

**Linda S. Lee**

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**Education:** B.S. Chemistry (1983), M.S. Environmental Engineering Sciences (1989), Ph.D. Soil Chemistry & Contaminant Hydrology (1993), University of Florida

**Academic Appointments**

2022 - present	Distinguished Professor
2021- current	COA Assistant Dean of Graduate Education & Research
2021- present	Professor, Division of Environmental Ecological Engineering
2011- 2018	Associate Head, Department of Agronomy
2006 - present	Head, Ecological Sciences & Engineering Interdisciplinary Graduate Program
2011 - present	Courtesy Faculty appointment, Division of Environmental Ecological Engineering
2013 - present	Purdue Center for the Environment Executive Board
2010 - 2017	Purdue Water Community Executive Committee
2005 - 2010	Associate Director, Discovery Park Center for the Environment
2006 - 2010	Pre-Environmental Studies Program, Chair (2006-07AY); Co-Chair (2007-09AY)
2001 - present	Professor, Purdue University, Department of Agronomy
1997 - 2001	Associate Professor, Purdue University, Department of Agronomy
1993 - 1997	Assistant Professor, Purdue University, Department of Agronomy
1989 - 1993	Senior Chemist, University of Florida, Soil & Water Science Department
1988-1989	Chemist III, University of Florida, Soil & Water Science Department
1984-1988	Chemist, University of Florida, Soil & Water Science Department

**Awards and Honors:** Chemist Certification, American Chemical Society (ACS, 1984); Frederick B. Smith Scholarship, U. of Florida (1991); Certificate of Merit, ACS (1991); U. of Florida Sigma Xi Graduate Student Research Award (1992); Award for Excellence in Grad. Studies, Soil & Water Science, University of Florida (1993); Emil Truog Award for Best Doctoral Dissertation, Soil Science Society of America (1994); Gamma Sigma Delta Research Award of Merit (2001); Purdue University Faculty Scholar (2001-2006); SSAJ Citation for Excellence in Manuscript Review (2003); ASA Fellow (2003); SSSA Fellow (2004); Outstanding Assoc. Editor for J. of Environ. Quality (2004); Gamma Sigma Delta Award of Merit in Research & Teaching (2005); Outstanding Graduate Educator in Agronomy (2008, 2009, 2010); Purdue Graduate Student Government Faculty Mentor Award (2012); ES&T Excellence in Review Award (2014). COA Outstanding Graduate Educator (2015); Agriculture's First Unsung Diversity Hero Diversity InFocus Highlight (2016); Purdue Seed for Success (2017, 2018, 2019, 2020, 2023); Faculty Unsung Diversity Hero (2021); #Purdue Women Highlighted (2021); 2020 JHM Editor-selected Paper of the Year; 2021 ASA Environmental Quality Research Award; 2023 SSSA Diversity Trailblazer Presidential Award; 2024 ASA Mentoring Award.

**Editorial Boards/National Committees.** Soils and Human Health within Frontiers in Soil Science, Associate Editor (2021 – current); Associate Editor -Vadose Zone J. (2002-7); Associate Editor - J. Environ. Qual. (2003-6); W45 Mechanisms & Mitigation of Agrochemical Impacts on Human and Environ. Health (2000-5); W82/W1082/W2082 Evaluating the Physical and Biological Availability of Pesticides and Pharmaceuticals in Agricultural Contexts (1994-2013); Indiana Water Resources Research Center Faculty and External Advisory Committees; National Council of Science and the Environment (NCSE) (2005-2010); Council of Deans and Director (CEDD) (2005-2010); Livestock & Poultry Expert (LPE) Pharmaceutical Expert Team (2007-09); W2170/W3170/W4170 Beneficial Ruses of Residuals and Reclaimed Water: Impact on Soil Ecosystem and Human Health (2009-current); National Biosolids Data Project Advisor (2019-2023); EPA Science Advisory Board's Biosolids Panel (2022-2023).

**Representative Expert Services:** EPA Expert Panel Member for Past, Present, and Future Research in the Area of Complex Mixtures (1993); Gas Remediation Institute Expert Panel Member for Environmentally Acceptable Endpoints (1996); Ecological Soil Screening Task Group on Soil Chemistry (Eco-SSLs) (1998-2003); EPA Peer Consultation PFOA Panel for Alabama Dow Site Evaluation (2008); EPA Peer Consultation PFOA Panel for the DuPont Washington Works Site Evaluation (2009); WERF/EPA Supplemental Scientist -Board Member for addressing Trace Organic Chemicals in Biosolids-Amended Soils (2010); Perfluorotelomer Biodegradation Supplemental Environmental Project External Evaluation Team (2010); Technical Panel, Geothermal Inc. Landfill, Management of Coal Combustion Products (2010); NRC Report Review Team (Future Options for Management in the Nation's Subsurface Remediation Effort, 2012); International Panel Member for Advising Australian Water Board; Expert Reviewer for CA Proposed Basin Plan Amendment to Adopt Total Maximum Daily Loads for Toxicity and Pesticides in the Santa Maria Watershed (2012); DuPont C-F Forum (2012-2013); Expert Peer Reviewer for the Proposed Adoption of Carpet and Rugs Containing Perfluoroalkyl or Polyfluoroalkyl Substances as a Priority Product (2019); Expert Peer Reviewer for Product – Chemical Profile for Treatments Containing Perfluoroalkyl or Polyfluoroalkyl Substances for Use on Converted Textiles or Leathers (2020); Expert Peer Reviewer for Product- Chemical Profile for Food Packaging Containing Perfluoroalkyl or 4Polyfluoroalkyl Substances (2021); Water Research Foundation 5107 Project Advisory Committee for “Understanding Pyrolysis for PFAS Removal” (2021-2023); Eastern Research Group Expert Reviewer for EPA’s draft report, Emerging Issues in Food Waste Management: Persistent Chemicals Report (2021); EPA Science Advisory Board: Biosolids Area (2021- 2023); National Academies Study Addressing PFAS on Agricultural Land (2024-2025).

**Research Advisory Roles:** Current Major Graduate Advisees: 6 PhD, 2 MS; Previous Major or co-Major Graduate Advisees: 21 PhD, 7 MS-Thesis, & 8 MS-nonthesis; Undergraduate Research Advisor: 23 previous, 7 current undergraduate research assistants; Postdoctoral Assoc. and Visiting Scientists (VS) sponsored: 20 previous, 5 current postdocs, one incoming VS Spring 2025.

