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RESEARCH INTERESTS

I use ecosystem ecology as a lens to study the changing biogeochemical cycles of terrestrial ecosystems. I am particularly interested in the nitrogen cycle of plants and soils in forests and agricultural ecosystems.

EDUCATION

Ph.D. 2000. Colorado State University, Ecology
M.S. 1997. Northern Arizona University, Forestry, with Honors
B.A. 1993. University of Virginia, Chemistry, with Distinction

PROFESSIONAL APPOINTMENTS

2018- Chair, Intercollege Graduate Degree Program in Ecology, Penn State.
2015-2016 Investigador Invitado. Universidad Politécnica de Madrid
2012- Professor of Soil Biogeochemistry, Dept. of Ecosystem Science and Management, Penn. State Univ. (promoted from Associate to Full Professor in 2016)
2005-2012 Assistant then Associate (tenured in 2011) Professor of Soil Biogeochemistry, Dept. of Crop and Soil Sci., Penn. State Univ.
2002-2004 Assistant Professor, School of Life Sciences, Arizona State Univ.
2000-2002 USDA Postdoctoral Research Fellow, Department of Forest Sciences, Colorado State Univ.
1997-2000 Grad. Research Assistant, Graduate Degree Program in Ecology, Colorado State Univ.
1995-1997 Grad. Research Assistant, School of Forestry, Northern Arizona Univ.
1993-1994 Research Assistant, Harvard Forest LTER, Harvard Univ.
1992 Research Assistant, Virginia Coastal Reserve LTER, Univ. of Virginia.

HONORS AND AWARDS

Alex and Jesse Black Award for Excellence in Research, PSU College of Agricultural Sciences
Fulbright Scholar, Spain
Bellis Award, Penn State Intercollege Degree Program in Ecology
Community of Excellence Teaching Award, NACTA Chapter of PSU
Distinguished Alumni Award, Colorado State University Graduate Degree Program in Ecology
Early Career Research Award, Environment and Natural Resources Institute, PSU
Junior Faculty Fellow in Conservation and the Environment, A.W. Mellon Foundation

PEER REVIEWED RESEARCH ARTICLES (my students, postdocs, technicians are in italics)

Hoagland, B., C. Schmidt, T. Russo, R. Adams, J. Kaye. 2019. Controls on nitrogen transformation rates on restored floodplains along the Cosumnes River, California. *Science of the Total Environment* 649: 979–994

Baraibar B., D. Mortensen, M. Hunter, M. Barbercheck, J. Kaye, *D Finney*, W. Curran, J. Bunckek, and C. White (2018) Growing degree days and cover crop type explain weed biomass in winter cover crops. *Agronomy for Sustainable Development* 38:65 <https://doi.org/10.1007/s13593-018-0543-1>

Weitzman, J. N., and J.P. Kaye. 2018. Nitrogen budget and topographic controls on nitrous oxide in a shale-based watershed. *Journal of Geophysical Research: Biogeosciences*, 123. <https://doi.org/10.1029/2017JG004344>

Hoagland, B., T.A. Russo, X. Gu, *L. Hill*, J. Kaye, B. Forsythe, and S. L. Brantley. 2017. Hyporheic zone influences on concentration-discharge relationships in a headwater sandstone stream. *Water Resour. Res.* 53: 4643–4667. doi:10.1002/2016WR019717.

