L. Bouwman, H. Tian, A. Uwizeye, and A. J. Eagle. 2021. Nitrogen and the food system. *One Earth* 4:3-7. DOI:10.1016/j.oneear.2020.12.018.
- 2020 Grady, J. M., **Q. D. Read**, S. Record, N. Rüger, P. L. Zarnetske, A. I. Dell, S. P. Hubbell, S. T. Michaletz, A. Shenkin, and B. J. Enquist. 2020. Life history scaling and the division of energy in forests. *bioRxiv* 2020.06.22.163659. DOI:10.1101/2020.06.22.163659. (preprint)
- 2020 **Read, Q. D.**, S. Brown, A. D. Cuéllar, S. M. Finn, J. A. Gephart, L. T. Marston, E. Meyer, K. A. Weitz, and M. K. Muth. 2020. Assessing the environmental impacts of halving food loss and waste along the food supply chain. *Science of the Total Environment* 712:136255. DOI:10.1016/j.scitotenv.2019.136255. (OA)
- 2020 **Read, Q. D.**, P. L. Zarnetske, S. Record, J. M. Grady, A. M. Wilson, A. O. Finley, A. M. Latimer, J. K. Costanza, K. D. Gaddis, K. M. Dahlin, M. L. Hobi, S. V. Ollinger, S. L. Malone, and S. Pau. 2020. Beyond counts and averages: relating geodiversity to dimensions of biodiversity. *Global Ecology and Biogeography*. DOI: 10.1111/geb.13061.
- 2020 Record, S., K. M. Dahlin, P. L. Zarnetske, **Q. D. Read**, S. L. Malone, K. D. Gaddis, J. M. Grady, J. Costanza, M. L. Hobi, A. M. Latimer, S. Pau, A. M. Wilson, S. V. Ollinger, A. O. Finley, and E. Hestir. Remote sensing of geodiversity as a link to biodiversity. Book chapter in *Remote Sensing of Biodiversity: Using spectral signals to understand the biology and biodiversity of plants, communities, ecosystems and the tree of life*. J. Cavender-Bares, J. Gamon, and P. Townsend, eds. Springer International. DOI: 10.1007/978-3-030-33157-3
- 2019 Muth, M. K., C. Birney, A. Cuéllar, S. M. Finn, M. Freeman, J. N. Galloway, I. Gee, J. A. Gephart, K. Jones, L. Low, E. Meyer, **Q. D. Read**, T. Smith, K. A. Weitz, and S. Zoubek. 2019. A systems approach to assessing environmental and economic effects of food loss and waste interventions in the United States. *Science of the*