### Patents

Ji, Yangyuan, Warsinger, D. Lee, L.S. Electric Field-Assisted Nanofiltration. 2024 Provisional patent in process.

Zenobio, J., Lee, L.S., Vecitis, C. Activated carbon supported NiFe nanoparticles for reductive transformation of perfluoroalkyl-containing compounds. Patent No. EUS 11,045,676 B2, June 29, 2021.

Xu, T., Lee, L.S., Nies, L.F., Seager, T. Decontaminating soils and sediments with zero-valent metal nanoparticles. Provisional Patent, Cosolvent-enhanced bimetal ZVI Remediation of PCB-contaminated Soils. Attorney Doc 12258-0105, Application 814562.

### Peer-reviewed Journal Papers (Nov. 2024)

Openiyi, E.O., Alukkal, C.R., Lee, L.S. 2024. Evaluating Sorbents for Reducing Per- and Polyfluoroalkyl Substance Mobility in Biosolids-Amended Soil Columns. *J. Environ. Qual.*, In press

Modiri, M., Sasi, P.C., Thompson, K.A., Lee, L.S., Khan, K., Marjanovic, K., Hystad, G, Norton, J. 2024. State of the Science and Regulatory Acceptability for PFAS Residual Management Options: PFAS Disposal or Destruction Options, *Chemosphere*, in press.

Bushong, A., M.S. Sepulveda, M. Scherer, A.C. Valachovic, C.M. Neill, S. Horn, Y.J. Choi, L.S. Lee, P. Baloni, T.D. Hoskins. 2024. Effects of perfluorinated alkyl substances (PFAS) on amphibian body and liver condition: Is lipid metabolism being perturbed throughout metamorphosis? *Toxics, Special Issue*, In press

Liao, S., Garza-Rubalcava, U., Abriola, L.M., Preisendanz, H.E., Lee, L.S., Pennell, K.D. 2024.

Simulating PFAS Transport in Effluent-Irrigated Farmland Using Modified PRZM5, LEACHM and Hydrus-1D Models. *J. Environ. Qual.*

<https://doi.org/10.1002/jeq2.20639>

- Alukkal, C.R., Modiri Gharehveran, M., Alvarez Ruiz, R, Choi, Y. and Lee, L.S. 2024. Evaluation of PFAS Extraction and Analysis Methods for Biosolids, *Talanta (In review)*.
- Alukkal, C. R., Lee, L. S. and Gonzalez, D. 2024. Understanding the impact of pre digestion thermal hydrolysis process on PFAS in anaerobically digested biosolids. *Chemosphere*, <https://doi.org/10.1016/j.chemosphere.2024.143406>
- Alukkal, C. R., Lee, L. S. and Staton, K. 2024. Per- and Polyfluoroalkyl Substances Behavior: Insights from Autothermal Thermophilic Aerobic Digestion - Storage Nitrification Denitrification Reactors. *Chemosphere*, <https://doi.org/10.1016/j.chemosphere.2024.143357>
- Álvarez-Ruiz, Rodrigo; Lee, Linda; Choi, Youn Jeong. 2024. PFAS Fate at a 40-year Dedicated Municipal Biosolids Land Disposal Site, *STOTEN*, <https://doi.org/10.1016/j.scitotenv.2024.176540>
- Peter, Lynda, Modiri-Gharehveran, M., Alvarez-Campos, O., Evanylo, G.K., Lee, L.S. 2024. PFAS Fate Using Lysimeters During Degraded Soil Reclamation Using Biosolids. *J. Environ. Qual.* <https://doi.org/10.1002/jeq2.20576>
- Coelho, P., Fitzgerald, G., Isaacson, K., Diop, R., Prabhakar, G., Heffner, S., Verma, A., Youngblood, J., Choi, Y., Surdyka, S., Spears, S. Frisbee, M.D., Del Real, K., Gustafson, L., Torrez, A.M., Proctor, C., Lee, L.S., Whitehead, H., Doudrick, K., Harpur, B., Whelton, A. 2023. Environmental and Private Property Contamination Following the Norfolk Southern Chemical Spill and Chemical Fires in Ohio, *Revision in process*.
- Wesley, F.R., Haskins, D., Hamilton, M., Choi, Y., de Perre, C., Sepúlveda, M. Lee, L.S., Hoverman, J., 2023. Trophic magnification and distribution of per-/polyfluoroalkyl substances (PFAS) in an AFFF-impacted aquatic food web. *Environ. Sci. & Tech.*, es-2023-093737, *Revision in process*.
- Lech, Melissa; Choi, Youn; Lee, Linda S.; Sepulveda, Maria; Hoverman, Jason, 2023. Assessing the combined effects of host and parasite exposure to forever chemicals in an amphibian-echinostome system. *Environ. Toxicol. and Chem.* <https://doi.org/10.1002/etc.5877>
- Nguyen, D., Stults, J., Devon, J., Novak, E., Lanza, H., Choi, Y., Lee, L.S., Schaefer, C.E. 2023. Removal of Per- and Polyfluoroalkyl Substances from Wastewater via Aerosol Capture. *Journal of Hazardous Materials*, <http://dx.doi.org/10.2139/ssrn.4610824>
- Pandelides, Z., Conder, J. , Choi, Y, Allmon, E., Hoskins, T., Lee, L.S., Hoverman, Jason, Sepúlveda, M. 2023. Critical Review of Amphibian Per- and Polyfluoroalkyl Substance Ecotoxicity Research Studies: Identification of Screening Levels in Water and Other Useful Resources for Site-Specific Ecological Risk Assessments, *Environ. Toxicol. and Chem.* <https://doi.org/10.1002/etc.5695>
- Liu, J., Edwards, E., Van Hamme, J., Manefield, M. Higgins, C.P., Blotvogel, J., Liu, Jinyong, Lee, L.S. 2023.2023. Correspondence on Defluorination of Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) by Acidimicrobium sp. Strain A6, *Enviro. Sci. & Tech.* 53 (19), 11410-11419
- Gravesen, C., Lee, L.S., Alukkal, C., Openiyi, E., Judy, J.D., 2023. Per and Polyfluoroalkyl Substances in Water Treatment Residuals: Occurrence and Desorption. *J. Environ. Quality*, 29 September 2023 <https://doi.org/10.1002/jeq2.20520>
- Wasel, Ola; King, Hanna; Choi, Youn; Lee, Linda; Freeman, Jennifer. 2023. Differential developmental neurotoxicity and tissue uptake of the PFAS alternatives, GenX and PFBS, *Environ. Sci. & Tech.*, 57(48): 19274-19284. <https://doi.org/10.1021/acs.est.3c05023>
- Schilling-Costello, Maria; Asad, Neelam; Haris, Muhammad; Bahambari, Peyman; Khan, Bushra; Lee, Linda. 2023. Reconnaissance Survey of Organic Contaminants of Emerging Concern in the Kabul and Swat Rivers of Pakistan, *Environ.Toxicol.Chem*, 42 (12), 2599-2613, <https://doi.org/10.1002/etc.5750>
- Barragan, Evelyn; Hoskins, Tyler; Allmon, Elizabeth; McQuigg, Jessica; Hamilton, Matthew; Christian, Erin; Coogan, Grace; Searle, Catherine; Choi, Youn; Lee, Linda; Hoverman, Jason; Sepúlveda, Maria. 2023. Toxicities of Legacy and Current Use PFAS in an Anuran: Do Larval Exposures Influence Responses to a Terrestrial Pathogen Challenge? *Environ. Sci.& Tech.*, 57(48):19180-19189, <https://doi.org/10.1021/acs.est.3c03191>