- Rosenzweig, S.T., M.E. Schipanski, and J.P. Kaye. 2017. Rhizosphere priming and plant-mediated cover crop decomposition. *Plant and Soil* 417: 127-139. <https://doi.org/10.1007/s11104-017-3246-5>.
- Finney, D., E. Murrell, C. White, B. Baraibar, M. Barbercheck, B. Bradley, S. Cornelisse, M. Hunter, J. Kaye, D. Mortensen, C. Mullen, and M. Schipanski. 2017. Ecosystem services and disservices are bundled in simple and diverse cover cropping systems. *Agricultural and Environmental Letters*. doi: 10.2134/aehl2017.09.0033
- Hasenmueller, E, X. Gu, J. Weitzman, T. Adams, G. Stinchcomb, D. Eissenstat, P. Drohan, S. Brantley, and J. Kaye. 2017. Weathering of rock to regolith: The activity of deep roots in bedrock fractures. *Geoderma* 300:11-31.
- Weitzman, J.N., and J.P. Kaye. 2017. Nitrate retention capacity of milldam-impacted legacy sediments and relict A horizon soils. *Biogeosciences Discussions* <http://www.soil-discuss.net/soil-2016-60/>
- Finney, D.M., J.S. Buyer, and J.P. Kaye. 2017. Living cover crops have immediate impacts on soil microbial community structure and function. *Journal of Soil and Water Conservation*. July/August 2017 vol. 72 no. 4 361-373. doi: 10.2489/jswc.72.4.361
- Finney, D.M. and J.P. Kaye. 2017. Functional diversity in cover crop polycultures increases multifunctionality of an agricultural system. *Journal of Applied Ecology* 54:509-517. doi: 10.1111/1365-2664.12765
- Kaye, J.P., and M. Quemada. 2017. Using cover crops to mitigate and adapt to climate change: A review. *Agronomy for Sustainable Development* 37:4. DOI 10.1007/s13593-016-0410-x
- Schipanski, M., M.E. Barbercheck, E.G. Murrell, J. Harper, D.M. Finney, J.P. Kaye, R.E. Smith, and D.A. Mortensen. 2017. Balancing multiple objectives in organic feed and forage cropping systems. *Agriculture, Ecosystems & Environment*. 239:219-227.
- White, C.M., DuPont, S.T., Hautau, M., Hartman, D., Finney, D.M., Bradley, B., LaChance, J.C., Kaye, J.P., 2017. Managing the trade off between nitrogen supply and retention with cover crop mixtures. *Agric. Ecosyst. Environ.* 237, 121–133. doi:10.1016/j.agee.2016.12.016
- Murrell, E.G., M.E. Schipanski, D.M. Finney, M.C. Hunter, M. Burgess, J.C. LaChance, B. Baraibar, C.M. White, D.A. Mortensen, and J.P. Kaye. 2017. Achieving diverse cover crop mixtures: Effects of planting date and seeding rate. *Agronomy Journal* 109:259-271. doi:10.2134/agronj2016.03.0174
- Saha, D., B. Rau, J.P. Kaye, F. Montes, P.R. Adler, and A.R. Kemanian. 2017. Landscape control of nitrous oxide emissions during the transition from conservation reserve program to perennial grasses for bioenergy. *Global Change Biology Bioenergy* 9:783-795. doi: 10.1111/gcbb.12395
- Kaye, J.P., M.W. Kaye, S.C. Hart, W.W. Covington, and P.Z. Fulé. 2016. Slow carbon and nutrient accumulation in trees established after fire exclusion in the southwestern United States. *Ecological Applications* 26: 2402-2413. doi: 10.1002/eap.1407
- Weitzman, J.N, and J.P. Kaye. 2016. Variability in nitrogen and carbon cycling across forest, urban and agricultural land uses. *Ecosystems* 19:1345-1361. doi: 10.1007/s10021-016-0007-x
- White, C.M., Kemanian, A., Finney, D.M. and J.P. Kaye. 2016. A Model-Data Fusion Approach for Predicting Cover Crop Nitrogen Supply to Corn. *Agronomy Journal*. 108:2527-2540. doi:10.2134/agronj2016.05.0288
- Brantley, S. R. DiBiase, T. Russo, Y. Shi, H. Lin, K. J. Davis, M. Kaye, L. Hill, J. Kaye, D. Eissenstat, B. Hoagland, A. Dere, A. L. Neal, K. Brubaker, D. Arthur. 2016. Designing a suite of measurements to understand the critical zone. *Earth Surface Dynamics* 4:211-235.
- Finney, D., C. White, and J. Kaye. 2016. Biomass production and carbon:nitrogen ratio influence ecosystem services from cover crop mixtures. *Agronomy Journal* 108:39–52. doi:10.2134/agronj15.0182
- Finney, D.M., Eckert, S.E., and J.P. Kaye. 2015. Drivers of nitrogen dynamics in ecologically based agriculture revealed by long-term, high frequency field measurements. *Ecological Applications* 25:2210-2227. <http://dx.doi.org/10.1890/14-1357.1>.

