

## Timothy R. Filley

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### Professional Preparation

Loyola University of Chicago, Chicago, IL	Chemistry, B.S.	1990
The Pennsylvania State University, State College, PA	Geosciences, Ph.D.	1997
Carnegie Institution of Washington, Washington, DC	Geophysical Lab, Postdoc	1997-2000

### Research and Professional Experience

2013-Present	Professor, Department of Earth, Atmospheric, and Planetary Sciences and Department of Agronomy, Purdue University
2019-Present	Director, Center for the Environment, Purdue University
2018 -Present	Co-Director, the Arequipa Nexus Institute for Food, Energy, Water, and the Environment, Arequipa, Peru
2017-2018	Acting Director, Center for the Environment, Purdue University
2015-2016	Visiting Professor, Civil and Environmental Engineering, Northwestern University, Evanston, IL.
2012-2016	U.S. Director, US-China EcoPartnership for Environmental Sustainability
May-Oct 2011	Visiting Senior Professor, Chinese Academy of Sciences
2007-2010	Associate Head, Department of Earth, Atmospheric, and Planetary Sciences, Purdue University
2007-2010	Graduate Committee Chair, Department of Earth, Atmospheric, and Planetary Sciences, Purdue University
2007-2008	Elected National Program Chair, Geochemistry Division of the American Chemical Society
2006-2013	Associate Professor, Department of Earth and Atmospheric Sciences, Purdue University
2006	Visiting Professor, Rangeland Ecology Department, Texas A&M University, College Station, TX.
2000-2006	Assistant Professor, Department of Earth and Atmospheric Sciences, Purdue University

### Awards and Honors

2004, 2018, 2019	Purdue University Seeds for Success Award (presented to faculty who have secured a sponsored research grant awarded to Purdue in excess of one million dollars in one year)
2011	Senior Foreign Research Scholar, Chinese Academy of Sciences, Institute of Applied Ecology, Shenyang China.
2015-2017	Foreign Expert for Nanjing Agricultural University, Jiangsu Province, China
2016	Alumnus of the year, Department of Chemistry and Biochemistry, Loyola University of Chicago

### Research Summary

Filley's research explores the biogeochemical and physical processes that transform organic matter in terrestrial and aquatic ecosystems within natural and intensively managed landscapes. An overarching goal of his work is to demonstrate that detailed mechanistic information about soil organic matter (SOM) dynamics can lead to better understanding of society's vulnerability to climate and land use change, as well as to the potential risks from emerging pollutants. His work includes fundamental research into upcycling of waste biomass (e.g. wooden railroad ties) into high value products like biochar for use as

adsorbents or soil amendments for land restoration and ecosystem carbon sequestration. Filley uses isotope geochemistry, molecular biology, and analytical chemistry to study the complex factors that drive organic geochemical transformations in the environment. Filley's group has produced numerous "first of its kind" studies related to emerging pollutant fate in soil, measurements of in-situ decay rates of natural chemicals in soil, and novel application of analytical tools to identify the molecular composition and reactivity of SOM. Filley also works to connect chemical transformations that primarily occur at the submicron scale to the ecosystem scale for an improved understanding of how environments respond to stresses such as invasive plants and animals, climate warming, and land use change. His work provides the foundational chemistry for many national and international, large-scale ecosystem projects such as the NSF Critical Zone Observatory (CZO) Network. His effort to create the Arequipa Nexus Institute for Food, Energy, Water and the Environment (Nexus Institute) in 2018 resulted in one of the largest cross-college collaborative efforts in Purdue's history and continues to be one of the largest foreign investments in Purdue research. Filley currently co-directs, along with his counterpart at the Universidad Nacional de San Agustín, the Nexus Institute which recently received a five-year continuation to 2025.

### **Research Leadership Experience**

From 2012-2016 Filley served as the director of the U.S.-China Ecopartnership for Environmental Sustainability (USCEES). The USCEES also included founding members of the University of Tennessee's Institute for a Secure and Sustainable Environment, Oak Ridge National Laboratories Joint Institute for Biological Sciences, and the Chinese Academy of Sciences' IAE, Institute of Geographic Sciences and Natural Resources Research, and the Research Center for Eco-environmental Sciences. The program was approved as a US-China Ecopartnership by the US Department of State and the National Development and Reform Commission of the People's Republic of China. As U.S. Director, Filley worked to foster bilateral research innovation, communication, and entrepreneurship by developing a strategy for subnational scientific collaborations. Under his leadership, the program established a Visiting Scholar Network (including a searchable database for visiting scholar engagement), an internet portal to Purdue-developed technologies licensable in China, and a series of bi-national annual conferences, technical workshops, and joint research projects on Agroecosystem Dynamics. Underpinning these activities was a strong effort to build cross-cultural exchange among the participating researchers—although both the U.S. and China have embraced a future based on science, technology, and innovation, these two nations have vastly different cultural, political, and demographic legacies that challenge uniform solutions or mandated collaborative networks.

Filley serves as director of Purdue's [Center for the Environment \(C4E\)](#). The C4E, housed in Purdue's Discovery Park, works is to promote proactive, interdisciplinary research, learning, and engagement at addressing important regional and global challenges related to the environmental and the sustainable use of natural resources. The Center helps to connect its over 175 faculty affiliate members from across departments and disciplines to work on sustainability challenges, it supports innovative projects, and increases the impact of Purdue's work on important environmental issues through outreach and stakeholder engagement activities. The Center is especially focused on supporting efforts to address three overlapping aspects of the environmental challenges facing the world today: challenges to ecosystem functioning, environmental challenges to community health and well-being, and environmental decision-making and behavior. By emphasizing the deep connection between human society and the ecosystems that support us, the Center seeks more promising solutions to environmental challenges than those that focus exclusively on technical or scientific fixes, or on social, political, or economic considerations in isolation.