- Broadbent, Emma, Caleb Gravesen, Youn Choi, Linda S Lee, Patrick Wilson and Jonathan Judy. 2023. Effects of Drinking Water Treatment Residual Amendments to Biosolids on Plant Bioavailable Per- and Polyfluoroalkyl Substances, *J. Environ. Quality*, <https://doi.org/10.1002/jeq2.20511>
- Burcham, Lucy; Elizabeth B. Allmon, PhD; Meredith N. Scherer; Anna G. Bushong; Matthew T. Hamilton; Sini Macheri; Grace S. Coogan; Youn Choi; Linda S. Lee; Maria S. Sepúlveda. 2023. Does salinity mediate the toxicity of perfluorooctanesulfonic acid (PFOS) in an estuarine fish? *Ecotoxicology and Environmental Safety*, <http://dx.doi.org/10.2139/ssrn.4409246>
- Hoskins, Tyler; Flynn, R. Wesley; Coogan, Grace; Catlin, Ann; De Perre, Chloe; Modiri Gharehveran, Mahsa; Choi, Youn Jeong; Lee, Linda; Hoverman, Jason; Sepúlveda, Maria, 2023, Chronic Exposure to a PFAS Mixture Resembling AFFF-Impacted Surface Water Decreases Body Size in Northern Leopard Frogs (*Rana pipiens*), *Environ. Sci. & Tech.*, <https://doi.org/10.1021/acs.est.3c01118>
- Ganga M. Hettiarachchi, Linda S. Lee, Hui Li, Dominic Brose, Nicholas Basta, 2023, Translating Soil Science to Improve Human Health, *Frontiers in Environmental Science*, <https://doi.org/10.3389/fenvs.2023.1215416>
- Liu, Min; Munoz, Gabriel; Hermiston, Juliana; Zhang, Ju; Vo Duy, Sung; Wang, Dan; Dey, Anindya Sundar; Bottos, Eric; Van Hamme, Jonathan; Lee, Linda; Sauv , S bastien; Liu, Jinxia. 2023. High Persistence of Novel Polyfluoroalkyl Betaines in Aerobic Soils, *Environ. Sci & Technol.* 57, 19, 7442–7453. <https://doi.org/10.1021/acs.est.2c07395>
- Gravesen, C., Lee, L.S., Choi, Y., Silveira, M.L. C., Judy, J.D., 2023. PFAS Release from Wastewater Residuals as a Function of Composition and Production Practices, *Environmental Pollution*, 12116,7 <https://doi.org/10.1016/j.envpol.2023.121167>
- Ji, Y., Y. Choi, Y. Fang, H.S. Pham, A. T. Nou, LS Lee, J. Niu, and D.M. Warsinger. 2023. Electric field-assisted nanofiltration for PFOA removal with exceptional flux, selectivity, and destruction, *Environ. Sci & Technol.*, <https://doi.org/10.1021/acs.est.2c04874>
- Choi, Y., Lee, L.S., Hoskins, T.D., Modiri-Gharehveran, M., Sep lveda, M.S. 2023. Occurrence and Implications of Per and Polyfluoroalkyl Substances in Animal Feeds Used in Laboratory Toxicity Testing, *STOTEN*, <https://doi.org/10.1016/j.scitotenv.2023.161583>.
- Souza, A., Rojas, MZ, M., Yang, Y., Lee, L.S. Hoagland, L Classifying cadmium contaminated leafy vegetables using hyperspectral imaging and machine learning. *Heliyon*, <https://doi.org/10.1016/j.heliyon.2022.e12256>
- Lech, ME, YJ Choi, LS Lee, MS Sep lveda, JT Hoverman. 2022. Effects of Per-and Polyfluoroalkyl Substance Mixtures on the Susceptibility of Larval American Bullfrogs to Parasites, *Environmental Science & Technology*, <https://doi.org/10.1021/acs.est.2c04574>
- Hoskins, TD, EB Allmon, RW Flynn, LS Lee, Y Choi, JT Hoverman, MS Sep lveda. 2022. An Environmentally Relevant Mixture of PFOS and PFHxS Does Not Conform to Additivity in Northern Leopard Frogs Exposed Through Metamorphosis, *Environmental Toxicology and Chemistry*, <https://doi.org/10.1002/etc.5486>
- Judy, J.D., Gravesen, C., Wilson, P.C., Lee, L.S., Sarchapone, J., Hinz, F., Broadbent, E. 2022. Trophic transfer of PFAS from tomato (*Solanum lycopersicum*) to tobacco hornworm (*Manduca sexta*) caterpillars. *Environ Poll.* 310:119814. doi: 10.1016/j.envpol.2022.119814.
- Souza, A., Rojas, MZ., Yang, Y., Lee, L.S. Hoagland, L. 2022. Identifying cadmium contaminated leafy vegetables using hyperspectral imaging and machine learning. <http://dx.doi.org/10.2139/ssrn.4095061>
- Schaefer, C.E., Hooper, J., Modiri-Gharehveran, M., Drennan, D., Beecher, N. Lee, L.S. 2022. Release of poly- and perfluoroalkyl substances from finished biosolids in soil mesocosms. *Water Research*, 217:118405. <https://doi.org/10.1016/j.watres.2022.118405>
- Nixon, R., Zhao, M., Zanotti, L., Khan, B., Birkenholtz, T., Lee, L.S., Mian, I., 2022. Social influence shapes adaptive water governance: Empirical evidence from northwestern Pakistan. *Environmental Management, Ecology and Society*, <https://doi.org/10.5751/ES-13546-270337>