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- Hasenmueller, E., L. Jin, G. Stinchcomb, H. Lin, S. Brantley, J.P. Kaye.* 2015. Topographic controls on the depth distribution of soil CO₂ in a small temperate watershed. *Applied Geochemistry* 63:58-69.
- Wiechmann, M., M. Hurteau, J. Kaye, and J. Miesel.* 2015. Charcoal C content following prescribed burning in a mixed-conifer forest, Sierra Nevada, California. *PLOS ONE* 10(8): e0135014. doi:10.1371/journal.pone.0135014
- Lewis, D., M. Castellano, and J.P. Kaye.* 2014. Forest succession, soil carbon accumulation, and rapid nitrogen storage in poorly-remineralized soil organic matter. *Ecology* 95: 2687-2693.
- Jin, L., N. Ogrinc, T. Yesavage, E. Hasenmueller, L. Ma, P. Sullivan, J. Kaye, C. Duffy, and S. Brantley.* 2014. The CO₂ consumption potential of gray shale weathering: insights from the evolution of carbon isotopes in the Susquehanna Shale Hills critical zone observatory. *Geochimica et Cosmochimica Acta* 142:260-280.
- White, C., Kemanian, A. and J. Kaye.* 2014. Implications of carbon model structure for simulated nitrogen mineralization dynamics. *Biogeosciences* 11:9667-9695.
- McDaniel, M., J. Kaye, M. Kaye.* 2014. Do “hot moments” become hotter under climate change?: Soil nitrogen dynamics from a climate manipulation experiment in a post-harvest forest. *Biogeochemistry* 121:339-354.
- Weitzman, J., K. Forshay, J.P. Kaye, Meyer, P., Koval, J., and R. Walter.* 2014. Potential nitrogen and carbon mineralization in a landscape rich in mill dam legacy sediments. *Biogeochemistry* 120:337-357.
- Kurth, V., S. Hart, C. Ross, J. Kaye, P. Fule.* 2014. Stand-replacing wildfires increase nitrification for decades in southwestern ponderosa pine forests. *Oecologia* 174:395-407.
- Lewis, D. B., J. P. Kaye, and A. P. Kinzig.* 2014. Legacies of agriculture and urbanization in labile and stable organic carbon and nitrogen in Sonoran Desert soils. *Ecosphere* 5(5):59. <http://dx.doi.org/10.1890/ES13-00400.1>
- McDaniel, M.D., J.P. Kaye, M.W. Kaye, and M.A. Bruns.* 2014. Climate change interactions affect soil CO₂ efflux and microbial functioning in a post-harvest forest. *Oecologia* 174:1437-1448.
- Schipanski, M., R.G. Smith, T.L. Pisani-Gareau, R. Jabbour, D.B. Lewis, M.E. Barbercheck, D.A. Mortensen, J.P. Kaye.* 2014. The structure of multivariate relationships influencing crop yields during the transition to organic management. *Agriculture Ecosystems and Environment* 189:119-126.
- Lee, C., G.W. Feyereisen, A.N. Hristov, C.J. Dell, J.P. Kaye, and D. Beegle.* 2014. Effect of dietary protein concentration on utilization of dairy manure nitrogen for plant growth, leachate nitrate losses, and ammonia emissions from lysimeters. *Journal of Environmental Quality* 43:398-408.
- Schipanski, M., M. Barbercheck, M.R. Douglas, D.M. Finney, K. Haider, J.P. Kaye, A.R. Kemanian, D.A. Mortensen, M.R. Ryan, J. Tooker, and C.M. White.* 2014. A conceptual framework for evaluating ecosystem services provided by cover crops in agroecosystems. *Agricultural Systems* 125:12-22.
- McDaniel, M.D., R.J. Wagner, C.R. Rollinson, B.A. Kimball, M.W. Kaye, and J.P. Kaye.* 2014. Microclimate and ecological threshold responses in a warming and wetting experiment following whole-tree harvest in central Pennsylvania. *Theoretical and Applied Climatology* 116:287-299.
- Zhang, Y., Y. Qian, D. Bremer, J. Kaye, and W.J. Parton.* 2013. Simulation of N₂O Emissions and estimation of global warming potential in turfgrass systems using the DAYCENT model. *Journal of Environmental Quality* 42: 1100-1108.
- Castellano, M., D. Lewis, and J.P. Kaye.* 2013. Response of soil nitrogen retention to the interactive effects of soil texture, hydrology, and organic matter. *JGR-Biogeosciences* 118:280-290.
- McDaniel, M., J. Kaye, and M. Kaye.* 2013. Field climate manipulations had limited effects on soil extracellular enzyme activities in a post-harvest forest. *Soil Biology and Biochemistry* 56: 90-98.
- Ross, C., J.P. Kaye, M.W. Kaye, V.J. Kurth, R. Brimmer, S.C. Hart, and P.Z. Fulé.* 2012. Ecosystem carbon remains low for three decades following fire and constrains soil CO₂ responses to precipitation in southwestern ponderosa pine forests. *Ecosystems* 15:725-740.

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- Sponseller, R., S. Hall, D. Huber, N. Grimm, J. Kaye, C. Clark, and S. Collins. 2012. Variation in monsoon precipitation drives spatial and temporal patterns of *Larrea tridentata* growth in the Sonoran Desert. *Functional Ecology* 26:750-758.
- Lee, C., A. N. Hristov, C. J. Dell, G. W. Feyereisen, J. Kaye, and D. Beegle. 2012. Effect of dietary protein concentration on ammonia and greenhouse gas emitting potential of dairy manure. *J. Dairy Sci.* 95:1930-1941.
- Lewis, D. and J.P. Kaye. 2012. Inorganic nitrogen immobilization in live and sterile soil of old-growth conifer and hardwood forests: implications for ecosystem nitrogen retention. *Biogeochemistry* 111:169-186.
- Castellano, M., J.P. Kaye, H. Lin, and J. Schmidt. 2012. Linking carbon saturation concepts to nitrogen saturation and retention. *Ecosystems* 15:175-187. DOI: doi:10.1890/100068
- Kaye, J.P., S.E. Eckert, D.A. Gonzales, J.O. Allen, S.J. Hall, R.A. Sponseller, and N.B. Grimm. 2011. Decomposition of urban atmospheric carbon in Sonoran Desert soils. *Urban Ecosystems* 14:737-754.
- Lewis, D.B., J.P. Kaye, R. Jabbour, and M.E. Barbercheck. 2011. Labile carbon and other soil quality indicators in two tillage systems during transition to organic agriculture. *Journal of Renewable Agriculture and Food Systems* 26:342-353.
- Collins, S.L., S.R. Carpenter, S.M. Swinton, D. Orstein, D.L. Childers, T.L. Gragson, N.B. Grimm, J.M. Grove, S.L. Harlan, J.P. Kaye, A.K. Knapp, G.P. Kofinas, J.J. Magnuson, W.H. McDowell, J.M. Melack, L.A. Ogden, G.P. Robertson, M.D. Smith, A.C. Whitmer. 2011. An integrated conceptual framework for long-term social-ecological research. *Frontiers in Ecology and the Environment* 9:351-357.
- Hall, S.J., R. Sponseller, N. Grimm, D. Huber, J. Kaye, C. Clark, S. Collins. 2011. Ecosystem response to nutrient enrichment in the Sonoran Desert across an urban airshed. *Ecological Applications*. 21:640-660
- Castellano, M.J., J.P. Schmidt, J.P. Kaye, C. Walker, C.B. Graham, H. Lin, C. Dell. 2011. Hydrological controls on heterotrophic soil respiration across an agricultural landscape. *Geoderma* 162:273-280.
- Sullivan, B.W., T.E. Kolb, S.C. Hart, J.P. Kaye, B.A. Hungate, S. Dore, and M. Montes-Helu. 2011. Wildfire reduces carbon dioxide efflux and increases methane uptake in ponderosa pine forest soils of the southwestern USA. *Biogeochemistry* 104:251-265.
- Diggins, C., P.Z. Fulé, J.P. Kaye, and W.W. Covington. 2010. Future climate affects management strategies for maintaining forest restoration treatments. *International Journal of Wildland Fire* 19:903-913.
- Majumdar, A., Paul, D., and J. Kaye. 2010. Sensitivity analysis and model selection for a generalized convolution model for spatial processes. *Bayesian Analysis* 5:493-518.
- Adviento-Borbe, M.A.A., J.P. Kaye, M. A. Bruns, M.D. McDaniel, M. McCoy, S. Harkcom. 2010. Soil greenhouse gas and ammonia emissions in a long-term maize-based cropping systems experiment. *Soil Science Society of America Journal* 74:1623-1634
- Castellano, M.J., J.P. Schmidt, J.P. Kaye, C. Walker, C. Graham, H. Lin, and C. Dell. 2010. Hydrological and biogeochemical controls on the timing and magnitude of nitrous oxide flux across an agricultural landscape. *Global Change Biology*. 16:2711-2720.
- Kaye, J.P., Romaniaa, J., and R. Vallejo. 2010. Plant and soil carbon accumulation following fire in Mediterranean woodlands. *Oecologia*. 164:533-543.
- Cook J., R.S. Gallagher, J.P. Kaye, J. Lynch, and B. Bradley. 2010. Optimizing vetch nitrogen production and corn nitrogen uptake in a no-till cropping system. *Agronomy Journal* 102:1491-1499.
- Esque, T.C., J.P. Kaye, S.E. Eckert, L.A. DeFalco, and C.R. Tracy. 2010. Short-term soil inorganic N pulse after experimental fire alters invasive and native annual plant production in a Mojave Desert shrubland. *Oecologia* 164:253-263.