- Total Environment* 685:1240-1254. DOI:10.1016/j.scitotenv.2019.06.230. (OA)
- 2019 Zarnetske, P. L., **Q. D. Read**, S. Record, K. Gaddis, S. Pau, M. Hobi, S. L. Malone, J. K. Costanza, K. M. Dahlin, A. Latimer, A. M. Wilson, J. M. Grady, S. Ollinger, A. O. Finley. 2019. Towards connecting biodiversity and geodiversity across scales with satellite remote sensing. *Global Ecology and Biogeography*. DOI:10.1111/geb.12887. (OA)
- 2019 Henning, J. A., **Q. D. Read**, N. J. Sanders, and A. T. Classen. 2019. Fungal colonization of plant roots is resistant to nitrogen addition and resilient to dominant species losses. *Ecosphere*. DOI:10.1002/ecs2.2640. (OA)
- 2018 Grady, J. M., **Q. D. Read**, S. Record, P. L. Zarnetske., B. Baiser, K. Thorne, and J. Belmaker. 2018. Size, niches, and the latitudinal diversity gradient. *Teaching Issues and Experiments in Ecology*, Vol. 14, Figure Set 1. http://tiee.esa.org/vol/v14/issues/figure_sets/grady/abstract.html (OA)
- 2018 **Read, Q. D.**, J. M. Grady, P. L. Zarnetske, S. Record, B. Baiser, J. Belmaker, M.-N. Tuanmu, A. Strecker, L. Beaudrot, and K. M. Thibault. 2018. Among-species overlap in rodent body size distributions predicts species richness along a temperature gradient. *Ecography*. DOI:10.1111/ecog.03641 (OA)
- 2018 **Read, Q. D.**, B. Baiser, J. M. Grady, P. L. Zarnetske, S. Record, and J. Belmaker. 2018. Tropical bird species have less variable body sizes. *Biology Letters* 20170453. DOI:10.1098/rsbl.2017.0453
- 2018 **Read, Q. D.**, J. A. Henning, A. T. Classen, and N. J. Sanders. 2018. Aboveground resilience to species loss but belowground resistance to nitrogen addition in a montane plant community. *Journal of Plant Ecology*. DOI:10.1093/jpe/rtx015
- 2018 Welshofer, K. B., P. L. Zarnetske, N. K. Lany, and **Q. D. Read**. 2018. Short-term responses to warming vary between native vs. exotic species and with latitude in an early successional plant community. *Oecologia*. DOI:10.1007/s00442-018-4111-9
- 2017 **Read, Q. D.**, J. A. Henning, and N. J. Sanders. 2017. Intraspecific variation in traits reduces ability of trait-based models to predict community structure. *Journal of Vegetation Science*. DOI:10.1111/jvs.12555
- 2017 Hendershot, J. N.*, **Q. D. Read**, J. A. Henning, N. J. Sanders, and A. T. Classen. 2017. Consistently inconsistent drivers of patterns of microbial diversity and abundance at macroecological scales. *Ecology*. DOI:10.1002/ecy.1829 (OA)
- 2017 Butler, E. E., A. Datta, ..., **Q. D. Read**, ..., and P. B. Reich. 2017. Mapping local and global variability in plant trait distributions. *Proceedings of the National Academy of Sciences*. DOI:10.1073/pnas.1708984114
- 2016 **Read, Q. D.**, S. M. Hoban, M. B. Eppinga, J. A. Schweitzer, and J. K. Bailey. 2016. Accounting for the nested nature of genetic variation across levels of organization improves our understanding of biodiversity and community ecology. *Oikos* 125:895-904. DOI:10.1111/oik.02760 *Editor's Choice*.
- 2016 Van Nuland, M. E., R. C. Wooliver, A. A. Pfennigwerth, **Q. D. Read**, I. M. Ware, L. Mueller, J. A. Fordyce, J. A. Schweitzer, and J. K. Bailey. 2016. Plant-soil feedbacks: connecting ecosystem ecology and evolution. *Functional Ecology*. DOI:10.1111/1365-2435.12690
- 2016 Yoon, S. A.* and **Q. D. Read**. 2016. Consequences of exotic host use: impacts on Lepidoptera and a test of the ecological trap hypothesis. *Oecologia*. DOI:10.1007/s00442-016-3560-2
- 2015 Schussler, E. E., **Q. D. Read**, G. Marbach-Ad, K. Miller, and M. Ferzli. 2015. Preparing biology graduate teaching assistants for their roles as instructors: an

assessment of institutional approaches. *CBE-Life Sciences Education* 14:1-11. DOI:10.1187/cbe.14-11-0196 (OA)

- 2014 **Read, Q. D.**, L. C. Moorhead, N. G. Swenson, J. K. Bailey, and N. J. Sanders. 2014. Convergent effects of elevation on functional leaf traits within and among species. *Functional Ecology* 28:37-45. DOI:10.1111/1365-2435.12162 *nominated for the British Ecological Society's Haldane Prize for Young Investigators*
- 2013 Gorman, C. E., **Q. D. Read**, M. E. Van Nuland, and others. 2013. Species identity influences belowground arthropod assemblages via functional traits. *Annals of Botany Plants* plto49. DOI:10.1093/aobpla/plto49 *Editor's Choice*. (OA)
- 2013 Van Nuland, M. E., E. N. Haag, J. A. Bryant, **Q. D. Read**, and others. 2013. Fire promotes pollinator visitation: implications for ameliorating declines of pollination services. *PloS One* 8:e79853. DOI:10.1371/journal.pone.0079853 (OA)
- 2012 Clark, J. S., B. D. Soltoff, A. S. Powell, and **Q. D. Read**. 2012. Evidence from individual inference for high-dimensional coexistence: long term experiments on recruitment response. *PLoS One* 7:e30050. DOI:10.1371/journal.pone.0030050 (OA)

