RICHARD P. PHILLIPS

Department of Biology, Indiana University, 1001 E. Third St., Bloomington, IN 47405, USA

☎ 812.856.0593 ✉ rpp6@indiana.edu 🌐 http://phillipslab.bio.indiana.edu 🐦@richphillipslab

Research areas: Ecosystem ecology, soil biogeochemistry; plant-microbe interactions

Orcid ID: 0000-0002-1345-4138

Keywords: Ecosystem ecology, soil biogeochemistry; plant-microbe interactions; global change

DEGREES

2005	Ph.D. Natural Resources (Ecology and Biogeochemistry), Cornell University, Ithaca, NY; Ph.D. advisor: Timothy J. Fahey
1999	M.S. Forestry (Soils), SUNY College of Environmental Science & Forestry, Syracuse, NY; M.S. advisor: Ruth D. Yanai
1992	B.A. Environmental Studies Program, University of Vermont, Burlington, VT

APPOINTMENTS AND RESEARCH EXPERIENCE

2019 -	Professor, Department of Biology, Indiana University (IU), Bloomington, IN
2014 -	Director of Research; IU Research & Teaching Preserve, Bloomington, IN
2014-2018	Associate Professor, Department of Biology, IU, Bloomington, IN
2008-2014	Assistant Professor, Department of Biology, IU, Bloomington, IN
2005-2008	Postdoctoral Associate, Department of Biology, Duke University, Durham, NC
2000-2005	Research Associate, Department of Natural Resources, Cornell University; *Dissertation:* "Rhizosphere carbon flux and rhizosphere effects on microbial activity and nutrient availability in northern hardwood forests"
1999-2000	Research Specialist - Boyce Thompson Institute for Plant Research, Ithaca, NY
1996-1998	Research Associate, Department of Forestry, SUNY CESF; *Thesis*: "The effects of calcium chloride and aluminum chloride additions on rhizosphere soil and sugar maple (*Acer saccharum* Marsh.) fine root chemistry

FELLOWSHIPS, HONORS AND AWARDS

2020	Highly Cited Researchers List (Cross-Field); Clarivate (Wed of Science data)
2019	Highly Cited Researchers List (Cross-Field); Clarivate (Wed of Science data)
2016	Outstanding Faculty Collaborative Research Award (with K.A. Novick); Office of Provost & Executive Vice President and Office of Vice Provost for Research; IU
2008	Best Oral Paper, S-7 Div., ASA-CSSA-SSSA Intl. Annual Meeting, Houston, TX
2004-2005	NSF Integrated Graduate Research (IGERT) Fellowship, Cornell University
2003	R.H. Whittaker Award, Best Oral Presentation, Ecology and Evolutionary Biology Graduate Student Symposium, Cornell University
2002	Outstanding Student Presentation, S-7 Division, ASA-CSSA-SSSA International Annual Meeting, Indianapolis, IN
2001	Best Oral Presentation, Graduate Student Symposium, Cornell University
2000-2001	NSF K-12 Graduate Teaching Fellowship, Cornell University, Ithaca, NY

PUBLICATIONS

Google scholar metrics: H-Index (46); I10-Index (83)

*ResearchGate "*RG score": 41.5

Note: Last author typically indicates "group leader" or "corresponding author"

2020

103. Missik, J.E., Oishi, A.C., Benson M.C. Meretsky, V.J., **Phillips, R.P.**, and K.A. Novick. *In Press*. Performing gas exchange measurements on excised branches – evaluation and recommendations. Photosynthetica.

102. Keller, A.B., Brzostek, E., Craig, M.A., Fisher, J.B. and **R.P. Phillips**. *In Press*. Root-derived inputs are major contributors to soil carbon in temperate forests, but vary by mycorrhizal type. Ecology Letters.

101. Mushinski, R.M., Payne, Z.C., Raff, J.D., Craig, M.A., Pusede, S.E., Rusch, D.B., White, J.R., and **R.P. Phillips**. *In Press*. Nitrogen cycling microbiomes are structured by plant mycorrhizal associations with consequences for nitrogen oxide fluxes in forests. Global Change Biology.

100. Cheeke, T.E., **Phillips, R.P.**, Kuhn, A., Rosling, A. and P. Fransson. *In Press*. Variation in mycorrhizal hyphal production rather than turnover regulates standing fungal biomass in temperate hardwood forests. Ecology.

99. Bond-Lamberty, B. (**R.P. Phillips** one of 96 authors). *In Press*. COSORE: A community database for continuous soil respiration and other soil-atmosphere greenhouse gas flux data. Global Change Biology.

98. Pastorello, G., et al. (**R.P. Phillips** one of 287 authors) 2020. The FLUXNET2015 dataset and the ONEFlux processing pipeline for eddy covariance data. Sci. Data 7, 225 (2020). https://doi.org/10.1038/s41597-020-0534-3

97. Au, T.F. Maxwell, J.T., Novick, K.A., Robeson, S.R., Lockwood, B.R., Warner, S.M., Harley, G.L., **Phillips, R.P.**, Therrell, M.D., Telewski, F.W., and N. Pederson. 2020. Demographic shifts in eastern US forests increases the impact of late-season drought on forest growth. Ecography. DOI: 10.1111/ecog.05055

96. Allen, K., Fisher, J.B., **Phillips, R.P.**, Powers, J.S. and E.R. Brzostek. 2020. Interactions between the C cost of N and P uptake in an optimal allocation model lead to divergent model predictions of nutrient limitation across tropical and temperate forests. Frontiers in Forests and Global Change. DOI: 10.3389/ffgc.2020.00043

95. Trowbridge, A.M., Stoy, P.C., and **R.P. Phillips**. 2020. Soil biogenic volatile organic compound flux in a mixed hardwood forest: Net uptake at warmer temperatures and the

importance of mycorrhizal associations. Journal of Geophysical Research - Biogeosciences. DOI: 10.1029/2019JG005479; *(Commentary by Rinnan and Albers, DOI: 10.1029/2020JG005773 and by Schultz, DOI: 10.1029/2020EO143604).*

94. Beidler, K.V., **Phillips, R.P.**, Andrews, E., Fernandez, C.W., Maillard, F., Mushinski, R.M., See, C.R. and P.G. Kennedy. 2020. Substrate quality drives fungal necromass decay and decomposer community structure under contrasting vegetation types. Journal of Ecology. DOI: 10.1111/1365-2745.13385

93. Kannenberg S.A., and **R.P. Phillips**. 2020. Non-structural carbohydrate pools not linked to hydraulic strategies or carbon supply in tree saplings during severe drought and subsequent recovery. Tree Physiology. DOI: 10.1093/treephys/tpz132

2019

92. Keller, A.B., and **R.P. Phillips**. 2019. Relationship between belowground carbon allocation and nitrogen uptake in saplings varies by plant mycorrhizal type. Frontiers in Forests and Global Change. DOI: 10.3389/ffgc.2019.00081

91. Kumar, A., **Phillips, R.P.**, Scheibe, A., Klink, S. and J Pausch. 2019. Invasive plant effects on SOM priming depends on tree mycorrhizal type. Soil Biology and Biochemistry. DOI: https: //doi.org/10.1016/j.soilbio.2019.107645

90. Midgley M.G. and **R.P. Phillips**. 2019. Spatio-temporal heterogeneity in extracellular enzyme activities tracks variation in saprotrophic fungal production in a temperate forest soil. Soil Biology and Biochemistry. DOI: https://doi.org/10.1016/j.soilbio.2019.107600

89. Song, J. et al. (**R.P. Phillips** one of 59 authors). 2019. A meta-analysis of 1119 manipulative experiments on terrestrial carbon cycling responses to global change. Nature Ecology and Evolution. DOI: https://doi.org/10.1038/s41559-019-0958-3

88. Craig, M.E., Lovko, N., Flory, S.F., Wright, J.P., and **R.P. Phillips**. 2019. Impacts of an invasive grass on soil organic matter pools vary across a tree-mycorrhizal gradient. Biogeochemistry. DOI: https://doi.org/10.1007/s10533-019-00577-2

87. Zhang, Q., Ficklin, D.L., Manzoni, S., Wang, L., Way, D., **Phillips, R.P.**, and K.A. Novick. 2019. Rising vapor pressure deficit increases water use efficiency during drought. Environmental Research Letters. DOI: 10.1088/1748-9326/ab2603

86. Kannenberg, S.A., Novick, K.A., Alexander, M.R., Maxwell, J.T., Moore, D.J.P, **Phillips, R.P.**, and Anderegg, W.R.L. 2019. Linking drought legacy effects across scales: From leaves to tree rings to ecosystems. Global Change Biology. DOI: 10.1111/gcb.14710

85. Menge D.N.L., et al (**R.P. Phillips** one of 81 authors). 2019. Patterns of nitrogen-fixing tree abundance in forests across Asia and America. Journal of Ecology. DOI: 10.1111/1365-2745.13199

84. Jo, I., Fei., S., Oswalt, C., Domke, G., and **R.P. Phillips**. 2019. Shifts in dominant tree-mycorrhizal associations in response to anthropogenic impacts. Science Advances. DOI: 10.1126/sciadv.aav6358

83. Kannenberg, S.A., Novick, K.A., and **R.P. Phillips**. 2019. Anisohydric behavior linked to persistent hydraulic damage and delayed drought recovery across seven North American tree species. New Phytologist. DOI: 10.1111/nph.15699

82. Zak, D.R., Pellitier, P.T., Argiroff, W.A., Castillo, B., James, T.Y., Nave, L.E., Averill, C., Beidler, K., Bhatnagar, J., Blesh, J., Classen, A.T., Craig, M.E., Fernandez, C.W., Johansen, R., Koide, R.T., Lilleskov, E.A., Lindahl, B.D., Nadelhoffer, K., **Phillips, R.P.**, and A. Tunlid. 2019. Exploring the function of ectomycorrhizal fungi in soil organic matter dynamics. Tansley Insight. New Phytologist. DOI: 10.1111/nph.15679