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- Staravoytov A., R.S. Gallagher, K. Jacobsen, J.P. Kaye, and B. Bradley. 2010. Management of small grain residues to retain legume-derived nitrogen in corn cropping systems. *Agronomy Journal* 102:895-903.
- Dore, S., T. Kolb, M. Montes-Helu, S. Eckert, B. Sullivan, B. Hungate, J.P. Kaye, S. Hart, G. Koch, and A. Finkral. 2010. Carbon and water fluxes from ponderosa pine forests disturbed by wildfire and thinning. *Ecological Applications* 20:663-683.
- Laughlin, D.C., S.C. Hart, J.P. Kaye, and M.M. Moore. 2010. Evidence for indirect effects of plant diversity and composition on net nitrification. *Plant and Soil* 330:435-445; DOI 10.1007/s11104-009-0217-5
- Castellano, M.J. and J.P. Kaye. 2009. Global within-site variance in soil solution nitrogen and hydraulic conductivity are correlated with clay content. *Ecosystems*. 12:1343-1351.
- Fricks, B., J.P. Kaye, and R. Seidel. 2009. Abiotic NO₃⁻ retention in agroecosystems and a forest soil. *Soil Science Society of America Journal* 73:1137-1141
- McCrackin, M. T.K. Harms, N.B. Grimm, S.J. Hall and J.P. Kaye. 2008. Responses of soil microorganisms to resource availability in urban, desert soils. *Biogeochemistry* 87: 143-155.
- Sullivan, B.W., T.E. Kolb, S.C. Hart, J.P. Kaye, S. Dore, and M. Montes-Helu. 2008. Thinning reduces soil carbon dioxide but not methane flux from southwestern USA ponderosa pine forests. *Forest Ecology and Management* 255: 4047-4055.
- Morehouse, K.H., T. Johns, J.P. Kaye, and M.W. Kaye. 2008. Carbon and nitrogen cycling immediately following bark beetle outbreaks in southwestern ponderosa pine forests. *Forest Ecology and Management* 255:2698-2708.
- Dore, S., T.E. Kolb, M. Montes-Helu, B.W. Sullivan, W.D. Winslow, S.C. Hart, J.P. Kaye, G.W. Koch, B. A. Hungate. 2008. Long-term impact of a stand-replacing fire on ecosystem CO₂ exchange of a ponderosa pine forest. *Global Change Biology* 14: 1801-1820.
- Majumdar, A., J.P. Kaye, C. Gries, D. Hope, R. Burdick, and N. Grimm. 2008. Hierarchical spatial modeling and prediction of multiple soil nutrients and carbon concentrations. *Communications in Statistics—Simulation and Computation* 37: 434–453.
- Kaye, J.P., Majumdar, A., Gries, C., Buyantuyev, A., Grimm, N., Hope, D., Jenerette, G., Zhu, W., Baker, L. 2008. Hierarchical Bayesian scaling of soil properties across urban, agricultural, and desert ecosystems. *Ecological Applications* 18:132-145.
- Oleson, J., Hope, D., Gries, C., and J.P. Kaye. 2006. Estimating soil properties in heterogeneous land-use patches: a Bayesian approach. *Environmetrics* 17: 517-525.
- Lewis, D., J.P. Kaye, C. Gries, A. Kinzig, and C. Redman. 2006. Agrarian legacy in soil nutrient pools of urbanizing arid lands. *Global Change Biology* 12: 703-709.
- Kaye, J.P., P. Groffman, N.B. Grimm, L. Baker, and R. Pouyat. 2006. A distinct urban biogeochemistry? *Trends in Ecology and Evolution* 21:192-199.
- Hope, D., W. Zhu, C. Gries, J. Oleson, J.P. Kaye, N.B. Grimm, and L. Baker. 2005. Spatial variation in soil inorganic nitrogen across an arid urban ecosystem. *Urban Ecosystems* 8:251-273.
- Kaye, J.P., S.C. Hart, P.Z. Fulé, W.W. Covington, M.M. Moore, and M.W. Kaye. 2005. Initial carbon, nitrogen, and phosphorus fluxes following ponderosa pine restoration treatments. *Ecological Applications* 15: 1581-1593.
- Boyle, S., S.C. Hart, J.P. Kaye, and M. Waldrop. 2005. Restoration and canopy type influence soil microflora in a Ponderosa pine forest. *Soil Sci. Society of America Journal* 69:1627–1638.
- Kaye, J.P., R. McCulley, and I.C. Burke. 2005. Carbon fluxes, nitrogen cycling and soil microorganisms in adjacent urban, native and agricultural ecosystems. *Global Change Biology* 11:575-587.
- Binkley, D., G. Ice, J.P. Kaye, and C. Williams. 2004. Nitrogen and phosphorus concentrations in forest streams of the United States. *Journal of the American Water Resources Association* 40:1277-1291.
- Binkley, D., J.P. Kaye, M. Barry, and M. Ryan. 2004. First rotation changes in soil carbon and nitrogen in a *Eucalyptus* plantation in Hawaii. *Soil Science Society of America Journal* 68:1713–1719.
- Kaye, J.P., I.C. Burke, A. Mosier, and J.P. Guerchman. 2004. Methane and nitrous oxide fluxes from urban soils to the atmosphere. *Ecological Applications* 14:975–981.