In review/revision/accepted

- Rewcastle, K. E., J. A. Henning, **Q. D. Read**, R. E. Irwin, N. J. Sanders, and A. T. Classen. Effect of plant removal on mineralization with elevation: moderate effects on rates but substantial effects on variation. *Ecology*, accepted.
- Read, Q. D.**, K. L. Hondula, and M. K. Muth. Biodiversity effects of food system sustainability actions from farm to fork. *PNAS*, in revision.
- Kamoske, A. G., K. M. Dahlin, **Q. D. Read**, S. Record, S. P. Serbin, S. C. Stark, and P. L. Zarnetske. Towards mapping biodiversity from above: Can fusing lidar and hyperspectral remote sensing predict taxonomic, functional, and phylogenetic tree diversity in temperate forests? *Ecography*, submitted.
- Prager, C. M., A. T. Classen, ... **Q. D. Read**, ... and N. J. Sanders. Integrating natural gradients, experiments, and statistical modelling in a distributed network experiment: an example from the WaRM Network. *Perspectives in Plant Ecology, Evolution and Systematics*, submitted.
- Mason, R. E., J. M. Craine, N. K. Lany, ... **Q. D. Read**, ... and A. J. Elmore. Evidence, causes, and consequences of a global decline in terrestrial ecosystem nitrogen availability. *Science*, pre-approved and submitted.
- Stuble, K. L., **Q. D. Read**, L. D. Chick, and M. Rodríguez-Cabal. Here be dragons: Antagonistic interspecific interactions constrain diurnal temporal shifts as a means of coping with warming. *Ecology*, in preparation.
- Knott, J., **Q. D. Read**, S. Record, and P. L. Zarnetske. Patterns of biodiversity across the National Ecological Observatory Network. *Frontiers in Ecology and the Environment*, in preparation.

Teaching and curriculum development

- 2021 Co-designed curriculum for day-long geospatial data analysis workshop for postdocs and grad students; taught introductory lesson and lesson on geospatial statistics with vector data
- 2020 Co-designed and co-taught day-long whirlwind data science class for SESYNC postdoctoral researchers
- 2020 Co-delivered guest lecture on data synthesis in food-energy-water nexus research, Global Stewards graduate seminar, University of Maryland
- 2020 Co-taught SESYNC 2020 [Computational Summer Institute](#), a week-long online

	data science course	
2020	Designed and led workshop on best practices for collaboration with GitHub	
2018	Designed graduate teaching module: “Using NEON data to test macroecological hypotheses”	
2017	Co-instructor of record, Metacommunity Ecology, MSU	
2016	Graduate teaching assistant, Models in Biology, UT-Knoxville	
2015-2016	Graduate teaching assistant, Conservation Biology, UT-Knoxville	
2015	Designed and led workshop on graphing with R and ggplot2	
2015	Guest lecture (led a mock trial), Conservation Biology, UT-Knoxville	
2014	Designed and led workshops on introductory statistics with R	
2013-2014	Member of panel developing and reforming curriculum of undergraduate introductory biology courses, UT-Knoxville	
2013	Guest lecture on climate change and communities, General Ecology, UT-Knoxville	
2012-2014	Graduate teaching assistant, General Ecology, UT-Knoxville	
2012	Guest lecture on biogeochemistry, General Ecology, UT-Knoxville	
2011-2012	Graduate teaching assistant, Introduction to Biodiversity, UT-Knoxville	

Mentoring

2021	Mentored student team in University of Maryland Data Challenge; team won grand prize in a 75-team competition	
2020	Remotely mentored two Bryn Mawr College undergraduates on an R package development project, funded by NSF Macrosystems Biology grant	
2017-2018	Mentored 4 undergraduates through Summer Research Opportunities Program and High Performance Computing Center, MSU	
2012-2015	Mentored 8 undergraduate field and lab assistants, Rocky Mountain Biological Laboratory	
2013-2015	Mentored 3 undergraduate lab assistants, UT-Knoxville	