Filley is the co-director and lead principal investigator of the Nexus Institute for Sustainable Food, Energy, Water and the Environment (The Nexus) - <https://www.purdue.edu/discoverypark/arequipa-nexus/en/index.php>. The Nexus is a technical and research alliance program between Purdue University and the Universidad Nacional de San Agustín (UNSA) in the Arequipa region of Peru. The Nexus Institute supports a collaborative research, education and innovation ecosystem where transformative

solutions to challenges faced by Arequipa, Peru, and Latin America are explored. It aims to understand the region's food, energy and water production and delivery systems in the context of the complex socio-economic-environmental challenges Arequipa faces such as a changing climate, diminishing resources, a legacy of environmental degradation, and diverse communities striving for prosperity and security. The C4E is the administrative home and the collaborative link to UNSA. Over 60 Purdue faculty spanning 7 colleges, 100 UNSA faculty, and 30 postdoctoral researchers are supported with this effort.

Filley is co-director of the [Purdue Stable Isotope Instrumentation](#) (PSI) facility within the Department of Earth, Atmospheric, and Planetary Sciences. PSI is a core Purdue University instrumentation facility specializing in analytical services utilizing light stable isotope mass spectrometry for analysis of  $^1\text{H}$ ,  $^2\text{H}$ ,  $^{13}\text{C}$ ,  $^{12}\text{C}$ ,  $^{16}\text{O}$ ,  $^{17}\text{O}$ ,  $^{18}\text{O}$ ,  $^{14}\text{N}$ ,  $^{15}\text{N}$  in a variety of natural and synthetic materials. The lab primarily focuses on stable isotope measurements in environmental samples including water, soil, plant tissue, atmospheric particles, and specific chemical compound classes such as lipids, lignin, carbohydrates, and amino acids. The facility includes four magnetic sector, electron impact isotope ratio mass spectrometers with a variety of sample introduction peripherals, three quadrupole gas chromatography mass spectrometers, and two laser-based isotope monitoring systems. The lab services Purdue University faculty and external clients.

### Publication Summary

Google Scholar Citation Report (as of February, 2021): **h-index 41, i10 = 90, 7522 citations**

<sup>P</sup> = Post-doc in Filley's group; <sup>U</sup> = undergraduate researcher in Filley's group; underlined = Graduate students in Filley's group; \* = Visiting scholars in Filley's group

- 112) Blair, N., Bettis III, E.A., Filley, T.R., Moravek, J., Papanicolaou, A.N., Ward, A.S., Wilson, C.G., Zhou, N., Kazmierczak, B., Kim, J., The Spatiotemporal Evolution of Storm Pulse Particulate Organic Carbon in a Low Gradient, Agriculturally Dominated Watershed. *Frontiers in Water* 3, 9 (In Press)
- 111) Waimin, J., Jiang, H., Detwiler, D.A., <sup>P</sup>Jimenez-Castaneda, M.E., Mutlu, Z., Cakmak, M., **Filley, T.R.**, Rahimi, R. (2021) Noninvasive assessment of microbial activity by real time monitoring degradation of cellulose acetate via electrochemical impedance measurement. *Sensors & Actuators: A. Physical* (In Press)
- 110) Hou, T., **Filley, T.R.**, Tong, Y., Abban, B.K., Singh, S., Papanicolaou, A.T., Wacha, K.M., Wilson, and C.G., Chaubey, I. (2021) Tillage-induced surface soil roughness controls the chemistry and physics of eroded particles at early erosion stage. *Soil and Tillage Research*, (207, 104807).
- 109) <sup>P</sup>Ramson, J., León-Salas, W.D., <sup>P</sup>Brecheisen, Z., <sup>P</sup>Foster, E.F., Johnston, C.T., Schulze, D.G., Filley, T.R., Rahimi, R., Villalta Soto, M., Lopa Bolivar, J., Postigo Málaga, M. (2021) A Self-Powered, Real-Time, LoRaWAN IoT-based Soil Health Monitoring System. *IEEE Internet of Things Journal* 10.1109/JIOT.2021.3056586
- 108) <sup>P</sup>Brecheisen, Z., Hamp-Adams, N., Tomasek, A., <sup>P</sup>Foster, E.J., **Filley, T.R.**, Villalta Soto, M., Zuniga, L., Lima Moraes, A., Schulze, D.G. (2021) Using Remote Sensing to Discover Historic Context of Human-Environmental Water Resource Dynamics. *Journal of Contemporary Water Research & Education* 171 (1), 74-92
- 107) \*Li, M., <sup>P</sup>Foster, E.J., Le, P.V.V., Yan, Q., Stumpf, A., Hou, T., Papanicolaou, ANT., Wacha, K.M., Wilson, C.G., Wang, J., Kumar, P., **Filley, T.R.** (2020) A new dynamic wetness index predicts soil moisture persistence and correlates with key indicators of surface soil geochemistry. *Geoderma* 368, 114239.
- 106) Ding, X., Chen, S., Zhang, B., He, H., **Filley, T.R.**, Horwath, W.R. (2020) Warming yields distinct accumulation patterns of microbial residues in dry and wet alpine grasslands on the Qinghai-Tibetan Plateau. *Biology and Fertility of Soils* 56, 881-892.