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- Kaye, J.P., D. Binkley, and C. Rhoades. 2003. Stable soil nitrogen accumulation and flexible organic matter stoichiometry during primary floodplain succession. *Biogeochemistry* 63:1-22.
- Kaye, J.P., D. Binkley, X. Zou, and J. Parrotta. 2002. Non-labile soil ¹⁵nitrogen beneath three tree species in a tropical plantation. *Soil Science Society of America Journal* 66:612–619. (principal author)
- Kaye, J.P., J.E. Barrett, and I.C. Burke. 2002. Stable carbon and nitrogen pools in grassland soils of variable texture and carbon content. *Ecosystems* 5: 461-471.
- Kaye, J.P., S.C. Resh, M.W. Kaye, and R. Chimner. 2000. Nutrient and carbon dynamics in a replacement series of *Eucalyptus* and *Albizia* trees. *Ecology* 81:3267-3273.
- Kaye, J.P., S.C. Hart, R.C. Cobb, and J. Stone. 1999. Water and nutrient outflow following ecological restoration of a ponderosa pine/bunchgrass ecosystem. *Restoration Ecology* 7:252-261.
- Boone, R.D., K.J. Nadelhoffer, J.D. Canary, and J.P. Kaye. 1998. Roots exert a strong influence on the temperature sensitivity of soil respiration. *Nature (London)* 396:570-572.
- Kaye, J.P. and S.C. Hart. 1998. Restoration and canopy type effects on soil respiration in a ponderosa pine-bunchgrass ecosystem. *Soil Science Society of America Journal* 62:1062-1072.
- Kaye, J.P. and S.C. Hart. 1998. Ecological restoration alters nitrogen transformations in a ponderosa pine-bunchgrass ecosystem. *Ecological Applications* 8:1052-1060.
- Kaye, J.P. and S.C. Hart 1997. Competition for nitrogen between plants and soil microorganisms. *Trends in Ecology and Evolution* 12:139-143.

PEER REVIEWED BOOK CHAPTERS

- Yu, Xuan, C. Duffy, J. Kaye, W. Crow, G. Bhatt, Y. Shi. 2015. Watershed Reanalysis of Water and Carbon Cycle Models at a Critical Zone Observatory. *In: V. Lakshmi (ed.), Remote Sensing of the Terrestrial Water Cycle, Geophysical Monograph, 206*. AGU Books.
- Burke, I.C., Mosier, A., P.B. Hook, D.G. Milchunas, J.E. Barrett, M.A. Vinton, R.L. McCulley, J.P. Kaye, R.A. Gill, H.E. Epstein, R.H. Kelly, W.J. Parton, C.M. Yonker, P. Lowe, and W. Lauenroth. 2008. Soil organic matter and nutrient dynamics of shortgrass steppe ecosystems. *In: W. Lauenroth and I. Burke (eds.), Ecology of the Shortgrass Steppe: A Long-Term Perspective*. Oxford University Press
- Nadelhoffer, K.J., R.D. Boone, R.D. Bowden, J.D. Canary, J.P. Kaye, P. Micks, A. Ricca, J.A. Aitkenhead, K. Lajtha, and W.H. McDowell. 2004. The DIRT experiment: Litter and root influences on forest soil organic matter stocks and function. *In: D. Foster and J. Aber (eds.), Forests in Time. Synthesis Volume of the Harvard Forest LTER Program*. Yale University Press.
- Burke, I.C., J.P. Kaye, S.P. Bird, S.A. Hall, R.L. McCulley, and G.L. Sommerville. 2003. Evaluating and testing models of terrestrial biogeochemistry: The role of temperature in controlling decomposition. Pp. 225-253. *In: Canham, C.D., J.J. Cole, and W.K. Lauenroth, editors. Models in Ecosystem Science*. Princeton (NJ): Princeton University Press.