81. Mushinski, R.M., **Phillips, R.P.**, Payne, Z.C., Abney, R.B., Jo, I., Fei, S., Pusede, S.E., White, J.R., Rusch, D.B., and J.D. Raff. 2019. Microbial mechanisms and ecosystem flux estimations for aerobic NO_y emissions from hardwood forest soils. Proceedings of the National Academy of Sciences. DOI: https://doi.org/10.1073/pnas.1814632116

80. Shi, M., Fisher, J.B., **Phillips, R.P.**, and E.R. Brzostek. 2019. Plant-microbe symbioses leads to underestimation of modeled climate impacts. Biogeosciences. DOI: https://doi.org/10.5194/bg-2018-293

79. **Phillips, R.P.**, Brandt, L., Polly, P.D., Zollner, P., Sunders, M.R., Clay, K., Iverson, L., and S. Fei. 2019. Towards an improved understanding of the ecological and economic consequences of climate change for Indiana forests. Climatic Change. DOI: https://doi.org/10.1007/s10584-018-2326-8

78. Keller, A.B., and **R.P. Phillips**. 2019. Leaf litter decay rates differ between mycorrhizal groups in temperate, but not tropical forests. New Phytologist. DOI: 10.1111/nph.15524

2018

77. Zhang, Z., **Phillips, R.P.** (co-first author), Zhao, W., Xiao, J., Liu, Q., and H. Yin. 2018. Mycelia-derived C contributes more to nitrogen cycling than root-derived C in two alpine forests. Functional Ecology. DOI: 10.1111/1365–2435.13236

76. Kannenberg, S.A., Maxwell, J.T., Pederson, N., D'Orangeville, L., Ficklin, D.L., and **R.P. Phillips**. 2018. Drought legacies are dependent on water table depth, wood anatomy, and drought timing across the eastern U.S. Ecology Letters. DOI: 10.1111/ele.13173

75. Lee, M.R., Flory, S.L., **Phillips, R.P.**, and J.P. Wright. 2018. Site conditions are more important than abundance in explaining plant invader's impact on soil nitrogen cycling. Ecosphere. DOI: 10.1002/ecs2.2454

74. Asbjornsen, H., Campbell, J.L., Jennings, K.A., Vadeboncoeur, M.A., McIntire, C., Templer, P.H., **Phillips, R.P.**, Bauerle, T.L., Dietze, M.C., Frey, S.D., Groffman, P.M., Guerrieri, R., Hanson, P.J., Kelsey, E.P., Knapp, A.K., McDowell, N.G., Meir, P., Novick, K.A., Ollinger, S.V., Pockman, W.T., Schaberg, P.G., Wullschleger, S.D., Smith, M.D., and L. Rustad. 2018. Guidelines and considerations for designing field experiments simulating precipitation extremes in forest ecosystems. Methods in Ecology and Evolution. DOI: 10.1111/2041-210X.13094

73. Yi, K.; Maxwell, J.; Wenzel, M.; Roman, D.T.; Sauer, P.; **Phillips, R.P.**, and K.A. Novick. 2018. Linking variation in intrinsic water-use efficiency to isohydricity: a comparison at multiple spatiotemporal scales. New Phytologist. DOI: 10.1111/nph.15384

72. D'Orangeville, L., Houle, D., Duchesne, L., **Phillips, R.P**., Bergeron, Y., and D. Kneeshaw. 2018. Beneficial effects of climate warming on boreal tree growth may be transitory. Nature Communications. DOI: 10.1038/s41467-018-05705-4

71. Zhang, Q., **Phillips, R.P.**, Manzoni, S., Scott, R.L., Oishi, A.C., Finzi, A.F., Daly, E., Vargas, R., and K.A. Novick. 2018. Photosynthesis and soil moisture affect the seasonal soil respiration-temperature hysteresis relationship. Agricultural and Forest Meteorology. DOI: 10.1016/j.agrformet.2018.05.005

70. LaManna J.A. et al. **(R.P. Phillips** one of 50 authors). 2018. Response to two Comments on "Plant diversity increases with the strength of negative density dependence at the global scale", Science. DOI: 10.1126/science.aar5245 and DOI: 10.1126/science.aar3824

69. Lutz, J.A., et al. (**R.P. Phillips** one of 98 authors). 2018. Global importance of large-diameter trees in forests. Global Ecology and Biogeography. DOI: 10.1111/geb.12747

68. Zhang, H., Lü, X., Hartmann, H., Keller, A., Han, X., Trumbore, S.E., and **R.P. Phillips**. 2018. Foliar nutrient resorption differs between arbuscular mycorrhizal and ectomycorrhizal trees at local and global scales. Global Ecology and Biogeography. DOI: 10.1111/geb.12738

67. D'Orangeville, L., Maxwell, J., Kneeshaw, D., Pederson, N., Duchesne, L., Logan, T., Houle, D., Arseneault, D., Beier, C.M., Bishop, D.A., , Druckenbrod, D., Fraver, S., Girard, F., Halman, J., Hansen, C., Hart, J.L., Hartmann, H., Kaye M., Leblanc, D., Manzoni, S., Rayback, S.,

Rollinson, C., and **R.P. Phillips**. 2018. Local climate and drought timing determine the sensitivity of eastern temperate forests to drought. Global Change Biology. DOI: 10.1111/gcb.14096

66. Craig, M.E., Turner, B.L., Liang, C., Clay, K., Johnson, D.J., and **R.P. Phillips**. 2018. Tree mycorrhizal type predicts within–site variability in the storage and distribution of soil organic matter. Global Change Biology. DOI: 10.1111/gcb.14132

65. Jacobs, L.M., Sulman, B.N., Brzostek, E.R., Feighery, J.J. and **R.P. Phillips**. 2018. Interactions among decaying leaf litter, root litter, and soil organic matter vary with mycorrhizal type. Journal of Ecology. DOI: 10.1111/1365-2745.12921

64. Johnson, D.J., Clay, K., and **R.P. Phillips**. 2018. Mycorrhizal associations and the spatial structure of an old-growth forest community. 186: 195-204, Oecologia. DOI: 10.1007/s00442-017-3987-0

2017

63. Bailey, V.L., Bond-Lamberty, B., DeAngelis, K., Grandy, A.S., Hawkes, C.V., Heckman, K., Lajtha, K., **Phillips, R.P.**, Sulman, B.N., Todd-Brown, K., and M.D. Wallenstein. 2017. Soil carbon cycling proxies: Understanding their critical role in predicting climate change feedbacks. Global Change Biology. DOI: 10.1111/gcb.13926

62. Terrer, C., Vicca, S., Stocker, B.D., Hungate, B., **Phillips, R.P.**, Reich, P.B., Finzi, A.F., and C.I. Prentice. 2017. Ecosystem responses to elevated CO_2 governed by plant-soil interactions and the cost of nitrogen acquisition. Tansley Review. New Phytologist. DOI: 10.1111/nph.14872

61. Kannenberg, S. A., Novick, K., A, and **R.P. Phillips**. 2017. Coarse roots prevent declines in whole-tree non-structural carbohydrate pools during drought in an isohydric and an anisohydric species. Tree Physiology. DOI: 10.1093/treephys/tpx119

60. Montané, F., Fox, A.M., Arellano, A.F., MacBean, N., Alexander, M.R., Dye, A., Bishop, D.A., Trouet, T. Babst, F. Hessl, A.E., Pederson, N., Blanken, P.D., Bohrer, G., Gough, C.M., Litvak, M.C., Novick, K.A., **Phillips, R.P.**, Wood, J.D., and D.J.P. Moore. 2017. Evaluating the effect of alternative carbon allocation schemes in a land surface model on carbon fluxes, pools and turnover in temperate forests. Geoscientific Model Development. DOI: 10.5194/gmd-2017-74

59. Hwang, T., Gholizadeh, H., Sims, D.A., Novick, K.A., Brzostek, E.R., **Phillips, R.P.**, Roman, D.T., Robeson, S.M., and A.F. Rahman. 2017. Capturing species-level drought responses in a temperate deciduous forest using ratios of photochemical reflectance indices between sunlit and shaded canopies. Remote Sensing of Environment. DOI: 10.1016/j.rse.2017.07.033

58. Flory, S.L., Bauer, J.T., **Phillips, R.P.** and K. Clay. 2017. Effects of a non-native grass invasion decline over time. J. of Ecology. 105: 1475–1484. DOI: 10.1111/1365-2745.12850

57. LaManna J.A. et al. (**R.P. Phillips** one of 50 authors). 2017. Plant diversity increases with the strength of negative density dependence at the global scale. Science. 356: 1389–1392. DOI: 10.1126/science.aam5678. *(highlighted in a Perspective by L. Comita in Science, Vol. 356: 1328-1329).*

56. Sulman, B.N., Brzostek, E.R., Medici, C., Shevliakova, S., Menge., D., and **R.P. Phillips**. 2017. Feedbacks between plant N demand and rhizosphere priming depend on type of mycorrhizal association. Ecology Letters. 20: 1043–1053. DOI: 10.1111/ele.12802

55. van Groenigen, K.J., Osenberg, C.W., Carrillo, Y., Dijkstra, F., Heath, J., Nie, M., Pendall, E., **Phillips, R.P.** and B. A., Hungate. 2017. Faster turnover of new soil carbon inputs under increased atmospheric CO_2. Global Change Biology. DOI: 10.1111/gcb.13752. *(Faculty of 1000 Prime recommended; highlighted in News & Views; Bradford, M. 2017, Nature Climate Change, 7: 475–476)*

54. Terrer, C., Vicca, S., Hungate, B., **Phillips, R.P.**, Reich, P.B., Franklin, O., Stocker, B.D., Fisher, J.B., and C. Prentice. 2017. Response to Comment on "Mycorrhizal association as a primary control of the CO_2 fertilization effect". Science, 355: 358-359.

53. Yi, K., Dragoni, D., **Phillips, R.P.**, Roman, D.T., and Novick, K.A., 2017. Dynamics of stem water uptake among isohydric and anisohydric species experiencing a severe drought. Tree Physiology, DOI:10.1093/treephys/tpw126.