- 105) Wacha, K.M., Papanicolaou, A.N.T., Abban, B.K., Wilson, C.G., Giannopoulos, C.P., Hou, T., **Filley, T.R.**, Hatfield, J. (2020) The impact of tillage row orientation on physical and chemical sediment enrichment. *Agrosystems, Geosciences & Environment* 3 (1), e20007
- 104) \*Jin, X., Gall, A.R., Saeed, M.F., Li, S., **Filley, T.R.**, Wang, J. (2020) Plastic film mulching and nitrogen fertilization enhance the conversion of newly-added maize straw to water-soluble organic carbon. *Soil and Tillage Research* 197, 104527
- 103) Li, Z., Wang, D., Dai, H., Wang, X., Liang, S., Xu, J., Yang, J., Wang, L., **Filley, T.R.** et. al, (2020) Background and Research Prospect of Geo-ecological Survey and Monitor in the Critical Zone of Black Soil. *Acta Geologica Sinica-English Edition* 93 (S3), 126-129
- 102) \*Ding, X., \*Zhang, B., Wei, Z., He, H., **Filley, T.R.** (2019) Conversion of grassland into cropland affects microbial residue carbon retention in both surface and subsurface soils of a temperate agroecosystem. *Biology and Fertility of Soils*, 65, 137-143.
- 101) Nierop, K., Versteegh, G., **Filley, T.R.**, de Leeuw, J. (2019) Quantitative analysis of diverse sporomorph-derived sporopollenins. *Phytochemistry*, 162, 207-215.
- 100) Ceja-Navarro, J., Karaoz, Bill, M., Hao, Z., White, R., Arellano, A., Ramanculova, L., **Filley, T.R.**, **Berry, T.**, Conrad, M., Blackwell, M., Nicora, C., Kim, Y-M., Reardon, P., Lipton, M., Adkins, J., Pett-Ridge, J., Brodie, E. (2019) Gut anatomical properties and microbial functional assembly promote lignocellulose deconstruction and colony subsistence of a wood-feeding beetle. *Nature-Microbiology* 4(5), 864.
- 99) Ma, Y., Szlavecz, K., McCormick, K., **Filley, T.R.** (2019) Controls on soil organic carbon stability and temperature sensitivity with increased aboveground litter input in deciduous forests at different forest ages. *Soil Biology & Biochemistry* 134, 90-99.
- 98) \*Ding, X., Zhang, B., **Filley, T.R.**, Tian, C., Zhang, X., He, H., (2019) Changes of microbial residues after wetland cultivation and restoration. *Biology and Fertility of Soils* 55, 405-409.
- 97) Yan, Q. Le, P.V.V., Woo, D.K., Hou, T., **Filley, T.R.**, Kumar, P. (2019) 3-D Modeling of the Co-evolution of Landscape and Soil Organic Carbon. *Water Resources Research*, 55, 1218-1241.
- 96) Wacha, K., Papanicolaou, T., Giannopoulos, C., Abban, B., Wilson, C., Zhou, S., Hatfield, J., **Filley, T.R.**, Hou, T. (2018) The Role of Hydraulic Connectivity and Management on Soil Aggregate Size and Stability in the Clear Creek Watershed, Iowa. *Geosciences* 8 (12), 470.
- 95) Gibson, C., Hatton P.J., Bird, J.A., Nadelhoffer, K.J., Ward, C., Stark, R., **Filley, T.R.** (2018) Interacting Controls of Pyrolysis Temperature and Plant Taxa on the Degradability of PyOM in Fire-Prone Northern Temperate Forest. *Soil Systems* 2 (3), 48.
- 94) Kumar, P., Le, P., Papanicolaou, T., Rhoads, B., Anders, A., Stumpf, A., Wilson, C., Bettis, E., Ward, A., **Filley, T.R.**, Lin, H., Keefer, L., Keefer, D., Lin, Y.F., Muste, M. Royer, T., Fofoula-Georgiou, E., Belmont, P., Blair, N. (2018) Critical Transition in Critical Zone of Intensively Managed Landscapes. *Anthropocene* 22, 10-19.
- 93) Hou, T., Berry, T., Singh, S., Hughes, M<sup>U</sup>, Tong, Y., Papanicolaou, T., Wacha, K., Wilson, C., Chaubey, I., **Filley, T.R.** (2018) Control of tillage disturbance on the chemistry and proportion of raindrop-liberated particles from soil aggregates *Geoderma* 330, 19-29.
- 92) Szlavecz, K. Chang, C.H., Bernard, M.J., Pitz, S.L., Ma, Y., McCormick, M.K., **Filley, T.R.**, Yarwood, S.A., Yesilonis, I.D., Csuzdi, C. (2018) Litter quality, dispersal and invasion drive earthworm community dynamics and forest soil development. *Oecologia* 1-14.
- 91) Gibson, C., Hatton P.J., Bird, J.A., Nadelhoffer, K.J., Le Moine, J., **Filley, T.R.** (2018) Tree taxa and pyrolysis temperature interact to control pyrogenic organic matter induced native soil organic carbon priming. *Soil Biology and Biochemistry*. 119, 174-183
- 90) Jin, X\*, An, T., Gall, A.R., Li, S., **Filley, T.R.**, Wang, J. (2018) Enhanced conversion of newly-added maize straw to soil microbial biomass C under plastic film mulching and organic manure management. *Geoderma*. 313, 154-162
- 89) De Oliveira, S.A., Camberato, J.j., Coram, T., **Filley, T.R.**, Vyn, T.J. (2017) Applicability of a multi-stage pulse-labeling <sup>15</sup>N approach to phenotype N dynamics in maize plant components during the growing season. *Frontiers in Plant Science* 8, 1360.
- 88) Baskaran, M., Bianchi, T.S., **Filley, T.R.** (2017) Inconsistencies between <sup>14</sup>C and