- Modiri-Gharehveran, M., Choi, Y. Zenobio, J.E., Lee, L.S. 2021. Perfluoroalkyl Acid Transformation and Mitigation by nNiFe-Activated Carbon Nanocomposites in Steady-state Flow Column Studies. *J. of Environ. Chemical Engineering*, 127, 678-687 <https://doi.org/10.1016/j.jece.2021.106901>
- Jones, Devin; Quinlin, Kathryn; Wigren, Maggie; Choi, Youn; Sepulveda, Maria; Lee, Linda; Haskins, David; Lotufo, Guilherme R.; Kennedy, Alan; May, Lauren; Harmon, Ashley; Biber, Thomas; Melby, Nicolas; Chanov, Michael; Hudson, Michelle; Key, Peter; Chung, Katy; Moore, David; Suski, Jamie; Wirth, Edward; Hoverman, Jason. Acute toxicity of 8 aqueous film-forming foams to 13 aquatic species, *Environ. Sci. & Technol.*, <https://doi.org/10.1021/acs.est.1c03776>.
- Flynn, RW, GM Hoover, M. Iacchetta, S. Guffey, C DePerre, B. Huerta, W. Li, J. Hoverman, LS Lee, M. Sepulveda. 2022. Comparative toxicity of aquatic PFAS exposure in three species of amphibians. *Environ. Toxicol. & Chemistry*. <https://doi.org/10.1002/etc.5319>
- Zea, M. Z, A. Souza, Y. Yang; L.S. Lee; K. Nemali, L. Hoagland. 2021. Leveraging high-throughput hyperspectral imaging technology to detect cadmium stress in two leafy green crops and accelerate soil remediation efforts. *Environ. Pollution*, <https://doi.org/10.1016/j.envpol.2021.118405>.
- Modiri-Gharehveran, M., Zenobio, J.E., Lee, L.S. 2021. Transformation and defluorination by nNiFe-activated carbon nanocomposites: PFAS structure and matrix effects. *J. of Environ. Chemical Engineering*, 9(6):106901 <https://doi.org/10.1016/j.jece.2021.106901>.
- Nixon, R., Z. Ma, B. Khan, T. Birkenholtz, L. S. Lee, I. Mian. 2021. Adaptation to Social-Ecological Change in Northwestern Pakistan: Household Strategies and Decision-making Processes, *Environmental Management*, <https://doi.org/10.1007/s00267-021-01583-7>.
- Guelfo, Jennifer L., S. Korzeniowski, M.A. Mills, J. Anderson, R. H. Anderson, J.A. Arblaster, J.M. Conder, I.T. Cousins, K. Dasu, B.J. Henry, LS. Lee, J. Liu, E. McKenzie, J. Willey. 2021. Environmental sources, chemistry, fate and transport of per- and polyfluoroalkyl substances: state of the science, key knowledge gaps, and recommendations presented at the August 2019 SETAC focus topic meeting. *Environ. Toxicol. & Chem.*, <https://doi.org/10.1002/etc.5182>
- Cheng, F.Y., H.E. Preisendanz, M.L. Mashtare, L.S. Lee, N.B. Basu, 2021. Nevertheless, they persisted: Can hyporheic zones increase the persistence of estrogens in streams? *Water Resources Research*, <https://doi.org/10.1029/2020WR028518>.
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- Flynn, R.; Hoskins, T.; Iacchetta, M.; De Perre, C.; Lee, L.S.; Hoverman, J.; Sepulveda, M.S. 2021. Dietary exposure and accumulation of per- and polyfluoroalkyl substances alters growth and reduces body condition of post-metamorphic salamanders. *Science of the Total Environ.*, 765:142730. <https://doi.org/10.1016/j.scitotenv.2020.142730>
- Wasel, O., Thompson, K.M., Gaob, Y., Godfrey, A.E., Gaob, J., Mahaptra, C., Lee, L.S., Sepúlveda, M.S., Freeman, J.L., Comparison of zebrafish in vitro and in vivo developmental toxicity assessments of perfluoroalkyl acids (PFAAs). 2020. *J. Toxicol. & Environ. Health A*, <https://doi.org/10.1080/15287394.2020.1842272>
- Foguth, R., Hoskins, T., Cali Clark, G., Nelson, M., Flynn, W., de Perre, C., Hoverman, J., Lee, L.S., Sepulveda, M., Cannon, J.R. 2020. Single and mixture per- and polyfluoroalkyl substances accumulate in developing Northern leopard frog brains and produce complex neurotransmission alterations. *Neurotoxicology and Teratology*, 81:106907. <https://doi.org/10.1016/j.ntt.2020.106907>
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- Abercrombie, S., de Perre, C., Iacchetta, M., Flynn, R., Sepulveda, M., Lee, L.S., Hoverman, J. 2020. Sublethal Effects of Dermal Exposure to Poly- and Perfluoroalkyl Substances on Post- Metamorphic Amphibians, *Environ. Toxicol. Chem.*, <https://doi.org/10.1002/etc.4711>

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- Lazcano-Kim, R., Choi, Y., Mashtare, M. Lee, L.S. 2020. Characterizing and Comparing Per- and Polyfluoroalkyl Substances in Commercially Available Biosolid and Nonbiosolid-based Organic Products. *Environ. Sci. Technol.* 54(14):8640-8648. <https://doi.org/10.1021/acs.est.9b07281>.
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- Sammi, S.R., Foguth, R.M., Nieves, C.S., De Perre, C., Wipf, P., McMurray, C.T., Lee, L.S., Cannon, J.R. 2019. Perfluorooctanesulfonate (PFOS) produces selective dopamine neuron neuropathology in *C. elegans*. *Tox. Sci.*, 172(2): 417–434, <https://doi.org/10.1093/toxsci/kfz191>
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- Kim Lazcano, R., C. de Perre, M.L. Mashtare and L.S. Lee. 2019. Per- and Polyfluoroalkyl Substances in Commercially Available Biosolid-Based Products: The Effect of Treatment Processes, *Water Environ. Research*, <https://doi.org/10.1002/wer.1174> WER paper of the year.
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#### **Non-Peer-reviewed Publications** – 30 book chapters, briefs, and proceedings