52. Meier, I.C., Finzi, A.F. and **R.P. Phillips**, 2017. Root exudates increase N availability by stimulating microbial turnover of fast-cycling N pools. Soil Biology and Biochemistry, 106: 119–128 *(Faculty of 1000 Prime recommended).*

51. Cheeke, T.E., **Phillips, R.P.**, Brzostek, E.R., Rosling, A., Bever, J.D., and P. Fransson. 2017. Dominant mycorrhizal association of trees alters C and nutrient cycling by selecting for microbial groups with distinct enzyme function. New Phytologist, 214: 432–442.

50. Kannenberg S.A., and **R.P. Phillips**. 2017. Soil microbial communities buffer physiological responses to drought stress in three hardwood species. Oecologia, 183: 631-641 *(Ehleringer & Hanski Prize for best student paper in Plant Ecology*).

49. Kannenberg S.A., and **R.P. Phillips**. 2017. Plant responses to stress impacts: The C we do not see. Tree Physiology, 37: 151-153.

2016

48. Midgley M.G. and **R.P. Phillips**. 2016. Resource stoichiometry determines the biogeochemical consequences of nitrogen deposition. Ecology, 97: 3369–3378.

47. Sulman B.N., Roman, D.T., Yi, K., Wang, L., **Phillips, R.P.**, and K. A., Novick. 2016. High atmospheric demand for water can limit forest carbon uptake and transpiration as severely as dry soil. Geophysical Research Letters, 43: 9686–9695.

46. Knapp A.K., Avolio, M.L., Beier, C., Carroll, J.W.C., Collins, S.L., Dukes, J.S., Fraser, L., Griffin-Nolan, R.J., Hoover, D.L., Loik, M.E., **Phillips, R.P.**, Post, A.K., Sala, O.E., Slette, I.J., Yahdjian, L., and M.D. Smith. 2016. Pushing precipitation to the extremes in distributed experiments: recommendations for simulating wet and dry years. Global Change Biology, 23: 1774–1782

45. Novick, K.A., Ficklin, D.L., Stoy, P.C., Williams, C.A., Bohrer, G., Oishi, A.C., Papuga, S.A., Blanken, P.D., Noormets, A., Sulman, B.S., Scott, R.L., Wang, L., and **R.P. Phillips**. 2016. The increasingly important role of atmospheric demand in limiting ecosystem functioning. Nature Climate Change, 6: 1023-1027

44. Yin, H., **Phillips, R.P.** (co-first author), Liao, R., and Q. Liu. 2016. Resource stoichiometry mediates soil C loss and nutrient transformations in forest soils. Applied Soil Ecology, 108: 248–257.

43. **Phillips, R.P.**, Ibáñez, I., Hanson, P.J., Ryan, M.G., and N. McDowell. 2016. A belowground perspective on the drought sensitivity of forests: Towards improved understanding and simulation. Forest Ecology and Management, 380: 309-320.

42. Terrer, C., Vicca, S., Hungate, B., **Phillips, R.P.**, and C. Prentice. 2016. Mycorrhizal association as a primary control on the CO_2 fertilization effect. Science, 353: 72-74.

41. Fisher, J.B., Sweeney, S., Brzostek, E.R., Evans, T.P., Johnson, D.J., Myers, J.A., Wolf, A.T., Howe, R.W., Bourg, N.A. and **R.P. Phillips**. 2016. Remote sensing of mycorrhizal associations from canopy spectral properties. Global Change Biology, 22 (7): 2596–2607.

40. Rosling, A., Midgley M.G., Cheeke, T., Urbina, H., Fransson, P. and **R.P. Phillips**. 2016. Phosphorus cycling in deciduous forest soil differs between stands dominated by ecto- and arbuscular mycorrhizal trees. New Phytologist, 209: 1184–1195 *(highlighted in a Commentary; Kuyper and Koele 2016, New Phytologist, 209 (3): 894–895)*

39. Shi, M., Fisher, J.B., Brzostek, E.R., and **R.P. Phillips**. 2016. Carbon cost of plant nitrogen acquisition: Global carbon cycle impact from an improved plant nitrogen cycle in the community land model. Global Change Biology, 22: 1299-1314.

38. Schlesinger, W.H., Dietze, M.C., Jackson, R.B., **Phillips, R.P.**, Rhoades, C.C., Rustad, L.E., and J.M. Vose. 2016. Forest biogeochemistry in response to drought. Global Change Biology, 22: 2318–2328.

2015

37. Midgley M.G., Brzostek, E.R. and **R.P. Phillips**. 2015. Decay rates of high-quality AM leaf litters are more sensitive to soil effects than low-quality ECM litters. Journal of Ecology, 103: 1454-1463.

36. Roman, D.T., Novick, K.A., Brzostek, E.R., Dragoni, D., Rahman, F. and **R.P. Phillips**. 2015. The role of isohydric and anisohydric species in determining ecosystem-scale response to severe drought. Oecologia, 179: 641-654.

35. Shannon-Firestone, S., Reynolds, H.L., **Phillips, R.P**., Flory, S.L., and A. Yannarelle. 2015. The role of ammonium oxidizing communities in mediating effects of an invasive plant on soil nitrification. Soil Biology and Biochemistry, 90: 266-274.

34. McCormack, M. L., Dickie, I.A., Eissenstat, D.M., Fahey, T.J., Fernandez, C.W., Guo, D., Helmisaari, H-S., Hobbie, E.A., Iversen, C.M., Jackson, R.B., Leppälammi-Kujansuu, J., Norby, R.J., **Phillips, R.P.**, Pregitzer, K.S., Pritchard, S.G., Rewald, B., Zadworny, M. 2015. Redefining fine roots improves understanding of belowground contributions to terrestrial biosphere processes. Tansley Review, New Phytologist. 207: 505-518

33. Brzostek, E.R., Dragoni, D., Brown, Z.A., and **R.P. Phillips**. 2015. Mycorrhizal type determines the magnitude and direction of root-induced changes in decomposition in a temperate forest. New Phytologist. 206(4): 1274–1282.

32. Finzi, A.F., Abramoff, R.Z., Spiller, K.S., Brzostek, E.B., Darby, A.B., Kramer, M.A., and **R.P. Phillips**. 2015. Rhizosphere processes are quantitatively important components of terrestrial carbon and nutrient cycles. Global Change Biology. 21: 2082–2094

31. Cheng, S.J., Bohrer, G., Steiner, A.L., Hollinger, D.Y., Suyker, A., **Phillips, R.P.**, and K.J. Nadelhoffer, 2015. Variations in the influence of diffuse light on gross primary productivity in temperate ecosystems. Agricultural and Forest Meteorology. 201: 98-110.

30. Toomey, M., Friedl, M. Frolking, S., Hufkens, K., Klosterman, S., Sonnentag, O., Baldocchi, D.B., Bernacchi, C.J., Bohrer, G., Brzostek, E.R., Burns, S.P., Coursolle, C., Hollinger, D.Y., Margolis, H.A., McCaughey, H., Monson, R.K., Munger, J.W., Pallardy, S., **Phillips, R.P.**, Torn, M., Wharton, S., Zeri, M., and A.D. Richardson. 2015. Greenness indices from digital cameras predict the timing and seasonal dynamics of canopy-scale photosynthesis. Ecological Applications. 25: 99–115.

29. Anderson-Teixeira, K. et al. (**R.P. Phillips** one of 106 authors). 2015. CTFS-ForestGEO: A worldwide network monitoring forests in an era of global change. Global Change Biology. 21: 528–549.

28. Yan, H., Wang S.Q., Billesbach, D., Oechel W.; Bohrer G., Meyers T., Martin T.A., Matamala R.; **Phillips R.P.**, Rahman A.F, Yu Q., and H.H. Shugart. 2015. Improved global simulations of gross primary product based on a new definition of water stress factor and a separate treatment of C3 and C4 plants. Ecological Modelling. 297: 42-59.

2014

27. Sulman, B.N., **Phillips, R.P.**, Oishi, C., Shevliakova, E., and S.W. Pacala. 2014. Microbe-driven turnover offsets mineral-mediated storage of soil carbon under elevated CO_2. Nature Climate Change. 4:1099 – 1102 *(highlighted in News & Views; Weider, W. 2014, Nature Climate Change, 4:1052–1053)*

26. Meier, I.C., Pritchard, S., Brzostek, E.R., M. L. McCormack, and **R.P. Phillips**. 2014. Rhizosphere and hyphosphere differ in their impacts on carbon and nitrogen cycling in forests exposed to elevated CO_2. New Phytologist. 205: 1164-1174.

25. Réjou-Méchain, M., et al. (**R.P. Phillips** one of 60 authors). 2014. Local spatial structure of forest biomass and its consequences for remote sensing of carbon stocks. Biogeosciences. 11: 5711-5742

24. Brzostek, E.R., J.B. Fisher and **R.P. Phillips**. 2014. Modeling the carbon cost of plant nitrogen acquisition: mycorrhizal trade-offs and multi-path resistance. uptake improve predictions of retranslocation. JGR - Biogeosciences. 119: 1684–1697.

23. Yin, H., Wheeler, E., and **R.P. Phillips**. 2014. Root-induced changes in nutrient cycling in forests depend on mycorrhizal type. Soil Biology & Biochemistry, 78: 213-221.

22. Midgley M.G. and **R.P. Phillips**. 2014. Mycorrhizal associations mediate nitrate leaching responses to N deposition: a meta-analysis. Biogeochemistry, 117: 241-253. *(Faculty of 1000 Prime recommended).*

21. Brzostek, E.R., Dragoni, D., Schmid, H.P., Rahman, A.F., Sims, D., Wayson, C.A., Johnson, D.J., and **R.P. Phillips**. 2014. Chronic water stress reduces tree growth and the carbon sink of deciduous hardwood forests. Global Change Biology; 20: 2531–2539.

20. Sims, D., Rahman, A.F., Brzostek, E.R., Dragoni, D., and **R.P. Phillips**. 2014. An improved approach for remotely sensing water stress impacts on forest C uptake. Global Change Biology; 20(9): 2856–2866.