- short-lived radionuclides-based sediment accumulation rates: Effects of long-term remineralization. *Journal of Environmental Radioactivity*. 174, 10-16.  
<http://dx.doi.org/10.1016/j.jenvrad.2016.07.028>.
- 87) Wang, R\*, Gibson, C., Berry, T.D., Jiang, Y., Bird, J.A., **Filley, T.R.** (2017) Photooxidation of pyrogenic organic matter reduces its reactive, labile C pool and the apparent soil oxidative microbial enzyme response. *Geoderma* 293, 10–18.
  - 86) Ding, X\*, Qiao, Y., **Filley, T.**, Wang, H., Lü, X., Zhang, B\*, Wang, J (2017) Long-term changes in land use impact the accumulation of microbial residues in the particle-size fractions of a Mollisol. *Biology and Fertility of Soils*, 53, 281-286.
  - 85) Berry, T.D., **Filley, T.R.**, Clavijo, A.P., Bischoff, M., Turco, R.F. (2017) Degradation and Microbial Uptake of C60 Fullerenes in Contrasting Agricultural Soils. *Environmental Science & Technology* 51, 1387-1394.
  - 84) Liu, Y., Wang, P., Li, L., Cheng, K., Zheng, J\*, **Filley, T.R.**, Zhang, X., Zheng, J., Pan, G. (2016) Microbial activity promoted with organic carbon accumulation in macroaggregates of paddy soils under long-term rice cultivation. *Biogeosciences* 13 (24) 6565. doi:10.5194/bg-2016-40.
  - 83) Hatton P.J., Chatterjee, S., **Filley, T.R.**, Dastmalchi, K., Plante, A.F., Abiven, S., Gao, X., Masiello, C.A., Leavitt, S., Nadelhoffer, K.J., Stark, R. E., Bird, J.A. (2016) Tree taxa and pyrolysis temperature interact to control the efficacy of pyrogenic organic matter formation. *Biogeochemistry*. 130 (1-2), 103-116.
  - 82) Kaal J. and **Filley, T.R.** (2016) Novel molecular proxies for inferring pyrogenic black carbon oxidation state using thermally assisted hydrolysis and methylation (THM-GC-MS) with <sup>13</sup>C-labeled tetramethylammonium hydroxide (TMAH). *Journal of Analytical and Applied Pyrolysis*. 121 146-154.
  - 81) Creamer, C.A., **Filley, T.R.**, Boutton T.W., Rowe H.I. (2016) Grassland to woodland transitions: dynamic response of microbial community structure and carbon use patterns. *Journal of Geophysical Research: Biogeosciences*. 121(6) 1675-1688.  
**DOI:** 10.1002/2016JG003347
  - 80) Rose, C., Polissar, P., Tierney, J., **Filley, T.R.**, de Menocal, P. (2016) Changes in Northeast African Hydrology and Vegetation Associated with Pliocene-Pleistocene Sapropel Cycles. *Phil. Trans. R. Soc. B* 371 (1698), 20150243
  - 79) DeMarco, J\*, **Filley, T.R.**, and Throop, H.L. (2016) Patterns of woody plant derived soil carbon losses and persistence after brush management in a semi-arid grassland. *Plant and Soil*, 1-17. 277-293.
  - 78) Berry, T.D., Clavijo, A.P., Zhao, Y., Jafvert, C.T., Turco, R.F., **Filley, T.R.** (2016) Soil microbial response to photo-degraded C60 fullerenes. *Environmental Pollution*. 211, 338-345.
  - 77) Zhang, D., Yan, M., Niu, Y., Liu, X., van Zwieten, L., Chen, D., Bian, R., Cheng, K., Li, L., Joseph, S., Zheng, J., Zhang, X., Zheng, J\*, Crowley, D., **Filley, T.**, Pan, G. (2016) Is current biochar research addressing global soil constraints for sustainable agriculture? *Agriculture, Ecosystems & Environment* 226, 25-32
  - 76) Wang, J.Q., Liu, X.Y., Zhang, X.H., Smith, P., Li, L.Q., **Filley, T.R.**, Cheng, K., Shen, M.X., He, Y.B., Pan, G.X., (2016) Size and variability of crop productivity both impacted by CO<sub>2</sub> enrichment and warming—a case study of 4 year field experiment in a Chinese paddy. *Agriculture, Ecosystems and Environment*. 221, 40-49.
  - 75) Gibson, C., Berry, T.D., Wang, R\*, Spencer, J.A., Johnston, C.T., Jiang, Y., Bird, J.A., **Filley, T.R.** (2016) Weathering of pyrogenic organic matter induces fungal oxidative enzyme response in single culture inoculation experiments. *Organic Geochemistry*, 32-41. DOI: 10.1016/j.orggeochem.2015.12.003
  - 74) Chang, C.H., Szlavecz, K., **Filley, T.R.**, Buyer, J.S., Bernard, M.J., and Pitz S.L. (2015) Belowground competition among invading detritivores. *Ecology*.  
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  - 73) Papanicolaou, A. N. (T.), Wacha, K.M., Abban, B.K., Wilson, C.G., Hatfield, J., Stanier, C., and **Filley, T.R.** (2015) From soils to landscapes: A landscape oriented approach to simulate soil

- organic carbon dynamics in intensively managed landscapes, *J. Geophys. Res. Biogeosci.*, 120 (11), 2375-2401. doi:10.1002/ 2015JG003078.
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  - 70). Sarkar, A\*, **Filley, T.R.** Bera, R. (2015) Carbon isotopic composition of lignin biomarkers: Evidence of grassland over the Gangetic plain during LGM. *Quaternary International* 355, 194-201.
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  - 28). **Filley, T.R.**, McCormick, M.K., Crow, S.E.<sup>P</sup>, Szlavecz, K.E. Whigham, D.F., Johnston, C.T., van den Heuvel, R. (2008) Comparison of the chemical alteration trajectory of *Liriodendron tulipifera* L. leaf litter among forests with different earthworm abundance. *Journal of Geophysical Research:Biogeosciences* 113, G01027, doi:10.1029/2007JG000542.
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- 16). Dalzell, B.J., **Filley, T.R.**, Harbor, J.M. (2005) Flood pulse influences on terrestrial organic matter export from an agricultural watershed. *Journal of Geophysical Research: Biogeosciences*,
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- 11). **Filley, T.R.** (2003) Assessment of fungal wood decay by lignin analysis using tetramethylammonium hydroxide (TMAH) and C-13-labeled TMAH thermochemolysis In: *Wood Deterioration and Preservation-Advances in our Changing World*. Editors: Goodell B; Nicholas DD; Schultz TP, ACS SYMPOSIUM SERIES: 845, 119-139.
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- 5). Cody, G.D., Boctor, N.Z., **Filley, T.R.**, et al. (2000) Primordial carbonylated iron-sulfur compounds and the synthesis of pyruvate. *Science*. 289, 1337-1340.
- 4). **Filley, T.R.**, Hatcher, P.G., Shortle, W.C., et al. (2000) The application of C-13-labeled tetramethylammonium hydroxide (C-13-TMAH) thermochemolysis to the study of fungal degradation of wood. *Organic Geochemistry*, 31, 181-198.
- 3). **Filley, T.R.**, Minard, R.D., Hatcher, P.G. (1999) Tetramethylammonium hydroxide (TMAH) thermochemolysis: proposed mechanisms based upon the application of C-13-labeled TMAH to a synthetic model lignin dimer. *Organic Geochemistry*, 30, 607-621.
- 2). **Filley, T.R.**, Filley, R.M., Eser, S., Freeman, K. (1997) Compound-specific isotope analyses of products from carbonization of a fluid catalytic cracking decant oil doped with C-13-enriched 4-methyldibenzothiophene. *Energy and Fuels*, 11, 637-646
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## Reports and Briefs