##### **Current/Active Research Grants (Nov 1, 2024)**

- NSF Innovative Research Engine. Great Lakes ReNEW. (2024-2034) Harkness (PI, Current Water), Lee (Purdue PI)
- WRF5244. Validation of an Integrated Framework of Wastewater and Stormwater Treatment Options of CECs. (2024-2025). Modiri (PI, EA), Lee (co-PI)
- WQRF. Retention of PFAS on Spent Filters. (2024-2026) Total: \$100,00. Zhou (PI), Lee, Choi (co-PIs).
- NIH. PFAS induced alterations in reward processing. (2023-2028) Total: \$3,303,080. Cannon (PI), Chester, Foti, Lee, Wells (co-PIs)
- USGS-104G. Pre-treatment assisted PFAS analysis in understudied complex media. Total: \$250,000. (2024-2026). Lee (PI), Choi, Sepulveda Hoverman, Hoskins (co-PIs).
- SERDP ER24-C1-4061. Self-Assembly of PFAS Mixtures in the Presence of Inorganic Ions and Hydrocarbon Surfactants During Wetting and Drying. (2024-2028) Total: \$1,661,900. Martinez (PI), Youngblood, Lee, Choi, and Cordova (co-PIs).
- SERDP ER24-C1-4272 Self-assembly of PFAS Mechanistic Investigation of Assembly and Stability of Supramolecular forms of Per- and Polyfluoroalkyl Substances on Environmentally Relevant Surfaces and Development of Surface Analytical Protocols. 2024-2027. \$427,634 (Purdue portion) Lee (Purdue-PI), Lead is CDM Smith (I. Ross, PI)
- SERDP ER22-C4-3450 Assessment and Remediation of PFAS Supramolecular Structures. 2024-2026. \$393,771 (Purdue portion) Lee (Purdue-PI), Lead is Tetra Tech (R. Arnseth, PI).
- WRF5170. State of the Science and Regulatory Acceptability for PFAS Residual Management Options. (2023-2024). Modiri (PI, EA), Lee (co-PI)
- SERDP ER23-4032. Coupling Foam Fractionation with High-Resolution Molecular Absorption Spectrometry Graphite Furnace to Quantify Total PFAS in PFAS-Free Firefighting Formulations. (2024-2026), Total: \$250,000. Choi (PI), Lee (co-PI)

WRF 5212: Enhanced Aeration and Scum Recovery for Physical Removal of PFAS from Wastewater. 2023-2024. Schaefer (CDM Smith, PI), Lee (co-PI).

USDA-FSA. Overall PFAS Fate During Optimization of PFAS contaminated Livestock Composting, Stabilization and Use. 2023-2025, \$313,749. Lee (PI)

USDA-FSA. Overall PFAS Fate During Optimization of PFAS-contaminated Livestock Composting, Stabilization and Use. (2023-2025). Total: \$323,961, Lee (PI), Choi (co-PI)

USDA-CIG-Maine. Biochar Use to Reduce Crop Uptake of PFAS and Improve Soil Health. 2023-2026. Carpenter (Northern Tilth, PI), Lee (Purdue co-PI)

USDA-FSA. PFAS Mitigation Strategies and Effects of CRPs on PFAS Fate. 2023-2027. \$500 K. Lee (PI)

NIH. Role of military relevant chlorpyrifos exposure in Parkinson's disease relevant dopaminergic neurotoxicity (2022-2025). \$ 1.2M, Cannon (PI), Lee (co-PI)

SERDP ER22-3158: Electrocatalytic Reduction of PFAS in Groundwater and Aqueous Concentrates, (2023-2026), Total: \$ 989K Chaplin (PI, UIC), Lee (co-PI, Purdue).

WRF 5214. Direct In-situ Measurement of PFAS Transformation and Leaching from Land-applied Biosolids. (2023-2024) Total: 150K. Purdue PI; Led by Schaefer, CDM Smith

DC Water. PFAS Source Tracking and Changes During Processing to Biosolids-based Products, \$18,690 Lee, (PI)

SERDP ER-2527 Physiological, Ecological and Environmental Determinants of PFAS Accumulation in Fish: Towards an Improved Bioaccumulation Model. (2022-2023), Salice (PI, Towson University), Lee (co-PI)

EPA National Priority/WRF. Unregulated Chemicals in Biosolids: Prioritization, Fate and Risk Evaluation for Land Applications (2021 – 2026); Total \$ 1,497,907, Purdue \$585,000, Lee, Purdue PI; Led by Water Research Foundation.

EPA National Priority Grant. Evaluating PFAS Occurrence and Fate in Rural Water Supplies and Agricultural Operations to Inform Management Strategies (2020-2025); Total EPA \$ 1,609,344; Lee PI)

HRSD Match to EPA National Priorities Grant. Evaluating PFAS Occurrence and Fate in Rural Water Supplies and Agricultural Operations to Inform Management Strategies, 2021 – 2024, Total: \$ 340,000, Lee (PI)

SERDP ER-1491. Upscaling Reactive Electrochemical Membrane (REM) Reactors for the Oxidation of Perfluoroalkyl Compound Contaminated Water, 2021 – 2024, Total: \$ 972,820, \$ 336,402, Chaplin (PI, UIC), Lee (co-PI, Purdue)

NAWI. Electrocatalytic Destruction of PFAS using a Reactive Electrochemical Membrane System, 2022-2024. Total: \$ 1,912,295, Purdue (\$ 244,326), Chaplin (PI, UIC), Lee (co-PI, Purdue)

USGS-104G. PFAS Precursor Bioaccumulation and Biotransformation in Agriculturally Impacted Wetland Food Webs, 2022-2025, Fed Total \$243,721 (plus matching \$243,776), Sepulveda (PI), Lee (co-PI)

SERDP ER20-1537. The relative toxicities of current use aqueous film forming foams and next generation alternatives to aquatic species for informing risk assessment, 2020 – 2024, Total: \$ 1,298,816, Hoverman (PI), Lee (co-PI)

SERDP23-C1-3599, Assessing Polyfluorinated Compound Biotransformation in Historic AFFF-Impacted Source Areas, Total: \$ 886,000. Dung, CDM Smith (Lead), Lee (co-PI)

SERDP23-4032. Coupling Foam Fractionation with High-Resolution Molecular Absorption Spectrometry Graphite Furnace to Quantify Total PFAS in non-PFAS AFFFs. 2023-2024. \$249,466. Choi (PI), Lee (co-PI)

DOD-Army Research Dev. Command. Role of military relevant chlorpyrifos exposure in Parkinson disease relevant dopaminergic neurotoxicity. 2022-2025. \$1,199,999, Cannon (PI), Lee (co-PI)

WRF5170. State of the Science and Regulatory Acceptability for PFAS Residual Management Options. 2023-2024. \$150,000. Modiri-Gharehveran (EA Eng. PI), Lee (co-PI).