FUNDED GRANTS

- 9/2018-8/2023. NSF NRT INFEWS. Cover page Co-PI. Landscape-U, Impactful partnerships among graduate students and managers for regenerative landscape design. With Erica Smithwick and others. \$3,000,000.
- 7/2018-6/2023. USDA NNF. Lead PI. Training forest resource scientists as critical zone managers. With M. Kaye and J. Duncan. \$262,500.
- 10/2017-9/2020. USDA NIFA AFRI Foundational. Co-PI. Cover crop cascades can benefit mycorrhizae-associated maize resistance to insect pests. With Jared Ali. \$500,000.
- 7/2016-4/2019. USDA NE SARE Graduate Fellowship. Advisor of lead-PI. Interseeded cover crops: Evaluating nitrogen retention services provided by plant-microbe relationships. With S. Isbell (Ph.D. Student) \$14,998.
- 8/2016-8/2018. DOE. Co-PI. Understanding ecohydrological controls of biogeochemical reactions and fluxes at the watershed scale. With Li Li, and 5 others. \$180,000.

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- 9/2015-9/2019. USDA NIFA OREI. Lead PI. Making diversity functional: Farm-tuning cover crop mixtures to meet grower needs. With M. Barbercheck and D. Mortensen. \$999,972.
- 8/2015-7/2018. USDA NIFA ORG. Co-PI. Unraveling the interactive effects of tillage, residue, and manure additions on nitrous oxide emissions in grain and silage systems. With Armen Kemanian. \$499,999.
- 9/2015-1/2016. US Fulbright Commission. Sole PI. Faculty Fulbright Scholar to Spain. ~\$15,000.
- 10/2014-9/2019. USDA NIFA OREI. Co-PI. A reduced-tillage toolbox: Alternative approaches for integrating cover crops and reduced tillage in an organic feed and forage system. With Mary Barbercheck (PD), William Curran, Armen Kemanian, and several others. \$2,000,000.
- 10/2014-9/2016. USDA NIFA Graduate Fellowship. Advisor of lead-PI. A deeper understanding: using the depth distribution of N₂O to improve predictions of soil-atmosphere emissions. With J. Weitzman (Ph.D. Student). \$75,610.
- 08/2014-07/2018. Co-PI. DOE. Linking topographic variation in belowground C processes with hydrological processes to improve Earth System models. With D. Eissenstat and 4 others. \$1,000,000.
- 10/2013-9/2018. Co-PI. NSF EAR. Using the Susquehanna-Shale Hills CZO to project from the geologic past to the anthropocene future. With Susan Brantley and 9 co-PIs. \$4,496,160.
- 10/2013-9/2017. Co-PI, USDA NIFA. Biologically based fertilizer recommendations to meet yield expectations and preserve water quality. With A. Franzleubbers and many others. \$500,000 (\$90,000 to PSU).
- 6/2013-8/2014. Co-PI. USDA/USDI JFSP Graduate Fellowship. Quantifying the effect of fuel size on charcoal formation during prescribed fire. With M. Weischman (M.S. Student) and M. Hurteau. \$23,612.
- 9/2012 to 8/2013. Co-PI. NSF EAR. An accomplishment-based renewal of the Susquehanna-Shale Hills Critical Zone Observatory. With Susan Brantley and 9 co-PIs. \$1,000,000.
- 8/2012-7/2015: Advisor of lead-PI. USDA NIFA Graduate Fellowship. Building belowground diversity with cover crops to enhance agroecosystem resilience to climate change. With D. Finney (Ph.D. student). \$75,000.
- 8/2012-7/2014. Co-Advisor of lead-PI. USDA NIFA Postdoctoral Fellowship. Plant mediation of nitrogen mineralization via shifts in rhizosphere carbon allocation. With M. Schipanski (Postdoc) and D. Mortensen. \$130,000.
- 9/2011-8/2013: Advisor of lead-PI. USDA-NESARE Cover crop cocktails: Harnessing diversity to enhance nitrogen retention in agroecosystems. With D. Finney (Ph.D. student). \$14,998
- 3/2011 to 2/2012: Sole-PI, PA-WRRC. Quantifying the N retention capacity of legacy sediments and hydric soils before and after restoration. \$16,700.
- 9/2011-8/2016: Lead-PI, USDA OREI. Finding the right mix: Multifunctional cover crop cocktails for organic systems. With M. Barbercheck, D. Mortensen, D. Luthe, and 6 others. \$2,296,803.
- 1/2011-12/2014: Co-PI, USDOT Sun Grant. Production and life-cycle assessment of herbaceous bioenergy crops across the heterogeneous landscape of the Northeast. With Kemanian (lead-PI), Adler and Drohan. \$253,941.
- 10/2010-9/2014: Co-PI, USDA Cooperative Agreement. Integrated Pasture-Crop Rotation. With M. Hall (lead-PI). \$168,970.
- 9/2010-8/2013: Co-PI, NSF-OISE-IRES. International: Training global change ecologists through a US-Spain collaboration, with M.W. Kaye (lead PI) and D. Behring. \$149,553.
- 6/2009-5/2010: Advisor of lead-PI, NSF-DEB-Ecosystem Studies. Dissertation Research: Nitrogen transformation and transport along a soil texture gradient. With M. Castellano (Ph.D. student and Lead-PI) and H. Lin (co-PI). \$11,540.
- 7/2008-6/2012: Lead-PI, NSF-DEB-Ecosystem Studies. Testing a conceptual model of the terrestrial nitrogen cycle including rapid stabilization of nitrogen in soil, with C.E. Martinez and J. Ewing. \$532,371. (plus REU supplements of \$21,240)