Aines, R., Amador, G., Bennett, D., Cave, E., Chen, W., Dipple, G., Field, J., Filley, T., Friedmann, S., Funk, J., Jacobson, R., Kelemen, P., Lackjner, K., Lehmann, J., Levy, C., Lucas, M., Matchett, K., McCarty, J., Mooney, S., Neale, N., Park, A.A., Pett-Ridge, J., Powell, P., Sanchez, D., Song, C., Stechel, E., Sun, N., Swan, A., Wilcox, J., Woodbury, P., Zelikova, J (2018) [Building A New Carbon Economy: An Innovation Plan](#). *A Product of the New Carbon Economy Consortia*

## Graduate Student and Postdoctoral Researchers Advised

Serving/served as major professor or co-major professor

### Graduate Students

Dr. Brent Dalzell, PhD 2005

Ms. Wang Yang, MS 2005 (co-advised with Yuch Ning Shieh.)

Mr. Keith Crooker, MS 2006

Ms. Katie Schreiner, MS 2009

Dr. Courtney Creamer, PhD 2012

Dr. Yini Ma, PhD 2013

Dr. Sara Top, PhD 2013

Ms. Olivia Miller, MS 2014

Dr. Timothy Berry, PhD 2016

Dr. Ruzhen Wang, PhD 2015 (co-advised with Yong Jiang, Institute of Applied Ecology, Chinese Academy of Sciences)

Dr. Nana Wu, PhD 2014 (co-advised with Prof. Edith Bai, Institute of Applied Ecology, Chinese Academy of Sciences)

Dr. Yuanyuan Li, PhD 2015 (co-advised with Prof Dong Shikui, Beijing Normal University)

Dr. Christy Gibson, PhD 2017

Ms. Ming Li, 2014-present (co-advised with Prof Jingkuan Wang, Shenyang Agricultural University)

Ms. Ulyssa Hester, MS 2017

Mr. Jake Kastenbauer, MS 2020

Ms. Lucia Zuniga, MS 2020

Ms. Tingyu Hou, PhD 2017-present  
Mr. Gordon MacLeod, PhD 2018-present

### **Postdoctoral Researchers**

Dr. Karl Dria, 2004-2005  
Dr. Mi-Youn Ahn, 2005-2006  
Dr. Susan Crow, 2006-2007  
Dr Tim Berry, 2016  
Dr. Christy Gibson, 2017-2018  
Dr. Erika Forster, 2018-present  
Dr Alexander Ccancapa, 2019  
Dr. Martha Jimenez, 2019-present

### **Summary of Extramural Funding**

Since coming to Purdue Dr. Filley and colleagues have generated over \$25,000,000 for 25 research projects from a number of different funding sources including DOE, EPA, USDA, NSF, as well as international agencies, and industry. These projects were highly collaborative efforts both within Purdue and with prestigious institutions from around the U.S.

### **Current Research Support**

1. *CINET – Critical Interfaces Network*. 9/2020 – 8/2025. \$455,000/\$5,500,000 National Science Foundation. Multi University Grant. (Filley-Purdue PI), with Lisa Welp (Purdue CoPI) in a consortium of 8 universities, Praveen Kumar (Univ. of Illinois Campaign, Lead PI).
2. *Arequipa Nexus Institute for Food, Energy, Water and the Environment*. 1/2018 -06/2021, \$14,400,000. Funded through the Peru Mining Canon as a cooperative technical alliance with the National University of Saint Augustin (UNSA), Arequipa, Peru. (T. Filley lead PI along with 21 CoPI and 38 collaborative investigators at Purdue).
3. *Critical Zone Observatory for Intensively Managed Landscapes (IML-CZO)*. 8/13-11/2021, \$560,000/\$5,000,000. National Science Foundation. Multi University Grant. (Filley-Purdue PI), with Indrajeet Chaubey (Purdue CoPI) in a consortium of 10 universities, Praveen Kumar (Univ. of Illinois Campaign, Lead PI).
4. *Revisiting an Old Invader: Unraveling Interactions Between Japanese Beetle and the Soil Environment*; USDA/NIFA. 5/1/18-4/30/21, \$455,000.00. (Filley-CoPI with Ron Turco, and Doug Richmond (PI).
5. *Upcycling Spent Railroad Ties into a Value-Added Biochar to Improve Water Quality*. 10/15/20 – 2/28/22, \$150,000. RR Consortia. Filley CoPI with Chad Javert, Cliff Johnston, Abby Engelberth (PI).

### **Completed Research Support**

6. *Collaborative Research: Linking the Chemical Structure of Black Carbon to its Biological Degradation and Transport Dynamics in a Northern Temperate Forest Soil*. 10/11-09/17,; \$406,506/\$1,300,00.00. National Science Foundation. (Filley Purdue PI) with K. Nadelhoffer (PI), J. Bird (PI).
7. *Collaborative Research: Investigating the Soil-Earthworm-Litter System Controls on the Stabilization of Organic Matter in Eastern Deciduous Forests*, 08/08 to 09/12, \$383,000/\$680,000. National Science Foundation. (Filley-Lead PI) with C. Johnston (CoPI), K. Szlavecz (PI), M. McCormick (PI).
8. Research Experience for Undergraduates (REU) Supplement to *Investigating the Soil-Earthworm-Litter System Controls on the Stabilization of Organic Matter in Eastern Deciduous Forests*, 06/10-05/12, \$25,000. National Science Foundation. (Filley-Lead PI).