Fellowships and awards

2018	NSF SESYNC postdoctoral immersion fellowship	\$160,000
2015	University of Tennessee Science Alliance graduate award	\$3000
2015	NSF travel grant to deliver biology education seminar at Notre Dame	\$500
2014	Outstanding Outreach and Community Service award, UT-Knoxville Department of Ecology and Evolutionary Biology	
2013	Dr. Jean H. Langenheim Endowed Graduate Fellowship in the Ecology and Evolution of Plants, Rocky Mountain Biological Laboratory	\$6000
2013	UTK Graduate Student Senate travel award	\$500
2013	Honorable Mention, National Science Foundation Graduate Fellowship	
2012	Dr. Lee R. G. Snyder Memorial Fellowship, Rocky Mountain Biological Laboratory	\$700

Invited talks

- 2020 “Reducing food waste to benefit environment and society: how, why, and in what context?” Duke University Program in Ecology seminar series, Durham, NC
- 2018 “Food waste impacts on biodiversity.” Commission on Environmental Cooperation Food Loss and Waste Measurement Experts Group Meeting, Arlington, VA
- 2017 “Challenges in the functional trait approach to community ecology (and ways to overcome them).” German Centre for Integrative Biodiversity Research (iDiv), Leipzig, Germany
- 2017 “Intraspecific variation and community assembly.” National Ecological Observatory Network, Boulder, CO (talk co-delivered with John Grady)
- 2016 “Individual variation in organismal traits: predicting patterns in space and time from local to global scales.” Michigan State University Department of Forestry, Hanover Forest Science Seminar Series, East Lansing, MI
- 2015 “C3UBE undergraduate biology curriculum reform.” University of Notre Dame, Biology Education Seminar, Notre Dame, IN
- 2014 “Roots, leaves, and soils facing global change.” Rocky Mountain Biological Laboratory Seminar, Gothic, CO
- 2014 “Plant traits & interactions altered by warming at different elevations.” Oak Ridge National Laboratory, Environmental Sciences Division, Oak Ridge, TN

Conference presentations

- 2019 **Read, Q. D.**, J. A. Gephart, A. D. Cuéllar, ... and M. K. Muth. “Which supply chain stages should we target to reduce food loss and waste and benefit the environment?” Ecological Society of America-United States Society for Ecological Economics, Louisville, KY
- 2018 **Read, Q. D.**, S. Record, K. M. Dahlin, P. L. Zarnetske, and others. “Measuring geodiversity to explain biodiversity: what is the effect of spatial grain and spatial consciousness?” US-International Association of Landscape Ecology, Chicago, IL
- 2017 **Read, Q. D.**, J. M. Grady, P. L. Zarnetske, S. Record, and others. “Intraspecific variation reflects drivers of rodent community assembly across the National Ecological Observatory Network.” Ecological Society of America, Portland, OR
- 2015 **Read, Q. D.**, N. J. Sanders, and A. T. Classen. “A globally replicated experiment shows that long-term environmental filters constrain plant response to increased temperature and loss of foundation species.” Ecological Society of America, Baltimore, MD

Software

- 2021 **Read, Q. D.**, A. Yue, I. E. Fluck, B. Baiser, J. M. Grady, P. L. Zarnetske, and S. Record. 2021. Ostats: Pairwise community-level niche overlap statistics. R package version 0.1.0. <https://neon-biodiversity.github.io/Ostats/>
- 2020 Brunson, J. C. and **Q. D. Read**. 2020. ggalluvial: Layered Grammar for Alluvial Plots. R package version 0.12.2.0001. <https://corybrunson.github.io/ggalluvial/>
- 2019 Marchand, P., I. T. Carroll, M. Smorul, R. E. Blake, and **Q. D. Read**. 2019. rslurm: Submit R Calculations to a 'Slurm' Cluster. R package version 0.6.0. <https://cyberhelp.sesync.org/rslurm/>

Online content

2019-2021 Blog posts on the SESYNC Cyberhelp blog (<https://cyberhelp.sesync.org/blog>)

- “Making a fifty-state USA map, 2021 edition”
- “Making free maps with R, ggspatial, and Mapbox”
- “Goodbye %>%, hello := (Using R data.table to speed up my data science)”
- “How open reproducible methods benefit the research community: a shiny story”
- “The carbon footprint of R code, and how to reduce it”
- “Resources to help you learn GitHub Pages”
- “Tips for a smooth R(Studio) workflow and reproducible R code”
- “How do I resolve merge conflicts in git/GitHub/GitLab?”
- “Using the rslurm package to run code in parallel”
- “ggplot tricks not to forget about”