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- 7/2007-6/2012: Co-PI, NSF Critical Zone Observatory Network. Regolith & the Critical Zone in the Susquehanna River Basin: The Shale Experiment, with Chris Duffy and many Co-PIs. \$4,250,000 (plus REU supplements of \$7400 to Kaye).
- 10/2007-9/2011: Co-PI, USDA NRI. Transitions to Prosperity and Sustainability: Enhancing Small and Medium-Sized Farms in the Rural Exurban-Urban Transitional Zone, with J. Findeis (PD), D. Mortensen, R. Stedman, K. Brazier, and D. Miller. \$491,018.
- 10/2007-9/2011: Co-PI, USDA RAMP Weed management, environmental quality and profitability in organic feed and forage production systems, with M. Barbercheck, D. Mortensen, J. Harper, and N.E. Kiernan. \$980,804.
- 7/2007-6/2010: Co-PI, NOAA-NERRS Graduate Research Fellowship Program. Using soil properties as a framework for understanding nutrient transport and transformation at the terrestrial-aquatic estuarine interface. To Mike Castellano (Ph.D. Student) with J. Kaye (Advisor) and H. Lin (co-Advisor) as Co-PIs. \$59,483.
- 9/2007-8/2011: Co-PI, DOE NICCR. Northeastern forest regeneration in warmer and wetter climate, with M. Kaye and M. Abrams. \$410,831.
- 10/2006-9/2009; Co-PI, USDA/USDI Joint Fire Sciences, Modeling forest change and management alternatives on a restored landscape, with P. Fule and W. Covington. \$140,000 (\$39,651 to Kaye).
- 4/2005-6/2010: Sole-PI, The Andrew Mellon Foundation. A new conceptual model of the terrestrial N cycle based on rapid uptake of N into stable soil organic matter; \$260,000.
- 4/2005-3/2009: Lead-PI, NSF-DEB-Ecosystem Studies. Collaborative Research: Ecosystem responses to nutrient deposition from the urban atmosphere; with N. Grimm, S.H. Hall, and J. Allen; \$707,000 (\$96,000 to Kaye).
- 8/2005-7/2010: Lead-PD, USDA NRI Competitive Grants, Managed Ecosystems: Fire management and carbon storage in Southwestern ponderosa pine forests, with S. Hart, P. Fule, S. Haase, K. Prewitt, and M. Kaye. \$450,000.
- 9/2005-8/2009: Co-PI, USDA National Needs Fellowships in Integrated Soil and Water Sciences, with H. Lin, T. Wagener, J. Shortle, and G. Petersen. \$138,000.
- 11/2005-6/2006: Co-PI, PSU CAS Seed Grant, Coupled Soil Hydrologic and Biogeochemical Dynamics at Multiple Scales - A Preliminary Investigation, with H. Lin, and M.A. Bruns. \$15,000.
- 8/2005-7/2008: Co-PD, USDA NRI Special Research Grants: Improved Dairy Management Practices. Integrated Strategies for Reducing Gas Emissions from Dairy Farms, with T. Richard, E. Wheeler, G. Varga, and M. Bruns. \$330,000.
- 9/2004-8/2007: co-PI, USDA/NASA/DOE Carbon Cycle Science Program. Carbon dioxide and methane fluxes in disturbed southwestern ponderosa pine forests, with T. Kolb, G.W. Koch, B. Hungate, and S.C. Hart; \$700,000 (\$74,000 to Kaye).
- 11/2004-10/2010: co-PI, NSF-DEB-Long-Term Studies. Central Arizona Phoenix LTER: Phase 2, with N. Grimm, C. Redman, and 23 other co-PIs; \$4,919,954.
- 1/2004-12/2004: lead PI, College of Liberal Arts and Sciences, ASU. Developing a collaborative research initiative in ponderosa pine forest ecology at ASU, with M.W. Kaye, and J. Sabo. \$19,650.
- 9/2003-8/2005: co-PI, NSF Biocomplexity in the Environment, Coupled Biogeochemical Cycles. Coupled biogeochemical cycles in urban and agricultural ecosystems: role of hydrology, stoichiometry, spatial linkages, and human behavior; with P. Brezonik, L. Baker, S. Hobbie, J. King, D. Mulla, M. Bauer, and D. Hope; \$355,317
- 3/2003-8/2004: co-PI, Office of the Vice Provost for Research, ASU. Pilot socio-ecological research project at Agua Fria National Monument, with K. Spielmann and 7 co-PIs; \$51,000.
- 10/2002-9/2005: sole PI, NSF International Studies. Fire management and carbon storage in Spain and the United States; \$32,125.
- 5/2001-4/2003: co-PI, Ecological Restoration Institute. Long-term effects of restoration on the function of a ponderosa pine-bunchgrass ecosystem, with S.C. Hart; \$50,630.