NSF. RAPID: Elucidating the Types and Role of VOC and SVOC Fate in Drinking Water Wells and Plumbing After the 2023 Ohio Chemical Disaster in East Palestine. \$200,000. Whelton (PI), Lee (co-

### **Courses Taught in the past 5 years**

**FNR/AGRY/NRES/EAPS 125 *Introduction to Environmental Sciences*** is offered to students interested in an introductory natural resource or environmental science elective. It is a team-taught class and covers topics from introduction to ecological principles, history of conservation, natural resource management, human impacts on the environment, and environmental ethics. The course is taught every fall and spring. Dr. Lee has co-taught this course beginning in Spring 2018 to Dec. 2021.

**AGRY/NRES385 *Environmental Soil Chemistry*** is an upper-level introductory course with 3 lectures and one 3-hour wet lab each week. It covers environmental soil chemistry concepts in the framework most applicable to metal, nutrient, and organic chemical contamination of soil and water resources. Students are empowered with knowledge and both semi-quantitative and quantitative skills in the fundamental properties and processes responsible for the environmental fate of contaminants in the soil-water environment, with emphasis on soil and solution chemistry. The intended audience includes students in an environmental science field that may not have strong chemistry/math backgrounds. There is no textbook. Dr. Lee uses lectures, environmental case studies, laboratory exercises, and computer modules to teach the course. This course has been taught each year since its inception in 1999. Students have repeatedly expressed that they learned problem solving skills that they have applied to their other courses and their research.

**AGRY544 *Environmental Organic Chemistry*** focuses on the fundamental properties and processes responsible for the environmental fate of organic contaminants in aqueous and nonaqueous-phase liquids (e.g., fuels, chlorinated solvents, industrial and manufacturing residuals), and soils. Both conceptual and theoretical aspects are covered, as well as estimation, correlation, and measurement techniques. AGRY544 was initially taught every year for the first 15 years since it began in 1994 with an enrollment between 19 to 31. It has since been taught every other year with an enrollment of 15-24. Students repeatedly comment that this is among the top two courses they have taken at Purdue. AGRY544 recently was cross-listed with EEE.

**GRAD590 *ESE Colloquium*** is a 3-credit series (2 credits in Fall and 1 credit in Spring) seminar/lab course for ESE students. It fosters the development of critical thinking and life cycle-type thinking skills, team building, and integration across social, ecological, and technical sciences with a focus on sustainability and resilience. Dr. Lee co-developed and co-teaches or leads GRAD590 every fall and spring.

**GRAD590 *ESE Peer-to-Peer Mentoring*** is for advanced ESE students who formally mentor the incoming cohort, particularly through facilitating and co-instructing in the ESE Colloquium series.

**EEE560 *Per- & Polyfluoroalkyl Substances (PFAS)*** This course facilitates student exploration of the complex world of per and polyfluoroalkyl substances (PFAS) including history, uses, defining characteristics, exposure pathways and effects, regulatory and risk assessment, environmental fate, treatment options/challenges, and alternatives. PFAS are complex on many fronts and lead to many economic, environmental and social injustices, and sustainability challenges. Spring, 5-week module.

### **Subset of Invited Talks, Seminars and Webinars in the 2021-2024 Timeframe**

Lee, L.S. and Ned Beecher. PFAS in Agricultural Operations, NRCS PFAS Webinar. Feb. 19, 2021

Lee, L.S. Evaluating PFAS Occurrence and Impact in Agricultural Operations, IN Groundwater Focus Monthly Meeting, March 4, 2021

Lee, L.S. PFAS in Municipal Waste Management and Agricultural Operations. Carollo Engineers Seminar Series, March 26, 2021

Lee, L.S. Assessing Poly- and Perfluoroalkyl Substances (PFAS) Release from Finished Biosolids (WERF Project No. 5042), Michigan Water and Environment Association (MWEA), March 31, 2021

Lee, L.S. Per- and Polyfluoroalkyl Substances in Commercially Available Biosolids and Other Soil Amendments, WEF, April 1, 2021

Lee, L.S. PFAS: PFAS Mitigating PFAS in Biosolids, Finding the Way to the Future Panel, ET Tech, April 13, 2021

Lee, L.S. PFAS Characteristics, Fate and Challenges in Waste Management, Emerging Contaminant Conference, IL, Keynote, April 27, 2021

Lee, L.S. Trends in Trace Organics and Other Constituents in Biosolids and Biosolid Land-Application Sites. Ontario Water & Environment Association (OWEA), April 27, 2021

Lee, L.S. PFAS: Our Greatest Current Challenge in Waste Management, Water Environment Federation Biosolids and Residuals Specialty Conference. Columbus, Ohio May 11, 2021

Lee, L.S. PFAS in Biosolids: Challenges & Management Options. WEF Residual & Biosolid Conference, May 11, 2021

Lee, L.S. Per- and Polyfluoroalkyl Substances (PFAS): Characteristics and Management Challenges. Purdue DP C4E hosted meeting with a subset of Indiana Legislators, Virtual, May 12, 2021

Lee, L.S. In situ reductive defluorination of PFAS with nNi<sup>0</sup>Fe<sup>0</sup>-AC Nanocomposites, Noblis ESI, May 19, 2021

Lee, L.S. PFAS Challenges in Biosolid Management. California Water & Environment Association (CWEA) Annual Conference, Virtual, June 7, 2021

Lee, L.S. Multiplication through Transformation, American Chemical Society National Meetings, Division of Environmental Chemistry, Women in Environmental Science & Engineering, August 22, 2021

Lee, L.S. Process Effects on PFAS in Biosolids, Effluents, and Leachate. Biofest, Sept. 20, 2021

Lee, L.S. PFAS: Characteristics and Management Challenges, PFAS Research & Policy Forum, White River Alliance, Sept. 23, 2021.