19. Cheng, W., Parton, B, Gonzalez-Meyer, M.A., McNickle G.G, **Phillips, R.P.**, Brzostek, E.R. and J. Jastrow 2014. Synthesis and modeling perspectives of rhizosphere priming. *Tansley Review*, New Phytologist. 201: 31-44.

2013

18. **Phillips, R.P.**, Midgley, M.G. and E.R. Brzostek. 2013. The mycorrhizal-associated nutrient economy: A new framework for predicting carbon-nutrient couplings in forests. New Phytologist, 199: 41-51, *(Faculty of 1000 Prime recommended).*

17. Drake, J.E., Darby, B.A., Giasson, M.A., Kramer, M.A., **Phillips, R.P.** and A.C. Finzi. 2013. Stoichiometry constrains microbial response to root exudation – insights from a model and a field experiment in a temperate forest. Biogeosciences, 10: 821-838.

16. Meier, I.C., Avis, P.G., and **Phillips, R.P.**, 2013. Fungal communities influence root exudation rates in pine seedlings. FEMS Microbiology Ecology, 83: 585-95.

2012

15. **Phillips, R.P.**, Meier, I.C., Bernhardt, E.S., Grandy A.S. Wickings, K, and A.F. Finzi. 2012. Roots and fungi accelerate carbon and nitrogen cycling in forests exposed to elevated CO_2. Ecology Letters. 15: 1042-1049, *(Faculty of 1000 Prime recommended)*; *Media Coverage: "Higher CO_2 Levels in Atmosphere May Speed Soil Emissions", Scientific American Online; July, 2012*

14. Lee, M.A., Flory, S.L. and **R.P. Phillips**. 2012. "Positive feedbacks to growth of an invasive grass through alteration of nitrogen cycling". Oecologia,168: 14

2011

13. **Phillips, R.P**., A.F. Finzi and E.S. Bernhardt. 2011. Enhanced root exudation induces microbial feedbacks to N cycling in a pine forest under long-term CO_2 fumigation. Ecology Letters, 14: 187–194 *(Faculty of 1000 Prime recommended; ranking = 3 stars "exceptional"); Media Coverage: "The Root of the Problem: New research suggests that the flow of carbon through plants to underground ecosystems may be crucial to how the environment responds to climate change." The Scientist (cover story), August 1, 2011*

12. Drake, J.E., DeLucia E.H., Gallet-Budynek, A. Hofmockel K.S., Bernhardt, E.S., Billings, S.A., Jackson R.B., Lichter, J., McCormack, M.L., Moore, D.J.P., Oren, R., Palmroth, S., **Phillips, R.P.**, Pippen, J.S., Pritchard, S.G., Treseder, K.K., and Finzi, A.C. 2011. Increases in the flux of carbon belowground stimulates nitrogen uptake and sustains the long-term enhancement of forest productivity under elevated CO_2. Ecology Letters, 14: 349–357, *(Faculty of 1000 Prime recommended).*

2008-2010

11. **Phillips, R.P.**, E.S. Bernhardt and W.H. Schlesinger. 2009. Elevated CO_2 increases root exudation from loblolly pine (*Pinus taeda* L.) seedlings as an N-mediated response. Tree Physiology, 29:1513-1523

10. **Phillips, R.P.**, Erlitz, Y., Bier, R., and E.S. Bernhardt. 2008. A new approach for capturing soluble root exudates in forest soils. Functional Ecology, 22: 990-999

9. Shen, W., Jenerette, G.D., Hui, D., **Phillips, R.P.** and H. Ren. 2008. Effects of changing precipitation regimes on dryland soil respiration and C pool dynamics at rainfall event, seasonal and interannual scales. J. of Geophysical Research – Biogeosciences, 113, G03024, DOI:10.1029/2008JG000685

8. **Phillips, R.P.** and T.J. Fahey. 2008. Fertilization suppresses rhizosphere effects in northern hardwood forest soils. Soil Science Society of America Journal, 72: 453-461

7. Kiser, M.R., Reid, C.D. Crowell, A.S., **Phillips, R.P.**, and C.R. Howell. 2008. Exploring the transport of plant metabolites using positron emitting radiotracers. HFSP Journal, 2: 189-204

2004-2007

6. **Phillips, R.P.** and T.J. Fahey. 2007. Fertilization effects on fine root biomass, rhizosphere microbes and respiratory fluxes in hardwood forest soils. New Phytologist, 176: 655-664

5. **Phillips, R.P.** 2007. Towards a rhizo-centric view of plant-microbial feedbacks under elevated atmospheric CO_2. New Phytologist, 173: 664-667

4. **Phillips, R.P.** and T.J. Fahey. 2006. Tree species and mycorrhizal associations influence the magnitude of rhizosphere effects. Ecology, 87: 1302-1313

3. **Phillips, R.P.** and T.J. Fahey. 2005. Patterns of rhizosphere C flux in sugar maple (*Acer saccharum*) and yellow birch (*Betula allegheniensis*) saplings. Global Change Biology, 11: 983-995.

2. Yanai, R.D. **Phillips, R.P.**, Arthur, M.A., Siccama, T.G. and E.N. Hane. 2005. Spatial and temporal variation in calcium and aluminum in northern hardwood forest floors. Water, Air, and Soil Pollution, 160: 109-118. DOI: https://doi.org/10.1007/s11270-005-3940-4.

1. **Phillips, R.P.** and R.D. Yanai. 2005. The effects of $AlCl_3$ additions on rhizosphere soil and fine root chemistry of sugar maple (*Acer saccharum*). Water, Air, and Soil Pollution, 159: 339-356. DOI: https://doi.org/10.1023/B:WATE.0000049187.35869.7d.

RESEARCH MANUSCRIPTS – *In Revision or Submitted*

Terrer, C., **Phillips, R.P.**, Hungate, B.A., Rosende J., Pett-Ridge, J., Craig, M., van Groenigen, K.J., Keenan, T., Sulman, B., Stocker, B.D., Reich, P.B., Pellegrini, A.F.E., Pendall, E., Zhang, H., Evans, D.R., Carillo, Y., Fisher, J.B., and R.B. Jackson. *In Revision*. A global tradeoff between plant and soil carbon storage under elevated CO_2.

Migliavacca, M., et al. (**R.P. Phillips** one of 59 authors). *In Revision*. The global spectrum of ecosystem function.

Davies, S.J., et al. (**R.P. Phillips** one of 152 authors). *In Revision*. ForestGEO: Understanding Forest Diversity and Dynamics through a Global Observatory Network.

Stoy, P.C., Trowbridge, A.M., Siqueira, M.B., Friere, L.S., **Phillips, R.P.**, Jacobs, L., Wiesner, S., Stevens, P., Turner, R., and K.A. Novick. *Submitted*. Vapor pressure deficit helps explain biogenic volatile organic compound fluxes from the forest floor and canopy of a temperate deciduous forest.

Podzikowski, L.Y., Lee, M., Fahey, C., Wright, J.P., Flory, S.F., and **R.P. Phillips**. *Submitted*. Testing competing hypotheses about the biogeochemical consequences of invasion.

Lin, G., Craig M.A., Wang, X., Zeng, D., and **R.P. Phillips**. *Submitted*. Mycorrhizal type influences soil nitrogen dynamics via effects on soil acid-base chemistry.

Keller, A.B., Eissenstat, D.M., and **R.P. Phillips**. *Submitted*. Nitrogen economic strategies and litter-mediated feedbacks drive local scale nitrogen cycling in temperate forests.

Yin, L., Dijkstra, F.A., **Phillips, R.P.**, Zhu, B., Wang, P., and W. Cheng. *Submitted*. Stoichiometry of rhizosphere priming differs among tree species from different mycorrhizal groups.

Saifuddin, M., **Phillips, R.P.**, and A.C. Finzi. *Submitted*. Ectomycorrhizal fungi are associated with suppressed nitrogen cycling rates in temperate forest soils without structuring corresponding bacterial functional groups.

Braghiere, R.K., Fisher, J.B., Fisher, R.A., Shi, M., Steidinger, B.S., Sulman, B.N., Soudzilovskaia, N.A., Yang, X., Liang, J., Peay, K.G., Crowther, T.W. and **R.P. Phillips.** *Submitted*. Climate change impacts on mycorrhizae amplify nitrogen limitation on global plant growth.

Liu, R., He, Y., Zhou, G., Shao, J., Zhou, L., Zhou, H., Liang, C., Yan, E., Chen, X., Wang, X., Zhou, X., and **R.P. Phillips.** *Submitted*. Mycorrhizal effects on decomposition and soil CO_2 flux depend on changes in nitrogen availability during succession.

Yahdjian, L. Sala, O.E, Piñeiro, J.M., Smith, M.D., Knapp, A.K. **Phillips, R.P.**, and Collins, S.L. *Submitted*. Why coordinated distributed experiments should go global.

Benson, M.C., Miniat, C.F., Oishi, A.C., Denham, S.O., Domec, J.C., Johnson, D.M., Missik, J.E., **Phillips, R.P.**, Wood, J.D., and K.A. Novick. *Submitted*. Hydraulic traits of deciduous tree species: Do lessons learned from arid climates translate to eastern US temperate forests?

Sousa, D., Fisher, J.B., Galvan, F.R., Pavlick, R.P., Cordell, S., Gioambelluca, T.W., Giardina, C.P., Gilbert, G.S., Imran-Narahari, F., Litton, C.M., Lutz, J.A., North, M.P., Orwig, D.A., Osterag, R., Sack, L. and **R.P. Phillips**. *Submitted*. Tree canopies reflect mycorrhizal composition.

RESEARCH MANUSCRIPTS – *In Prep (estimated submission: November, 2020)*

Craig, M.A., Guyer, K., Beidler, K.V., Brzostek, E., Frey, S., Grandy, A.S., Liang, C., and **R.P. Phillips**. *In Prep*. High quality litters promote mineral retention of soil carbon, but not through alteration of microbial physiological traits

Novick, K.A., Jo, I., D'Orangeville, L., Au, T.F., Barnes, M., Benson, M., Denham, S., Fei, S., Heilman, K., Keyser, T., Maxwell, J.T., Miniat, C., McLauchlan, J., Pederson, N., and **R.P. Phillips**. *In Prep*. The drought response strategy of eastern US oaks, in the context of their ongoing decline.