2021 Marchand, P., I. T. Carroll, and **Q. D. Read**. “Introduction to Geospatial Data.” Jul. 2021, SESYNC Cyberhelp online lesson. <https://cyberhelp.sesync.org/geospatial-packages-in-R-lesson/>

2020 **Read, Q. D.** “Advanced git Techniques.” Sep. 2020, SESYNC Cyberhelp online lesson. <https://cyberhelp.sesync.org/advanced-git-lesson/>

2020 **Read, Q. D.** and I. T. Carroll. “Online Data with R.” Jul. 2020, SESYNC Cyberhelp online lesson. <https://cyberhelp.sesync.org/online-data-with-R-lesson/>

2020 Muth, M. K. and **Q. D. Read**. “Effects of COVID-19 meat and poultry plant closures on the environment and food security.” 7 Jul. 2020, RTI Insights blog. <https://www.rti.org/insights/covid-19-effect-meat-supply-chain>

2020 Blake, R. E., R. Beilinson, N. Motzer, K. L. Hondula, and **Q. D. Read**. “Resources and tips for elevating your team science in an all-virtual world.” Mar. 2020. <https://www.sesync.org/resources-and-tips-for-elevating-your-team-science-in-an-all-virtual-world>

Professional service

2020 Peer reviewer of R package for [RopenSci.org](https://ropensci.org): *pixelclasser*

2019– Maintainer of the R package *rslurm* (cyberhelp.sesync.org/rslurm)

2019 Review panelist, SESYNC immersion postdoctoral fellowship program

2017 Co-organizer of oral session at Ecological Society of America meeting: “Challenges and opportunities for investigating ecological communities across space and time: insights from coordinated research networks.”

2013– Peer reviewer for the following journals: *Food Policy*, *Anthropocene*, *Journal of Animal Ecology*, *Science of the Total Environment*, *Scientific Reports*, *Biogeosciences*, *Remote Sensing of Environment*, *Systematic Biology*, *Resources Conservation & Recycling* (2×), *Annals of Botany*, *Molecular Ecology*, *Energies*, *Nature Climate Change*, *Journal of Biogeography*, *Oikos* (2×), *Ecological Applications*, *Ecology*, *Journal of Ecology* (2×), *Global Ecology and Biogeography* (2×), *Plant Ecology*, *Ecological Monographs*, *Ecology Letters* (2×), *Annals of Botany Plants*, *Methods in Ecology and Evolution*, *Ecography* (2×), *Biotropica*, *Functional Ecology* (3×), *Journal of Plant Ecology*, *PeerJ* (2×), *Ecology and Evolution*, *PLoS One* (2×), *Ecosphere* (3×), *New Phytologist* (2×), *Global Change Biology* (3×)

Community outreach

- 2016– Maintain a personal science blog (blog.quentinread.com)
- 2016– Answer community programming questions on StackOverflow
- 2021 Interviewed on food waste for SESYNC podcast (anchor.fm/sesync-communications)
- 2018 Organized event and gave presentation on citizen science opportunities, MSU Science Festival
- 2017 Gave public research talk, MSU Biology On Tap
- 2014 Organized and coordinated Darwin Day Tennessee
- 2013 Coordinated advertising for Darwin Day Tennessee
- 2012 Discussed my research and assisted 7th-grade students with climate change projects
- 2011-2015 Volunteered at kids' science education events at the University of Tennessee and the Rocky Mountain Biological Laboratory

Professional training

- 2020 ReproHack reproducible science workshop, SESYNC
- 2019 Google Earth Engine workshop, SESYNC
- 2019 Ecosystem services valuation workshop, USDA, Washington, DC
- 2018 Data to Motivate Synthesis workshop, SESYNC
- 2018-2020 SESYNC postdoctoral immersion series, including multiday workshops on interdisciplinary techniques, team science, socio-environmental hydrology, land system science, methods in social science, ecology, environmental policy, and public health
- 2014 Structural equation modeling workshop with Dr. Jim Grace, Knoxville, TN
- 2013 Short course: Boreal Forest Ecology, Swedish University of Agricultural Sciences, Umeå, Sweden
- 2012 Short course: Fundamentals of Ecosystem Ecology, Cary Institute of Ecosystem Studies, Millbrook, NY