Lee, L.S. Trends in Trace Organics in Biosolids and Biosolid Land-Application Sites. Emerging Contaminant Short Course, Oct. 26, 2021

Lee, L.S. Poly- and Perfluoroalkyl Substances in Biosolids: Fate Trends and Fluorine Mole Balance. ASA/SSSA National Meetings, Nov. 7-10, 2021

Lee, L.S. PFAS Characteristics, Occurrence in Fertilizers and Plant Uptake (in person and virtual), the Association of American Plant Food Control Officials Jackson Hole, WY, CA Oct. 27, 2021 (virtual)

Lee, L.S. PFAS Characteristics, Occurrence in Fertilizers and Plant Uptake, California Department of Food and Agriculture Fertilizer Division, Jan 4, 2022 (virtual).

Lee, L.S. Characterizing PFAS in biosolids and their leaching potential when applied to agricultural soils in the US, PFAS Workshop, University of Tübingen, Tübingen, Germany, 04.-05. April 2022 (may switch to virtual due to COVID surge/uncertainty).

Lee, L.S. PFAS Characteristics and Trends in Waste Management. Shipshewana, IN, Feb. 9, 2022.

Lee, L.S. PFAS Occurrence, Fate and Mitigation in the Context of Biosolids, IWEA, Kokomo, IN, March 9, 2022.

Lee, L.S. Addressing Gaps in Understanding of PFAS in Rural Communities. Public Health and Water Conference, Cincinnati, OH, March 24, 2022.

Lee, L.S. Occurrence and Fate of PFAS in Land-Applied Biosolids. 2022 NWGA PFAS Conference Panel: Waste Products as a Source of PFAS, June 21-22, 2022, Westerville, OH

Lee, L.S. (Sept 28, 2023) Characterizing Fate and Impact of PFAS in Biosolids Generation and Application to Agricultural Soils. Notre Dame PFAS Workshop, Notre Dame, IN, Sept 28-29, 2023.

Lee, L.S. (May 11, 2023). PFAS (Per- & Polyfluoroalkyl Substances) and Biosolids Perspectives in Context. VWEA Education Seminar, Virtual, May 11, 2023.

Lee, L.S. Occurrence and Fate of PFAS in Land-Applied Biosolids. 2022 NWGA PFAS Conference Panel: Waste Products as a Source of PFAS, June 21-22, 2022, Westerville, OH.

- Lee, L.S. (Oct. 22, 2023) Overview of PFAS and Grand Challenges for Agricultural Systems. PFAS: Current Knowledge and Applications for Agricultural Production Workshop, Kellogg Hotel & Conference Center, MI, Oct 22-24, 2023, Keynote.
- Lee, L.S. (Dec 5, 2023) Characterization and Contamination Panel: PFAS and Food Wastes, NIST Food Waste Reduction and Recovery Workshop.
- Lee, L.S. (March 26, 2024). Unregulated Organic Chemicals (UOCs) in Biosolids: Prioritization, Fate and Risk Evaluation for Land Applications. Midwest Biosolids Association First Conference Meeting, Beck Center, West Lafayette, IN
- Lee, L.S., (June 13, 2024) PFAS Fate, Transport and Challenges in Waste Management. Virginia Biosolids Council hosted Lunch and Learn, Virtual.
- Lee, L.S. (June 19, 2024 ) Direct In Situ Measurement of PFAS Transformation & Leaching from Land-Applied Biosolids, WEFTEC Residuals and Biosolids Conference, OK City, OK
- Lee, L.S., PFAS Transformation & Leaching from Land-Applied Biosolids, CSWEA Webinar Series, Virtual, July 31, 2024.
- Lee, L.S., PFAS Fate After Land-Application of Biosolids, Synagro Technical Advisors Meeting, Nashville, TN, Aug. 6, 2024.
- Lee, L.S. Per- & Polyfluoroalkyl Substances (PFAS) Fate & Transport. Indiana Water Summit, Indianapolis, IN, August 21-22, 2024
- Lee, L.S., PFAS (& UOCs) Fate After Land-Application of Biosolids, SWANA-hosted virtual webinar, Aug 23, 2024.
- Lee, L.S., PFAS Fate & Transport, USDA PFAS Workshop, Sept. SWANA-hosted webinar, Arlington, VA, Sept. 10, 2024.
- Lee, L.S., PFAS Fate After Land-Application of Biosolids, NACWA PFAS Workshop, Virtual, Sept. 17, 2024.
- Lee, L.S., Addressing PFAS Challenges in Agriculture and the Food System, Purdue Back to the Classroom, West Lafayette, IN, Sept. 27, 2024.
- Lee, L.S., PFAS Replacements - Familiar Faces or Fresh Starts? Closing Keynote, Product Stewardship Conference, Denver CO, Oct 17, 2024.

#### **News/Media Examples for 2019-2024**

- WUFT News. Eco-friendly packaging could be poisoning our compost. Ula Chrobok, May 30, 2019. <https://projects.wufl.org/foreverinflorida/do-forever-chemicals-make-their-way-into-food/>
- Boston News. ‘Forever chemicals’ were found in MWRA fertilizer. Here’s what you need to know. Christopher Gavin, Dec. 3, 2019. <https://www.boston.com/news/local-news/2019/12/03/forever-chemicals-mwra-fertilizer-what-to-know>
- Boston Globe. ‘Forever chemicals’ are found in MWRA fertilizer, drawing alarm, David Able, Dec. 3, 2019. <https://www.bostonglobe.com/metro/2019/12/01/levels-toxic-chemicals-mwra-fertilizer-found-tests-are-raising-concern/tlnN0BffyugFKCweSpFq5J/story.html>
- Sinclair Broadcast Group. Inside Your World investigate toxic soil with potential links to cancer. Mark Hyman, Jan. 13, 2020. <https://wjla.com/news/inside-your-world/inside-your-world-investigates-toxic-soil-with-potential-links-to-cancer>
- Kokomo News. Inside Your World: The lasting effects PFAS contamination has on groundwater. Jan. 20, 2020. <https://komonews.com/news/inside-your-world/inside-your-world-the-lasting-effects-pfas-contamination-has-on-groundwater>
- Indianapolis Star. ‘Forever chemicals’ were found in Indianapolis’ tap water. Here’s why it matters. London Gibson, Indianapolis Star, March 19, 2020. <https://www.indystar.com/story/news/environment/2020/03/19/pfas-found-indianapolis-drinking-water/4830205002/>

Purdue Alumnus. So You Want to Do Field Research. March 25, 2020.  
<https://www.purduealumnus.org/features/so-you-want-to-do-field-research/>