Scheibe, A., Flory, S.F., Wright, J.P. and **R.P. Phillips**. *In Prep*. Resource competition and trait similarity mediate the effects of an invasive grass on tree growth.

BOOK CHAPTERS AND EDITED BOOKS

Avis, P.G., Meier, I.C., and **R.P. Phillips**. 2017. Chapter 13: An intact soil core bioassay for cultivating forest ectomycorrhizal fungal communities. In M. Lukac, P. Grenni & M. Gamboni Eds., *Soil Biological Communities and Ecosystem Resilience*. Springer. Electronic ISBN: 978-3-319-63335-0.

Brzostek, E.R. Rebel' K., Smith' K.R., and **R.P. Phillips**. 2017. Chapter 25: Integrating mycorrhizae into global scale models: A journey toward relevance in the earth's climate system. In Johnson, N.C., Gehring, C., and J. Jansa. Eds. *Mycorrhizal mediation of soil: fertility, structure, and carbon storage*. Elsevier, 201; Electronic ISBN 9780128043837.

McDowell, N., Hanson, P.J., Ibáñez, I., **Phillips, R.P.**, and M.G. Ryan. 2016. Chapter 3: Physiological responses of forests to future drought. In: Vose, J.M.; and J.S. Clark, eds., USDA Forest Service Report: Effects of Drought on Forests and Rangelands in the United States: A Comprehensive Science Synthesis. Gen. Tech. Report WO-93b January 2016

Schlesinger, W.H., Dietze, M.C., Jackson, R.B., **Phillips, R.P.**, Rhoades, C.C., Rustad, L.E., and J.M. Vose. 2016. Chapter 5: Forest biogeochemistry in response to drought. In: Vose, J.M.; and J.S. Clark, eds., USDA Forest Service Report: Effects of Drought on Forests and

Rangelands in the United States: A Comprehensive Science Synthesis. Gen. Tech. Report WO-93b January 2016

CONTRACTS AND GRANTS - State and Federal agencies only *(all amounts are totals)*

Pending awards

2021-2024 PI. (Collaborative with Songlin Fei) "Elucidating plant and mycorrhizal fungal relationships and consequences across space and time", NSF, DEB, MacroSysBIO & NEON-Enabled Science; $229,332

Current awards

2020-2022 Co-PI. (Collaborative with Kimberly Novick and Xi Yang) "The coordinated structural and physiological responses of trees to water stress: an organismal approach", NSF, IOS - Integrative Ecological Physiology, $393,585

2019-2022 PI. "Ecosystem and climate consequences of forest community change"; Environmental Resilience Institute, Indiana University, $237,383

2018-2021 PI. (Collaborative with Chris Blackwood and Kurt Smemo) "EAGER: Shifting control from negative plant-microbe feedback to nutrient limitation: predictions from dominant tree traits and ecosystem nutrient economies", NSF, DEB - Population and Community Ecology (Award# 1834255); $300,000

2019-2020 Co-PI. (PI, Jonathan Raff) "Mineralogy and soil organic matter composition as drivers of reactive nitrogen emissions from midwestern hardwood forest soils", DOE, Environmental Molecular Sciences Laboratory User Project Grant. $97,314 (*estimate*)

2020-2025 Co-PI. (with PI Kim Novick). Contract with DOE-funded Ameriflux Network Management Project to continue to provide long- term support for the Morgan Monroe State Forest eddy-flux tower; our site is among a core group of AmeriFlux towers spread across ecological and climate zones in the US; $965,400

Past awards

2017-2020 Co-PI. (PI, Kimberly Novick) "Drought impacts on species-specific carbon uptake and growth in Eastern U.S. hardwood forests", USDA, AFRI, Physiology of Agricultural Plant Program; $470,000

2016-2019 Co-PI. (PI, Joshua Fisher) "The carbon–nutrient economy of the rhizosphere: Improving biogeochemical prediction and scaling feedbacks from ecosystem to global scales", DOE, Environmental System Science Program, Terrestrial Ecosystem Sciences (Award# DE-SC0016188); $598,109

2014-2019 Co-PI. (PI, Melinda Smith), "Drought-Net: A global network to assess terrestrial ecosystem sensitivity to drought", NSF, Research Coordination Network, DEB (Award# 1354732). $499,992

2017-2019 PI. (Doctoral Dissertation Improvement Grant for Matt Craig) "Where plant litter ends and soil carbon begins: The role of microbial physiology in stabilizing soil organic matter", NSF, DEB Ecosystem Studies (Award# 1701652); $20,275

2016-2021 Co-PI. (with PI Kim Novick). Contract with DOE-funded Ameriflux Network Management Project to continue to provide long- term support for the Morgan Monroe State Forest eddy-flux tower; our site is among a core group of AmeriFlux towers spread across ecological and climate zones in the US; $780,754

2016-2019 Co-PI. (PI, Jonathan Raff) "Combined Flux Chamber and Genomics Approach to Understanding Soil Emissions of Reactive Nitrogen Oxides in a Forested Environment", DOE, Joint Genome Institute, Community Science Program.

2015-2017 Co-PI. (PI, William Wieder) "Benchmarking and improving microbial-explicit soil biogeochemistry models", DOE, Environmental System Science Program (Award# DE-SC0014374-1214.11.3201B); $497,780

2014-2016 PI. (Collaborative with Justin Wright and Luke Flory) "Testing a conceptually-driven framework to predict variability in the ecosystem consequences of plant invasion across heterogeneous landscapes", NSF, DEB - Ecosystem Studies (Award# 1353296); $340,048

2017 PI. (with co-PI Keith Clay). Contract with Smithsonian Tropical Research Institute (unit of Smithsonian Institution of Washington D.C.) to re-census the 25 ha Indiana University Forest Dynamics Plots at Lilly Dickey Woods; $14,115

2012-2016 Co-PI. (PI, Josh Fisher), "Nutrient cycle impacts on forest ecosystem carbon cycling: Improved prediction of climate feedbacks from coupled C–nutrient dynamics from ecosystem to regional scales", Department of Energy, Terrestrial Carbon Cycle Research, $1,044,835

2013-2016 Co-PI (with PI Kim Novick). Contract with DOE-funded Ameriflux Network Management Project to continue to provide long- term support for the Morgan Monroe State Forest eddy-flux tower; our site is among a core group of AmeriFlux towers spread across ecological and climate zones in the US; $562,508

2013-2015 Co-PI. (PI, Amy Trowbridge), "Above and belowground connections and species interactions: Controls over ecosystem fluxes", Department of Energy, Terrestrial Carbon Cycle Research, $150,000

2014-2015 Co-PI. (PI, Karin Rebel), "Climate models revisited: the biogeochemical consequences of mycorrhizal dynamics", Royal Netherlands Academy of Arts and Sciences, $25,939

2012-2014 PI. "A belowground framework for predicting how plant-microbial interactions couple carbon and nutrient economies of forests", NSF, DEB - Ecosystem Studies (#1153401), $398,042

2012-2014 Co-PI. (PI, Jeffrey Dukes), "Climate change feedbacks from interactions between new and old carbon", Department of Energy, Terrestrial Carbon Cycle Research, $150,000

2008-2011 PI. "Rhizosphere priming effects on soil N availability: the role of root exudates in coupling ecosystem C and N cycles under elevated CO_2", USDA NIFA, Soil Processes Program, $385,000; *NOTE: Excerpts of this grant were included as an exercise and writing example in "Scientific Writing and Communication: Papers, Proposals and Presentations", Oxford University Press, 2009*.

2009-2011 PI. "Examining the role of mycorrhizal associations in mediating carbon storage in southern Indiana", Indiana University, Center for Research in Environmental Science, $18,700

2010-2012 Co-PI. (PI, Danilo Dragoni), "Ecosystem-atmosphere exchange over a mixed deciduous forest in the Midwest: How does the carbon budget respond to short- and long-term climate variability?", Department of Energy, Terrestrial Carbon Cycle Research, $457,706

2010-2011 Co-PI. (PI, Todd Royer), "Hydrological controls on greenhouse gas emissions from agricultural landscape: the role of artificial subsurface drainage", Indiana University, Office of the Vice Provost for Research $59,269

2010-2011 PI. "Development of an improved land cover classification scheme to estimate ecosystem functioning in southern Indiana forests", Indiana University, Summer Stipends for Collaborative Research and Creative Activities, $9,767

2010-2011 Co-PI. (PI, Tom Evans). "New media approaches for cross-disciplinary education and community awareness of remote sensing and land use dynamics", Indiana Space Grant Consortium, $15,000

2011-2012 Co-PI. (PI, Philip Stevens), "Temporal dynamics of volatile organic carbon (C) emissions from forest soils: In-situ measurements of the C we do not see", Indiana University, Center for Research in Environmental Science, $26,000

2012-2013 Co-PI (with co-PI Keith Clay). Contract with Smithsonian Tropical Research Institute (unit of Smithsonian Institution of Washington D.C.) to establish the 25 ha Indiana University Forest Dynamics Plots at Lilly Dickey Woods; $30,759

