Quentin D. Read

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

SESYNC
1 Park Place, Suite 300
Annapolis, MD 21401 USA

Email: qread@sesync.org
Website/Blog: quentinread.com
GitHub, StackOverflow: qdread

Professional appointments

National Socio-Environmental Synthesis Center, Annapolis, MD (University of Maryland)

2020– Data scientist

2019-2020 Data scientist (50% time); Postdoctoral fellow (50% time)

2018-2019 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

- Provide data science consulting for socio-environmental research teams, including data analysis, management, and visualization in R and Python
- Support research users of a high-performance computing cluster
- Maintain the R package *rslurm*, and develop new features
- Maintain, update, and write content for SESYNC's cyberhelp website
- Develop lessons for data science curriculum, including modules on git and online data
- Teach data science courses and training modules to students and researchers
- 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, R Markdown, and package development
- 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 Spanish

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. Cheruvelil, 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* plt049. DOI:10.1093/aobpla/plt049 *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.

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.

Read, Q. D., K. L. Hondula, and M. K. Muth. Biodiversity effects of food system sustainability actions from farm to fork. In preparation, journal TBD.

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 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."

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: *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: *Anthropocene, Journal of Animal Ecology, Science of the Total Environment, Scientific Reports, Biogeosciences, Ecography, Remote Sensing of Environment, Systematic Biology, Resources Conservation & Recycling, 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, 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

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