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8/2000-7/2002: sole PI, USDA NRI Competitive Grants, Managed Ecosystems. Land-use change in central Colorado: Ecosystem consequences of urbanization; \$90,000.

ADVISORS

M.S.: Dr. Stephen C. Hart; Ph.D.: Dr. Dan Binkley; Postdoc: Dr. Ingrid Burke

ADVISEES (my students and postdocs)

Shannon Wray, M.S. Soil, began spring 2019
Caitlin Hodges, Ph.D., Soils, began fall 2017
Catalina Mejia, M.S., Soils, began fall 2017
Benjamin Dillner, M.S., Ecology, began fall 2017
Joseph Amsili, M.S. Soils, completed spring 2018
Sarah Isbell, Ph.D. Ecology, began fall 2015
Andrew Morris, MS Soils, completed spring 2017
Lillian Hill, M.S. Ecology, completed spring 2017
Elizabeth Hasenmueller, Postdoc, fall 2012-winter 2013
Mac Burgess, Postdoc, spring 2012-winter 2013
Meagan Schipanski, Postdoc, 2011 – winter 2013
Alison Grantham, Ph.D. Ecology, completed spring 2015
Denise Finney, Ph.D. Ecology, completed spring 2015
Charlie White, Ph.D. Soils, completed fall 2015
Julie Weitzman, M.S. and Ph.D. Soils, completed fall 2016
Rachel Brimmer, Ph.D. Soils, began fall 2008
Marshall McDaniel, Ph.D. Soils, completed winter 2010
Mike Castellano, Ph.D. Soils, completed winter 2009
Chris Ross, M.S. Ecology, completed summer 2008
Michelle Gresalfi, M.S. Ecology, completed spring 2007
Barbara Fricks, M.S. Soils, completed summer 2007
Arlene Adviento-Borbe, Postdoc, summer 2006-summer 2008
David Lewis, Postdoc., fall 2005-fall 2009
Tracy Johns, M.S., ASU, completed spring 2006
Kari Morehouse, M.S., ASU, completed summer 2005

CO-ADVISEES

Curt McConnell, Ph.D., Ecology and Biogeochemistry, in progress
(Primary advisor: Armen Kemanian)
Beth Hoagland, Ph.D., Geosciences and Biogeochemistry, in progress
(Primary advisor: Tess Russo)
Debasish Saha, Ph.D., Soil Science and Biogeochemistry, completed spring 2015
(Primary advisor: Armen Kemanian)

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PLACEMENT OF MY PH.D. STUDENTS AND POSTDOCS

Name	Position in my lab group	Placement
Dr. Elizabeth Hasenmueller	Postdoc	Assistant Professor, Saint Louis University
Dr. Meagan Schipanski	Postdoc	Assistant Professor, Colorado State University
Dr. Mac Burgess	Postdoc	Assistant Professor, Montana State University
Dr. David Lewis	Postdoc	Associate Professor, University of South Florida
Dr. Arlene Adviento-Borbe	Postdoc	Project Scientist, University of California, Davis
Dr. Michael Castellano	Ph.D. Student	Associate Professor, Iowa State University
Dr. Marshall McDaniel	Ph.D. Student	Assistant Professor, Iowa State University
Dr. Charles White	Ph.D. Student	Assistant Professor, Penn State University
Dr. Denise Finney	Ph.D. Student	Assistant Professor, Usinus College
Dr. Alison Grantham	Ph.D. Student	Ecologist, BlueApron.com
Dr. Julie Weitzman	Ph.D. Student	Postdoc, Cary Institute for Ecosystem Science

TEACHING EXPERIENCE

PSU	ERM 413W	Case Studies in Ecosystem Management (3 credits)
PSU	FOR 499	Global Change Ecology Research in Spain (3 credits)
PSU	SOILS/GEOSC536	Topics in Biogeochemistry (2 credits)
PSU	SOILS590	Colloquium in Crop and Soil Sciences (1 credit)
PSU	SOILS071 GN IL	Environmental Sustainability (3 credits)
PSU	ECLGY515	Classical Ecology (2 credits; team taught)
PSU	ECLGY510	Advances in Ecology (3 credits; team taught)
PSU	SOILS571	Ecosystem Nutrient Cycles (3 credits)
PSU	SOILS597B	Soil Properties and Functions (3 credits; team taught)
ASU	BIO491/594 GLG 490/598	Soil Ecology (4 credits with lab)
ASU	BIO491	Stable Isotopes in Ecological Research (1 credit)
ASU	BIO491/594	Global Change Biology (2 credits)
ASU	BIO594 - IGERT workshop	Social/Environmental Aspects of Irrigation Systems (3 credits)
ASU	BIO314/414	Biology and Society Research Colloquium (3 credits)
ASU	BIO311	Biology and Society (3 lectures in team taught course)