INVITED SYMPOSIA AND MEETING TALKS

2020 Soil Science Society of America Annual Meeting (CrossDiv Symposium on "Mycorrhizal Fungi As Modulators of Soil Organic Matter Dynamics"); Virtual Meeting
2020 Ecological Society of America Annual Meeting (session: "The Role of Mycorrhizae in Mediating Species Interactions"); Virtual Meeting
2019 Ecological Society of America Annual Meeting (session: "Mapping Earth's Microbiome: Understanding macroecological rules of microbial distributions and their implications for ecosystem function"); Louisville, KY
2019 International Conference on Mycorrhiza (ICOM-10); *keynote speaker* in session: "New technologies and innovation in the study of mycorrhizal symbioses: the way forward"); Meriada, Mexico
2018 Geological Society of America, Critical Zone Science: Bio-Geo Interactions across Environmental Gradients and Time; Indianapolis, IN
2018 Energy Institute at the University of Michigan (co-sponsored by the Beyond Carbon Neutral Program); "Fungal Communities and Soil Carbon Storage"; Ann Arbor, MI
2018 Ecological Society of America Annual Meeting, (session: "Integrating Diverse Evidence for Effects Rising CO_2 on Terrestrial Ecosystems"); New Orleans, LA
2017 DOE Office of Biological & Environmental Research "Long-term Vision" Workshop; Washington, DC; *one of six invited plenary speakers*
2016 American Geophysical Union Annual Meeting "Soil Carbon Dynamics: Interactions of Plants, Microbes, and Minerals"; San Francisco, CA
2016 Ecological Society of America Annual Meeting, (session: "Mycorrhizal fungi as drivers and modulators of ecosystem processes"); Ft. Lauderdale, FL
2015 American Geophysical Union Annual Meeting "Roots & Modeling"; San Francisco, CA
2015 Climate models revisited: the biochemical consequences of mycorrhizal dynamics; hosted by KNAW, Amsterdam, Netherlands
2014 Roots in Models Workshop; DOE-funded workshop to explore how root dynamics can be included in land surface models; hosted by Oak Ridge National Lab, Oak Ridge, TN
2014 Ecological Society of America Annual Meeting, (session: "Rhizosphere interactions: An exploration of patterns across systems"), Sacramento, CA
2014 RhizoNet Workshop; Chinese Academy of Sciences-funded workshop on new ways to couple roots and belowground processes with ecosystem functions; Beijing, China
2013 Midwest Flux Tower Workshop, funded by the Ameriflux Management Project; Bloomington, IN

2012 Department of Energy Workshop, "Scaling Root Processes: Global Impacts", Washington D.C.
2012 Gordon Conference, "Biogenic Hydrocarbons and the Atmosphere", Lewiston, ME (declined)
2011 Ecological Society of America Annual Meeting, (session: "Measuring and Modeling Roots, the Rhizosphere, and Microbial Processes Belowground"), Austin TX
2010 Goldschmidt Conference, (session: "Biological Weathering in the Critical Zone: From Nano to Global Scale"), Knoxville, TN
2009 Subsurface Biosphere Workshop, Oregon State University, Corvallis OR
2009 Ecological Society of America Annual Meeting (session: "The long-term response of ecosystems to simulated global change"), Albuquerque, NM
2009 American Geophysical Union Fall Meeting (session: "Soil Organic matter and carbon sequestration: From models to mechanisms"), San Francisco, CA
2008 American Geophysical Union Fall Meeting, (session: "Impact on terrestrial ecosystems of CO_2, climate, limiting nutrients, human activities and biofuel production"), San Francisco, CA

INVITED SEMINARS

2021 University of Leiden; Institute of Env. Sciences & Centre for Sustainability, Netherlands
2020 Texas Tech; Department of Biological Science; Lubbock, TX
2020 Duke University, Department of Biology; Durham, NC
2018 Butler University, Department of Biological Sciences; Indianapolis, IN
2018 University of Alberta, Dept. of Renewable Resources; Edmonton, Alberta, Canada
2018 University of Connecticut, Dept. of Natural Resources and the Environment; Storrs, CT
2017 Washington University, Tyson Research Center Summer Seminar Series, St Louis, MO
2017 Syracuse University, Department of Biology; Syracuse, NY
2017 University of Florida, Department of Biology; Gainesville, FL
2016 The Ecosystems Center, Marine Biological Laboratory; Woods Hole, MA
2016 University of Minnesota, Dept. of Ecology, Evolution and Behavior; Minneapolis, MN
2015 Cornell University; Biogeochemistry Program, Ithaca, NY
2015 University of Illinois - Chicago; Department of Biological Sciences; Chicago, IL
2014 Institute of Geographical Sciences & Natural Resources, Chinese Academy of Sciences
2014 Kellogg Biological Station, Hickory Corners, MI
2013 Ohio State University, Dept. of Evolution, Ecology and Org. Biology, Columbus, OH
2013 Cary Institute of Ecosystem Studies, Millbrook, NY
2012 University of Toledo, Department of Environmental Sciences, Toledo, OH
2012 Ohio University, Department of Environmental and Plant Biology, Athens, OH
2012 Colorado State University, Department of Soil and Crop Sciences, Fort Collins, CO
2012 Kent State, Department of Biological Sciences, Kent, OH
2011 University of Missouri – St Louis, Department of Biology, St Louis, MO
2011 University of Illinois, Urbana-Champaign, Department of Natural Resources
2011 DePauw University, Department of Biology, Greencastle, IN
2010 Purdue University, Department of Biological Sciences, W. Lafayette, IN

2009 Cornell University, Biogeochemistry Program, Ithaca, NY
2009 Michigan State University, Department of Forestry, Lansing MI
2009 Indiana-Purdue University at Indianapolis, Dept. of Earth Sciences, Indianapolis, IN
2009 Indiana University, Department of Geography, Bloomington, IN
2008 Indiana University, School of Public and Environmental Affairs, Bloomington, IN
2005 University of North Carolina, Department of Biology, Chapel Hill, NC

POSTDOCS, STUDENTS & TECHNICIANS TRAINED AND MENTORED

Current post-doc

1. Ashley Lang – Ph.D. Dartmouth College (recipient of NSF Collections Fellowship; 2020)

Current Ph.D. students

1. Katie Beidler – Ph.D. student (started in fall, 2016)
2. Sierra Perez – Ph.D. student (started in fall, 2020)

Current graduate advisory committees (Indiana University; IU)

1. Savannah Bennett - Ph.D. student in Evolution, Ecology and Behavior, Department of Biology, IU
2. Lienne Sethna - Ph.D. student in the Environmental Science Program, SPEA, IU
3. Tsun Fung Au - Ph.D. student in the Department of Geography, IU
4. Michael Benson - Ph.D. student in the Environmental Science Program, SPEA, IU
5. Benjamin Lockwood - Ph.D. student in the Department of Geography, IU

Current graduate advisory committees (Institutions other than IU)

1. David Moore - Ph.D. student; Department of Natural Resources & the Environment; University of New Hampshire
2. Laura Jessup - Ph.D. student; Department of Forestry & Natural Resources; Purdue University
3. Thomas Muratore - Ph.D. student; Department of Natural Resources & Environment; University of New Hampshire

Current technicians

1. Elizabeth Huenupi; Ph.D. in Engineering Science and Chemistry; University of Chile, Santiago, Chile
2. Mark Sheehan; Ph.D. in Botany; Indiana University, Bloomington
3. Young Oh; M.S. student in SPEA at IU (in progress)

Current undergraduate technicians or mentees

1. Mary Huynh; Biology Major, IU
2. Emma Hand; Biology Major, IU
3. Maddie Gallinger; Biology Major, IU

Current and Former visiting scholars

1. Svenja Stock – visiting scholar from Univ. of Bayreuth, Germany; Fullbright recipient (2018-)
2. Saskia Klink – visiting Ph.D. from Univ. of Bayreuth, Germany (2018-)
3. Amit Kumar – visiting Ph.D. student from Univ. of Bayreuth, Germany (2017)
4. Johanna Pausch – visiting scholar from Univ. of Bayreuth, Germany; DAAD scholar (2017-20)
5. Linette Viertelhauzen – visiting MS student from Utrecht University, Netherlands (2013)
6. Anna Rosling – visiting scholar from Uppsala University, Uppsala, Sweden (2013-15)
7. Huajun Yin – visiting scholar; Chengdu Institute of Biology, Chinese Acad. of Sci., (2013-14)

Former post-docs

1. Ryan Mushinski; now Assistant Professor at University of Warwick, UK
2. Quan Zhang, now Lecturer at State Key Laboratory, Wuhan University, Wuhan, China
3. Loïc D'Orangeville; now Assistant Professor at Univ. of New Brunswick; Fredericton, Canada
4. Andrea Scheibe; now Research Assistant at Max Planck Inst. for Biogeochemistry; Jena, Germany
5. Tanya Cheeke; now Assistant Professor at Washington State University
6. Benjamin Sulman; now Staff Scientist at Oak Ridge National Lab
7. Amy Trowbridge; now Assistant Professor at University of Wisconsin-Madison
8. Edward Brzostek; now Assistant Professor at West Virginia University
9. Ina Meier; now Heisenberg professorship at the University of Hamburg

Former Ph.D. students

1. Adrienne Keller – now post-doc at University of Minnesota, Minneapolis, MN
2. Matthew Craig – now post-doc at Oak Ridge National Lab, Oak Ridge, TN
3. Steve Kannenberg – now post-doc at University of Utah, Salt Lake City, UT
4. Meghan Midgley – now Soil Scientist at Morten Arboretum, Chicago, IL

Former undergraduate mentees

2019-202	Ashley Kovach-Hammons - Honor's thesis committee (Chair); Major: Biology; X490 independent research
2018-2019	Hongxi Lyu - Honor's thesis committee (Chair); Major: Biology; X490 research
2019	Karl Hagan – BS in Chemistry; X490 independent research
2018-2019	Kelly Fox – Honor's thesis committee (Chair); Major: Biology; X490 research
2018-2019	KC Cifizzari – Honor's thesis committee; Major: Biology
2018-2019	Andrew Reese – BS in Environmental Science; X490 independent research
2018-2019	Corben Andrews – BS in Environmental Science; X490 independent research
2017-2018	Max Zaret – Honor's thesis committee; Major: Biology; Class of 2018
2017-2018	Julius Hain – BS in Biology; X490 independent research
2016-2017	Peyton Joachim – BS in Biology; X490 independent research
2014-2015	Nadia Lovko – BS in Environmental Science; L490 independent research
2013-2015	Luke Jacobs – BS in Biology; L490 independent research