9. *Acquisition of a Gas Chromatograph-Quadrupole Mass Spectrometer and Upgrade to an Existing Stable Isotope Mass Spectrometer for Continued Biogeochemical Research.* 06/09-06/10, \$188,209. National Science Foundation (Filley Lead PI).
10. *Lignin as a Facilitator, not a Barrier, during Saccharification by Brown Rot Fungi.* 09/08-08/12, \$158,000. USDA-DOE (Univ MN), (Filley-Co-PI) with R. Blanchette (CoPI), J. Schilling (PI).
11. Research Experience for Undergraduates (REU) Supplement to *Impacts of Vegetation Change on Stabilization and Microbial Accessibility of Soil Organic Matter.* 06/09-05/10, \$4,924. National Science Foundation (Filley-PI).
12. *Mentoring Native American Students for Success in Geoscience Graduate Programs.* 08/06 to 07/10, \$500,000. National Science Foundation. (Filley-Co-PI) with G. Parker (CoPI), P. Welle (CoPI), T. Kroeger (CoPI), S. Zurn-Birkhimer (PI).
13. *Collaborative Research: Impacts of Vegetation Change on the Stabilization and Microbial Accessibility of Organic Matter: A Microbiological, Isotopic, and Molecular Study.* 08/05 to 07/09, \$254,00/\$454,000. National Science Foundation. (Filley-Lead PI) with T. Boutton (CoPI).
14. *Key Role of Nitrogenous Compounds in Soil Organic Matter Stabilization via Interactions with Mineral Surfaces.* 08/05 to 07/08, \$91,885. United State Department of Agriculture / sub contract through Oregon State University. (Filley Co-PI) with K. Lajtha (CoPI), B. Caldwell (CoPI), M. Kramer (CoPI), C. Swanston (CoPI), M. Kleber (CoPI), P. Sollins (PI).
15. *Nanoscale Initiative Research Teams (NIRT): Response of Aquatic and Terrestrial Microorganisms to Carbon-Based Manufactured Nanoparticles.* 07/04 to 06/08, \$320,000/\$1,600,00. National Science Foundation. (Filley-Co-PI) with B. Applegate (CoPI), C. Jafvert (CoPI), R. Balanchette (CoPI), L. Nies (CoPI), R. Turco (PI).
16. *Understanding the survival microorganisms in tile drainage and surface water.* 09/04 to 08/06, \$110,000. United State Department of Agriculture. (Co-PI) with R. Turco (PI).
17. *Watershed Tracking of Allochthonous Organic Matter and Nutrients to Geist, Eagle, and Morse Reservoirs, Indiana, Sub project 5.* 10/04 to 01/06, \$33,000. Central Indiana Water Resources Partnership. (Filley-PI).
18. *Repercussion of Carbon Based Manufactured Nanoparticles on Microbial Processes in Environmental Systems.* 10/04 to 09/07, \$83,750. Environmental Protection Agency, (Filley Co-PI) with R. Turco (PI).
19. *Hydrologic and land use control on the nature and cycling of allochthonous organic carbon in mixed land use water sheds within Central Indiana.* 03/04 to 02/06, \$27,000. United States Geological Survey-Indiana Water Resources Research Center, (Filley PI).
20. *Collaborative Research: Orchid-fungal interactions - a system for testing hypothesis about the ecological role and distribution of mycorrhizal fungi in affecting plant distribution.* 09/03 to 07/06, \$100,000. National Science Foundation, (Filley Purdue PI) with M. McCormick (CoPI), D. Whigham (PI).
21. *Anaerobic Microbial Reductive Debromination of Polybrominated Diphenyl Ethers.* 09/02 to 09/06, \$94,000. Environmental Protection Agency, (Filley CoPI) with L. Nies (PI).
22. *Consortium for Agricultural Soils Mitigation of Greenhouse Gases - Purdue University Tasks 1, 2, 3 and 5.* 03/02 to 08/05, \$90,000. United State Department of Agriculture. (Filley CoPI) with R. Turco (Purdue PI) through Kansas State University.
23. *Environmental Photochemistry of Polybrominated Diphenylethers.* 10/02 to 09/06, \$67,000. Environmental Protection Agency. (Filley CoPI) with C Jafvert (PI).
24. *Role of Fungal Decomposition of Woody Tissue in the Sulfurization of Lignin in Sulfidic Sediments.* 6/02 to 6/04, \$35,000. American Chemical Society, (Filley PI).
25. *Wood Modification by Brown Rot Fungi.* 11/00 to 11/02, \$28,600. United State Department of Agriculture-sub contract to the University of Maine, (Filley CoPI) with B. Goodall (PI) and J. Jellison (CoPI).

### **Professional Affiliations**

Soil Science Society of America  
American Chemical Society  
American Geophysical Union

### **Service**

#### **Professional Organizations**

Facilitated the coordination of the joint meeting between The Geochemistry Division of the American Chemical Society and The Clay Minerals Society, New Orleans, LA, 2007.

Elected National Chair and Program Chair -Geochemistry Division of the American Chemical Society, 2007-2008.

Member of Editorial Board for Geochemical Transactions, Official Journal of the ACS Division of Geochemistry, 2008-2011.

### **Purdue University**

#### ***Discovery Park and University Service***

Provost's Academic Committee for Diversity and Inclusion, College of Science representative, Oct 2020-present.

Search Committee, EVPRP Director of Research Communication, Oct 2020-present.

COVID-19 Purdue Research Ramp-up Committee, Mar 2020-Jan 2021.

Co-Chair (with Bernie Engel). Giant Leaps Toward a Sustainable Economy & Planet: Innovate today for a sustainable tomorrow. Purdue 105<sup>th</sup> anniversary celebration, 2018-2019.