2014-2015 Jack Feighery – BS in Environmental Science; L490 independent research
2014 Sam Incardona – BS in Biology; L490 independent research
2014 Alexander Kuhn – BS in Conservation Biology at SUNY ESF; REU student
2013-2014 Jennifer Swillik – BS in Environmental Science; L490 independent research
2013-2014 Rachel Gidley – BS in Environmental Science; L490 independent research
2013 Frances Einterz – BS in Environmental Science; L490 independent research
2012-2013 Elizabeth Allaby – BS in Biology; L490 independent research
2012-2013 Tyler Klingenberger – BS in Environmental Science; L490 independent research
2012 Daniel O'Conner; visiting undergraduate (summer); Occidental College, CA
2012 Emily Wheeler – BS in Environmental Science; L490 independent research
2011-2012 Tyler Pietrykowski – BS in Environmental Science; L490 independent research
2011-2012 Nate Barnett – BS in Environmental Science; L490 independent research
2010 Paula Arenas – BS in Environmental Science; L490 independent research
2010 Janelle Steffan – BS in Environmental Science; L490 independent research
2009 Ryan Kessens – Integrated Freshman Learning Experience
2008-2009 Sarah Hoffman – BS in Environmental Science; L490 independent research

Former graduate student graduate advisory committees

1. Ashley Lang - Ph.D. student; Department of Biological Sciences; Dartmouth College
2. Emma Oschrin - Ph.D. student in EEB, Department of Biology, IU
3. Ellen Herbert - Ph.D. student in Environmental Sciences Program in SPEA at IU
4. Kim Elsenbroek – former M.S. student in EEB at IU
5. Lauren Smith – former Ph.D. student in EEB at IU
6. Jonathan Bauer - former Ph.D. student in EEB at IU
7. Diana Oveido Vargas - former Ph.D. student in SPEA at IU
8. Joe Morgan - former M.S. student in SPEA at IU
9. Michael Brennan - former M.S. student in SPEA at IU
10. Erica Waters – former Ph.D. student in EEB at IU
11. Liz Koziol – former Ph.D. student in EEB at IU
12. Brian Steidinger – former Ph.D. student in EEB at IU
13. Mario Muscarella – former Ph.D. student in EEB at IU
14. Geoffrey House – former Ph.D. student in EEB at IU
15. Alyssa Beck – former Ph.D. student in Ecology, Evolution, & Conserv. Biology; U. Illinois
16. Alejandro Salazar – former Ph.D. student, Biological Sciences, Purdue University
17. Amy Snyder – former M.S. student in EEB at IU
18. Amanda Daly – former Ph.D. student, University of New Hampshire
19. Noah Sokol – former Ph.D. student, School of Forestry & Environmental Studies, Yale University
20. Venus Kuo – former Ph.D. student in EEB, Department of Biology, IU
21. Koong Yi – former Ph.D. student in Environmental Science Program, SPEA, IU
22. Nathan Wisnoski – former Ph.D. student in EEB at IU

Former full-time technicians

1. Laura Podzikowski – now a Ph.D. student; Department of EEB at University of Kansas

2. Robin Johnson – now lab assistant, Oliver Winery, Bloomington, IN
3. Dan Du – now Ph.D. student in Dept. of Soil & Water Ssystems at Univ. of Idaho
4. Zach Brown – now a Ph.D. student in Ecology at University of Tasmania, Australia
5. Andrea Martin – now Senior Associate at Cascade Consulting Group, WA
6. Christina Kuchle – now at Department of Natural Resources, OH
7. Daniel Lehman – now at lab manager in Ron Hites' Lab, SPEA, IU
8. Marissa Lee – now a Research Associate at North Carolina State University, NC
9. Nathan Kleczewski – now Research Assistant Professor in Crop Sciences at University of Illinois
10. Jill Greiner – now Coordinator of Water Conservation for City of Charlottesville, VA
11. Raven Bier – now Research Associate at Stroud Water Research Center, PA

STUDENT / POSTDOC AWARDS AND FELLOWSHIPS

2020 Ashley Lang; *NSF Postdoctoral Research Fellowship in Biology - Interdisciplinary Research Using Biological Collections*; $138,000
2020 Katie Beidler; George W. Brackenridge Fellowship; $2,500
2019 Katie Beidler; *Smithsonian CTFS-ForestGEO Research Grants Program*; $10,000
2019 Corben Andrews (undergraduate) and Katie Beidler; *IU Research and Teaching Preserve Grant*; $3,000
2019 Katie Beidler; Sears Crowell Scholarship; $2,500
2019 Adrienne Keller; *USDA AFRI NIFA Predoctoral Fellowship*; $119,985
2019 Ryan Mushinksi; *USDA AFRI NIFA Postdoctoral Fellowship*; $161,500
2019 Adrienne Keller; Floyd/Ogg/Cleland Final Year Fellowship (declined)
2018 Matt Craig; *IU Research and Teaching Preserve Grant*; $2,000
2018 Katie Beidler; Sears Crowell Scholarship; $2,500
2018 Adrienne Keller; *Blatchley Nature Study Club Scholarship*; $500
2018 Julius Hain; *Howard W. Clark Scholarship*; $500
2017 Matt Craig; *NSF DEB, Doctoral Dissertation Improvement Grant;* $20,275
2017 Matt Craig; *Best Student Presentation* – International Symposium on Soil Organic Matter; $332
2017 Adrienne Keller; *Smithsonian CTFS-ForestGEO Research Grants Program*; $14,977
2017 Steve Kannenberg; *Ehleringer & Hanski Prize* (best student paper in Plant Ecology; Oecologia); $500
2017 Adrienne Keller; *Louise Constable Hoover Fellowship*; $1,500
2017 Adrienne Keller; *IU Research and Teaching Preserve Grant*; $2,000
2017 Matt Craig; *Alfred Parson Mower Fellowship*; $1,500
2017 Matt Craig; *Blatchley Nature Study Club Scholarship*; $500
2016 Steve Kannenberg; *Sears Crowell Scholarship*; $3,200
2016 Adrienne Keller; *Fred Seward Award*; $2,500
2016 Matt Craig; *Best Student Presentation* – Biogeosciences Section; ESA Annual Meeting; $500
2016 Matt Craig; *Louise Constable Hoover Fellowship*; $1,000
2015 Steve Kannenberg; *Travel award to attend INTERFACE workshop in Tampa, Florida*

2014 Tanya Cheeke; *Forest Fungal Ecology Postdoc Award – Mycological Society of America;* $2,500
2014 Matt Craig; *Smithsonian-Forest Global Earth Observatory Program grant*; $15,000
2014 Tanya Cheeke; *Indiana Academy of Sciences Award;* $3,000
2013 Meghan Midgley; *USDA Graduate Research Fellowship;* $66,000
2013 Amy Trowbridge; *NSF Postdoctoral Research Fellowships in Biology*
2012 Emily Wheeler; *IU Women in Science Fellowship, 2012;* $500
2012 Elizabeth Allaby; *Indiana Daffodil Society ($500) and Women in Science ($500) Fellowships*
2011 Brian Steidinger; *NSF Graduate Research Fellowship*
2011 Meghan Midgley; *Indiana Academy of Sciences Award;* $3,000
2009 Meghan Midgley; *Indiana Space Grant Fellowship;* $15,000

CLASSROOM TEACHING (Indiana University only)

2020 L402 "Ecosystems and Global Change"; 3 credit hours
2020 Z620 (cross-listed with L402) "Ecosystems and Global Change"; 3 credit hours
2019 L402 "Ecosystems and Global Change"; 3 credit hours
2018 Z620 "Distributed Graduate Seminar: Modeling Drought Impacts";1.5 cr. hours
2018 L402 "Ecosystems and Global Change"; 3 credit hours
2017 L410 Special topic in Biology: "Ecosystems and Global Change"; 3 credit hours
2016 Z620 "Ecosystems and Global Change"; 2 credit hours; graduate class
2016 L570 "Brownbag" discussion leader; 1 credit hour
2015 Z620 "Ecological Stoichiometry"; 1.5 credit hours
2014 Z620 "Ecosystems and Global Change"; 1.5 credit hours; graduate class
2013 Z620 "Above-belowground linkages in a changing world"; 1.5 cr hours
2012 Z620 "Ecological Stoichiometry"; 1.5 credit hours
2010 L575 "Ecosystems and Global Change"; 3 credit hours
2008-13 L473 "Ecology"; 3 credit hours

UNIVERSITY AND DEPARTMENTAL SERVICE

Affiliations

2014 - present	Director of Research, IU Research & Teaching Preserve, Bloomington, IN
2013 - present	co-PI, AmeriFlux Management Program (AMP) lead by Lawrence Berkeley National Laboratory (funded by DOE); one of 12 "core sites" selected
2012 - present	co-PI, Indiana University Forest Dynamics Plot (Lilly Dickey Woods, IN), member of Smithsonian Institute Global Observatories (SIGEO); one of 50 plots in global network
2009 - 2017	Delegate for Indiana University at Organization for Tropical Studies
2009 - 2015	Delegate for Indiana University at NEON
2008-2010	NSF IGERT training grant – Biosphere-Atmosphere Research and Training (BART) University of Michigan

Committees

2020	Promotion Committee for Tara Darcy (EEB; Department of Bio; IU)
2020	Promotions Advisory Committee for Adam Fudickar (Environmental Resilience Institute; IU)
2018-present	EEB seminar coordinator
2018-2019	EEB Graduate Admissions Committee (Chair)
2018	Environmental Resilience Institute at IU, Fellows Search Committee (for invasive species ecologist)
2017-2018	Biology Dept., Faculty Search Committee (for invasive species ecologist)
2011-present	Research and Teaching Preserve Executive Committee
2010-present	Biology Dept. Graduate and Undergraduate Fellowship Committee
2010-12; 2017-2018	Departmental Planning Committee (DPC)
2013-2014	SPEA Faculty Search Committee (for eco-hydrologist)
2012-2014	EEB Admissions Committee (Committee Chair in 2013-14)
2009-2012	Graduate Recruitment Weekend Committee (Committee Chair in 2011)
2009	College of Arts and Sciences - Dissertation Year Fellowship Committee

PROFESSIONAL SERVICE

2020-present	Guest Handling Editor: Science Advances
2018-present	Associate Editor: Plant Physiological and Ecosystem Ecology section at Oecologia
2012-present	Editorial Review Board: Biogeochemistry

Reviewer

Grants: National Aeronautics and Space Administration - United States Department of Agriculture NIFA (panelist; Carbon Cycle Science Program), National Science Foundation (ad hoc reviewer; Ecosystem Studies Program, Natural Environmental Research Council – Science of the Environment (ad hoc reviewer); Department of Energy (ad hoc reviewer; National Institute for Climate Change Research); Canada's Discovery Grants - Forest & Conservation Sciences (ad hoc reviewer); Research Foundation - Flanders Belgium (ad hoc reviewer for Fonds Wetenschappelijk Onderzoe; FWO).

Manuscripts: American Journal of Botany, Applied Soil Ecology, Biogeochemistry, Biogeochemistry Letters, Biological Reviews, Canadian Journal of Forest Research, Ecology, Ecology Letters, Ecosphere, Ecosystems, Environmental & Experimental Botany, Forest Ecology & Management; Functional Ecology, Geoderma, Global Change Biology, Global Ecology and Biogeography, Journal of Ecology, Journal of Environmental Quality, Nature, Nature Climate Change, Nature Plants, New Phytologist, Oecologia, Plant Biology, Plant Physiology and Biochemistry, Plant and Soil, Proceedings of the National Academy of Sciences, Science, Soil Biology & Biochemistry, Tree Physiology.

Journals: Committee to evaluate Editor in Chief at Ecology (2015)

Book chapters: "Nutrient Cycling" and "Decomposition" (SimUtext); SimBiotic Software Co. Ithaca, NY

Thesis: External examiner for PhD student at University of Sydney, 2016

Author

Department of Energy, Biological and Environmental Research Advisory Committee "Grand Challenges in Microbial to Earth System Pathways" in *Grand Challenges for Biological and Environmental Research: Progress and Future Vision*; November 2017; DOE/SC–0190

Indiana Climate Change Impacts Assessment "Forest ecosystems"; 2017-2018 (lead author)

Symposium and Workshop organizer/co-organizer

2020 *Symposium:* "Soils in the Anthropocene: The Effect of Plant Communities and Their Microbial Associations on Soil Biogeochemistry"; American Geophysical Union Fall Meeting

2015 *Workshop:* "Climate models revisited: the biogeochemical consequences of mycorrhizal dynamics"; Amsterdam, Netherlands; April 7-10.

2015 *Symposium:* "Biogeochemical consequences of alterations in the water balance of terrestrial ecosystems: Lessons learned from experimental approaches"; American Geophysical Union Fall Meeting

2012 *Symposium:* "Root and microbial interactions that influence soil organic matter formation and stabilization", American Geophysical Union Fall Meeting

2011 *Symposium:* "Biological weathering: Carbon, water and nutrient flow through plant-microbe-soil networks", American Geophysical Union Fall Meeting

Invited Participant

2019 INCyTE (Investigating Nutrient Cycling in Terrestrial Ecosystems) Workshop funded by NSF's Research Coordination Network; Missoula Montana, June 10-14

2018 "Fungal Communities and Soil Carbon Storage" sponsored by the Energy Institute at the University of Michigan and the Beyond Carbon Neutral Program; Ann Arbor, MI; May 20-22

2017 "DOE Biological and Environmental Research Grand Challenges". Writer and invited participant for workshop identifying grand challenges relevant to DOE's interests/mission. Rockville, MD.

2016 "Understanding soil's resilience and vulnerability"; sponsored by Carbon Cycle Interagency Working Group; Boulder, CO; March 14-16.

2014 "Forest DroughtNet Workshop"; University of New Hampshire; November 17-19.

2014 "Roots and models"; DOE-sponsored Workshop, Oak Ridge, TN

2014 "National Forest-Drought Assessment" (US Forest Service), virtual workshop and synthesis

2014 "Using results from global change experiments to inform land model development and calibration", NSF- and Chinese Ministry of Science and Technology-funded workshop.

2013 "Ecosystem Sensitivity to Rainfall Experiment (EcoSeRE): Design and Synthesis": NSF-funded (LTEREB) working group to design an international network of rainfall manipulation experiments. Fort Collins, CO
2012 "Scaling Root Processes: Global Impacts" DOE-sponsored Workshop, Washington, DC
2011 "Emerging Frontiers in Rhizosphere Science" Workshop, Arlee Virginia

Society memberships

American Association for the Advancement of Science (*since 2018*); American Geophysical Union (*since 1997*), Ecological Society of America (*since 1997*), Soil Science Society of America (*since 1997*), Indiana Academy of Sciences (*since 2010*), Mycological Society of America (*since 2012*)

SERVICE/OUTREACH

Field trips at Morgan Monroe State Forest

35th Annual Central States Forest Soils Workshop; Martinsville, Indiana (October 13-15, 2015)
North American Forest Ecology Workshop (2012, 2013)

Invited outreach talks

2019 Indiana DNR Division of Forestry Annual Meeting; "How will climate change affect Hoosier forests?", McCormack's Creek State Park, IN; February 26-28, 2019
2018 Forest ecosystems in a Changing Climate; Science Fest; Indiana University; Bloomington, IN; October 27, 2018
2018 Indiana Climate Change Impacts Assessment Report; Press Briefing for release of reports titled *Indiana's Future Forests* and *Maintaining Indiana's Urban Green Spaces*; Bloomington, IN; May 13, 2018
2016 Indiana DNR Division of Forestry Annual Meeting; "Carbon Sequestration and Atmosphere-Biosphere Interactions in a Mixed Hardwood Midwest Forest", Clifty Falls State Park, IN; February 22-23, 2016
2015 35th Annual Central States Forest Soils Workshop; "The carbon consequences of water stress: A case study from Morgan Monroe State Forest", Martinsville, Indiana; October 13-15, 2015.
2015 "Grant Writing Tips"; presentation for Midwestern Ecology and Evolution Meeting, Bloomington IN; March 28-29, 2015

Broadening the participation of underrepresented groups

Jim Holland Research Initiative in STEM Education (RISE) Program; two-week program where high school students from underrepresented groups are mentored by multiple labs; 2016-17

Jim Holland Summer Science Research (SSR) Program; one week program where high school students from underrepresented groups are mentored by individual labs; 2013-16

Instructor/mentor

2018-20 Summer Science Institute; partnership between IU and WonderLab (local science museum for kids), where middle and high school teachers are trained on developing lesson plans about climate change and its impact on communities and ecosystems; won Indiana Dept. of Env. Management Governor's Award for excellence in Environmental Education/Outreach (2020)

2014-16 Biology Summer Institute; partnership between IU Biology Faculty and Indiana high school science teachers; 2014-16

Panelist

"Preparing Future Faculty", IU Annual Conference; Bloomington, IN (Feb. 12, 2016)

SERVICE/OUTREACH BY PHILLIPS LAB MEMBERS (partial list)

Lectures

Blatchley Nature Club; Noblesville, Indiana; March 2018
Indianapolis Public Library; spring, 2013
Monroe County Library; fall, 2012
Brown County Library; fall, 2012
Bedford Library; fall, 2012
Brown County Rotary Club; fall, 2012

Field trips led

Morgan Monroe State Forest; Indiana Dept. of Natural Resources staff; spring 2013
Morgan Monroe State Forest; Bloomington South High School; summer 2012
Morgan Monroe State Forest; Lighthouse Christian Academy; summer 2012

MEDIA EXPOSURE

Interview with Mongabay "Earth's hidden tree-microbe network mapped for the first time ever" https://news.mongabay.com/2019/05/earths-hidden-tree-microbe-network-mapped-for-the-first-time-ever/

Interview with Bloom Magazine on Indiana forests and climate change "Under the Weather: How Climate Change is Messing with Monroe County (cover story for April, 2019 issue); http://www.magbloom.com/2019/04/under-the-weather-how-climate-change-is-messing-with-monroe-county/

Television interview about the Indiana Climate Change Impacts Assessment's "Forest Report"; May, 2018; https://youtu.be/94Vc61BiFdQ

Radio interview for WFHB's Eco Report on the state and future of Indiana's forests ; June, 2018. http://wfhb.org/public-affairs/ecoreport/eco-feature-june-14-2018/

Print interview for Inside Science article "The Changing Face of American Forests", December, 2016; https://www.insidescience.org/news/changing-face-american-forests

Environmental Science Journal for Kids. High school lesson plan "What kind of fungus are you?"; developed from Fisher et al. 2016 (Global Change Biology; DOI: 10.1111/gcb.13264); http://www.sciencejournalforkids.org/articles/what-kind-of-fungus-are-you

Television interview on WTIU in Bloomington, IN; *topic:* IU Research and Teaching Preserve; http://indianapublicmedia.org/news/iu-environmental-research-preserve-directors-71180/

Radio interview with Chesapeake Quarterly (Maryland Sea Grant at the University of Maryland); *topic:* carbon storage under elevated CO_2 and climate change; http://www.mdsg.umd.edu/news/marshes-changing-world-part-1

Television interview on WTIU in Bloomington, IN; *topic:* How water affects carbon storage in forests; http://www.youtube.com/watch?v=99Z5DfXH4Ko&feature=player_embedded

Article in Scientific American Online; "Higher CO_2 Levels in Atmosphere May Speed Soil Emissions", July, 2012.

Radio interview on nationally syndicated weekly radio show and podcast (Sea Change Radio), first aired on August 7, 2012; http://www.cchange.net/2012/08/07/science-policy-progress/

Radio interview on WFIU in Bloomington, IN; *topic:* Midwest forests and climate change, first aired on May 20, 2012; http://indianapublicmedia.org/news/trees-adaptable-climate-change-research-shows-49500/

Cover story for The Scientist; "The Root of the Problem: New research suggests that the flow of carbon through plants to underground ecosystems may be crucial to how the environment responds to climate change." August 1, 2011