Director, Purdue Center for the Environment, 2019-present.

Acting Director, Purdue Center for the Environment, 2017-2018.

ESE graduate admission committee, 2017-present.

Purdue Center for the Environment Executive Committee, 2013-2017.

Purdue Director of the US-China EcoPartnership for Environmental Sustainability, 2012-2016.

ESE governance committee, 2008-2010.

Purdue Climate Change Research Center Executive Committee, 2004-2012.

Served on four faculty search committees for the Purdue Climate Change Research Center COALESCE joint-college hires, 2004-2009.

#### ***Department of Earth, Atmospheric, and Planetary Sciences***

EAPS Diversity, Equity, Inclusion Committee, 2020-present.

Environmental Geosciences Major Visioning Team, 2016-2018.

Chaired four successful EAPS faculty search committees (resulted in hires of N. Diffenbaugh, G. Michalski, G. Bowen, L. Welp) and served on three additional searches.

EAS Strategic Planning Committee, 2004, 2009, 2013, 2019.

Chair of EAPS Department Diversity Committee, 2011-2012.

EAS representative to the CIC Department Heads Meeting, 2009.

EAS Associate head, 2007-2010.

EAS Department Leadership team, 2007-2010.

EAS Graduate Committee Chair, 2007-2010.

EAS graduate committee, 2004-2010.

Outreach to educators: Volunteer participant in the Fall Purdue University Standards-Based Inquiry Workshop for grade 5-12 teachers, 2003-2005.

### ***College of Science***

CoS Faculty Council, 2017-2019.

CoS Faculty Council, 2011-2012.

CoS Faculty Diversity Committee, 2012.

College of Science Dean's Diversity Committee, 2005.

College of Science COALESCE Committee to review, cull, and merge 56 new focus area white papers, 2003.

Co-Authored Climate Change hiring initiative and the formation of the Purdue Climate Change Research Center, 2003.

Faculty representative to the College of Science Dean's Advisory Committee, 2003.

### **Scientific Community**

Inaugural Member of the New Carbon Economy Consortium, 2017-present.

NSF Isobank Working Group, 2019-present.

Member of the Committee of Environmental Director and Deans of the National Council of Science and the Arts, 2018-present (now Global Council for Science and the Environment).

Member of the NSF Critical Zone Observatory Network soil carbon group, 2015-2019.

AGU Session Co-Convener: B020: Comparative Organic Geochemistry of Soils and Aquatic Sediments: A New View in the 21<sup>st</sup> Century, Washington D.C., Dec 10-14, 2018.

AGU Session Co-Convener: B041E: Soil Carbon Dynamics at Broad Scales: Linking Mechanistic Knowledge to Broad-Scale Applications, New Orleans, LA., Dec 11-15, 2017.

Goldschmidt Conference Organic Geochemistry Co-organizer, Yokohama, Japan, June 26-July 1, 2016.

Organizing Co-Chair, Conference and Workshop on Critical Zone Science, Sustainability, and Services in a Changing World. Jointly organized by the USCEES and the cross-CZO Working Group on Organic Matter Dynamics, Purdue University, West Lafayette, IN, Oct 23-25, 2015.

Co-Organizer of a CUAHSI hands-on short course on the role of runoff and erosion on soil carbon stocks: from soilscales to landscapes, Purdue University, Oct 21-22, 2015.

Invited Participant, Sino-U.S. CZO Workshop, Guiyang, China, Oct. 6-7, 2015.

Scientific Committee, International Conferences on Biochar and Green Agriculture, April 14-18, 2015.

Co-Organizer, the U.S.-China Joint Ecopartnership Symposium on Land Use, Ecosystem Services, and Sustainable Development, HeFei China, Nov 16-18, 2014.

External Advisory Board Member of the Utah-Qinghai Ecopartnership, 2014-2016.

NSF Proposal Panel Member, Low Temperature Geochemistry and Geobiology, 2014, 2009, 2008.

Co-Organizer, symposium entitled “Environmental Fate and Reactivity of Highly Condensed Aromatic Carbon,” at 246<sup>th</sup> American Chemical Society National Meeting, Indianapolis, IN, Sept 2013.

Organizer, international workshop and symposium on “Opportunities and Challenges in US-China Intellectual Property Agreements” at the 246th National Meeting of the American-Chemical-Society, Indianapolis, IN, Sept 08-12, 2013.

NSF Proposal Panel Member, Ecosystems (Division of Environmental Biology), 2012, 2013.

Co-Organizer, The U.S.-China Joint Ecopartnership Symposium on Land Use, Ecosystem Services, and Sustainable Development, Gatlinburg, TN, Nov 16-18, 2013.

AGU session Co-Organizer, symposium on Dryland Biogeochemistry, San Francisco, CA, December 2012.

Co-Organizer - The U.S.-China Joint Ecopartnership Symposium on Land Use, Ecosystem Services, and Sustainable Development, Shenyang China, Sep 7 17-20, 2012.

Invited workshop participant on the biogeochemical applications of moving wire 14C AMS technology, Lawrence Livermore National Laboratory, Feb 8-10, 2012.

Invited participant in the European Cooperation in Science and Technology (COST) workshop on Stable Isotopes in Biosphere-Atmosphere-Earth System Research (SIBAE). Ghent, Belgium. Working group III. June 21-22, 2012.

Editor, Chicago Wilderness Climate Action plan, Sept 2011.

NSF Workshop committee member; committee to outline future research initiatives for the NSF Geobiology and Low Temperature Geochemistry Program (G&G), August 2010.

Presenter, Rotary Club World Congress, Climate Change Lecture and Discussion, March 2008.

NSF Carbon and Water Proposal Panel Member, 2007.



Guest editor (with Tom Boutton) of a special issue of *Soil Biology and Biochemistry* “Ecosystems in Flux: Molecular and Isotopic Indicators of Soil Organic Matter Dynamics,” Vol 38, 2006.

Co-organizer of an international conference on the “Mechanisms of Organic Matter Stabilization and Destabilization in Soils,” Asilomar Conference Center in Monterey, CA, October 9-13, 2005.

Invited participant in the development of the Great Lakes and Central States Ecological Session Organizer-fall American Geophysical Union Fall Meeting (2004). Co-organized (with Tom Boutton, Texas A&M) and chaired a session on “Ecosystems in Flux: Molecular and Isotopic Indicators of Soil Organic Matter Dynamics.”

Participant in planning session for the Great Lakes and Central US Ecological Observatory (GLACEO), a NEON infrastructure initiative. Presented and led discussion on the needs associated with “*organic compound-specific stable isotope analysis in NEON.*” University of Michigan Biological Research Station. Oct 15-17, 2004.

Rapporteur, NCAR Biogeosciences Workshop on “Development of a Science Plan for Integrated Studies of Coupled Biosphere-Atmosphere Carbon and Nitrogen Cycles,” Boulder, CO, Nov 15-17, 2003.

Session Organizer at the American Chemical Society National, co-organized with John Hedges, University of Washington; chair of session on Terrestrial Biogeochemistry, San Diego, CA, 2001.

NASA proposal panel member: Round-2 NASA Astrobiology Institutes, Ames, CA, 2001.

### **Diversity-Related Activities**

College of Science representative on Provost’s Academic Committee for Diversity and Inclusion, Oct 2020-present.

Co-Chair of EAPS Department Recruitment and Outreach Committee, 2015-present.

Chair of EAPS Department Diversity Committee, 2011-2012.

Member Purdue College of Sciences Faculty Diversity Committee, 2012-2013.

Co-principal investigator of NSF STEM education related grant, “Mentoring Native American Students for Success in Geoscience Graduate Programs.” Mentored and taught Native American tribal college students soil ecological/chemical principles through field-based learning, 2006-2010.

Principal Investigator, NSF REU supplements to engage both African American and Native American students in STEM disciplines in laboratory and field-based learning, 2009-2010.

### **Visiting Scientists Hosted**

Professor NaNa Wu, Visiting Professor, Shenyang Jianzhu University, July 2019-July 2020.

Ms. Xiaoyu Peng, PhD student and Visiting Scholar, Northwest Agricultural and Forestry University, Dec 2017-Dec 2019.

Ms. Xinxin Jin, PhD student and Visiting Scholar, Shenyang Agricultural University, Oct 2016-Feb 2018.

Ms. Wang Xin, PhD student and Visiting Scholar, Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, Dec 2017-Dec 2018.

Professor Jufeng Zheng, EcoPartnership Visiting Scholar in the IML-CZO, Nanjing Agricultural

University, Oct 2015-Oct 2016.

Ms. Ming Li, PhD student and EcoPartnership Visiting Scholar in the IML-CZO, Shenyang Agricultural University, Oct 2015-Oct 2017.

Professor Ge TiDa, EcoPartnership Visiting Scholar, Institute of Subtropical Agriculture, Chinese Academy of Sciences, Mar 2015-Mar 2016.

Professor Yun Zhang, EcoPartnership Visiting Scholar in the IML-CZO, Shenyang Agricultural University, Sept 2014-Sept 2015.

Professor Na Yu, EcoPartnership Visiting Scholar in the IML-CZO, Shenyang Agricultural University, Sept 2014 - Sept 2015.

Ms. Tingyu Hou, PhD student and EcoPartnership Visiting Scholar in the IML-CZO, Northwest Agriculture and Forestry University, Sept 2014-Sept 2016.

Ms. Nana Wu PhD, PhD student and EcoPartnership Visiting Scholar, Institute of Applied Ecology, Chinese Academy of Sciences, Aug 2012-Aug 2013.

Ms. Yuanyuan Li, PhD student and EcoPartnership Visiting Scholar, Department of Environmental Sciences, Beijing Normal University, Sept 2013-Sept 2014.

Mr. Li Bo, EcoPartnership Visiting Scholar. PhD student, Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, Mar 2013-Mar 2014.

Mr. Ruzhen Wang, PhD student and EcoPartnership Visiting Scholar, Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, May 2012-Aug 2013.

Professor Shenjun Qin, EcoPartnership Visiting Professor, Hebei University of Engineering, Mar 2013-Feb 2014.

Dr. Jennie DeMarco, Postdoctoral Research Associate, Department of Biology at New Mexico State University, Summer 2012.

Professor Anindya Sarkar, Dept. of Geology IIT Kharagpur, India, sabbatical stay in Filley Lab, Feb-Sept 2010.

Professor Joyanto Routh, Dept of Geology and Geochemistry, Stockholm University Stockholm, Sweden, Mar-Apr 2009.

Professor Akiko Nagawa-Izumi, Tsukuba University, sabbatical stay in Filley Lab, Jun 2007-Mar 2008.

Professor Tom Boutton, Texas A&M, sabbatical stay in Filley Lab, Aug 2006-Dec 2006.

Dr. David Bielman, Postdoctoral Scientist, University Southern California, Dept. Geography, Summer 2007.

Dr. Klaas Nierop, Research Scientist, University of Amsterdam, Department of Geography, Apr 2004.

Dr. Katherine Ficken, Research Scientist, University of Wales, Department of Geography, Feb 2004.

Ms. Susan Crow, PhD student, Soils-Oregon State University, Sept 2006.

Dr. Jennifer Boeckman, Research Scientist, National Soil Tilth Lab, Aug 2003.

Ms. Felicity Ku, PhD student, Taiwan National University, Geology, 2002-2003.

In addition, scientists from biogeochemistry programs at Open University, UK; New Castle on Tyne, UK; the National Isotope Center, New Zealand; University of Poitiers, France; University of Amsterdam, Netherlands; Tsukuba University, Japan; and Colorado State University, CO, have been trained in the application of  $^{13}\text{C}$  TMAH thermochemolysis and alkaline CuO oxidation for lignin extraction from leaf litter, soils, and sediment.