Indianapolis Star. Some industrial sites in Indiana may be discharging toxic ‘forever chemicals,’ report says. London Gibson, Indianapolis Star, May 2, 2020.  
<https://www.indystar.com/story/news/environment/2020/05/02/indiana-industrial-sites-could-discharging-toxic-pfas-chemicals/5153057002/>

Detroit Public TV, Great Lakes Now. Indiana universities receive grants to study PFAS impact on water quality. Sept 2, 2020. <https://www.greatlakesnow.org/2020/09/indiana-universities-pfas-impact-water-quality/>

WFYI, Indianapolis. Purdue, Indiana University get grants to study PFAS in Rural Water. Sept. 7, 2020 <https://www.wfyi.org/news/articles/purdue-indiana-university-get-grants-to-study-pfas-in-rural-water>

Inside Indiana Business. Purdue Scientist awarded \$1.6M from EPA. Mary Roberts, Aug. 27, 2020.  
<https://www.insideindianabusiness.com/story/42553395/purdue-scientist-awarded-dollar16m-from-epa>

VA Biosolids Council. New PFAS research will improve understanding. Jan. 31, 2021,  
<http://www.virginiabiosolids.com/pfas-research-proposes-improve-knowledge-fate/>

Indianapolis Star. Legislation tackles toxic ‘Forever chemicals’ found in Indianapolis drinking water, London Gibson, Indianapolis Star, Feb. 15, 2021.  
<https://www.indystar.com/story/news/environment/2021/02/15/bills-would-tackle-forever-chemicals-found-indiana-water/6677257002/>

WEF/Words on Water. \$123: Dr. Linda Lee on the Science of PFAS n Water Treatment.  
<https://wordsonwaterwef.com/2020/02/03/words-on-water-123-dr-linda-lee-on-the-science-of-pfas-in-water-treatment/>

Plastics Today. Warning: Compostable food packaging may be hazardous to our health. Feb. 13, 2021.  
<https://www.plasticstoday.com/packaging/warning-compostable-food-packaging-may-be-hazardous-your-health>

Indianapolis Star. South Bend legislators push state bills to regulate toxic ‘forever chemicals’ in drinking water. London Gibson, Indianapolis Star, Feb. 15, 2021.  
[https://www.southbendtribune.com/news/indiana/south-bend-legislators-push-state-bills-to-regulate-toxic-forever-chemicals-in-drinking-water/article\\_88c881d4-6f92-11eb-b880-472aa10828cc.html](https://www.southbendtribune.com/news/indiana/south-bend-legislators-push-state-bills-to-regulate-toxic-forever-chemicals-in-drinking-water/article_88c881d4-6f92-11eb-b880-472aa10828cc.html)

WUFT News. Do forever chemicals make their way onto food? Natalie Nix, Feb 16, 2021.  
<https://projects.wuft.org/foreverinflorida/do-forever-chemicals-make-their-way-into-food/>

CWEA, San Francisco Bay Area Agencies Participate in Land Application Biosolids Study, Issue 5 2022, pp 27-31. <https://www.kelmanonline.com/httpdocs/files/CWEA/cleanwater-issue5-2022/index.html>

CSA News. When chemicals go to the dark side. Nov., 2022, 65(11)6-15. Lee students on front cover and within, <https://access.onlinelibrary.wiley.com/doi/10.1002/csan.20894>

WISH TV - <https://www.wishtv.com/news/i-team-8/purdue-university-professors-fight-disinformation-about-east-palestine-train-derailment/>

Purdue innovation may take ‘forever’ out of ‘forever chemicals’. July 27, 2023,  
<https://fox59.com/indiana-news/purdue-innovation-may-take-forever-out-of-forever-chemicals/>

Special Investigation: *Dangerous Chemicals in Compost* | Montana PBS Reports: IMPACT.  
<https://www.youtube.com/watch?v=H7-yQALgSRE&t=1s>

The New Lede. Farmers facing PFAS pollution struggle for solutions. March 11, 2024.  
<https://www.thenewlede.org/2024/03/farmers-facing-pfas-pollution-struggle-for-solutions/>

### **Current Research Grants**

NSF Innovative Research Engine. Great Lakes ReNEW. (2024-2034) Harkness (PI, Current Water), Lee (Purdue PI)

WRF5244. Validation of an Integrated Framework of Wastewater and Stormwater Treatment Options of CECs. (2024-2025). Modiri (PI, EA), Lee (co-PI)



WQRF. Retention of PFAS on Spent Filters. (2024-2026) Total: \$100,00. Zhou (PI), Lee, Choi (co-PIs).

NIH. PFAS induced alterations in reward processing. (2023-2028) Total: \$3,303,080. Cannon (PI), Chester, Foti, Lee, Wells (co-PIs)

USGS-104G. Pre-treatment assisted PFAS analysis in understudied complex media. Total: \$250,000. (2024-2026). Lee (PI), Choi, Sepulveda Hoverman, Hoskins (co-PIs).

SERDP ER24-C1-4061. Self-Assembly of PFAS Mixtures in the Presence of Inorganic Ions and Hydrocarbon Surfactants During Wetting and Drying. (2024-2028) Total: \$1,661,900. Martinez (PI), Youngblood, Lee, Choi, and Cordova (co-PIs).

SERDP ER24-C1-4273. Mechanistic Investigation of Assembly and Stability of Supramolecular forms of Per- and Polyfluoroalkyl Substances on Environmentally Relevant Surfaces and Development of Surface Analytical Protocols (2024-2027) Co-PIs: Ross (PI, CDM Smith), Krafft (University of Strasbourg, France), Liu (McGill University, Canada), Lee (Purdue), Sears and Sharpe (University of Surrey, UK). *Contract in process*

SERDP ER22-3450. Assessment and Remediation of PFAS Supramolecular Structures. (2024-2026) Arnseth (PI, Tetra Tech) Co-PIs: Ross (PI, CDM Smith), Krafft (University of Strasbourg, France), Liu (McGill University, Canada), Lee (Purdue), Sears (University of Surrey, UK). *Contract in process*

WRF5170. State of the Science and Regulatory Acceptability for PFAS Residual Management Options. (2023-2024). Modiri (PI, EA), Lee (co-PI)

SERDP ER23-4032. Coupling Foam Fractionation with High-Resolution Molecular Absorption Spectrometry Graphite Furnace to Quantify Total PFAS in PFAS-Free Firefighting Formulations. (2024-2026), Total: \$250,000. Choi (PI), Lee (co-PI)

WRF 5212: Enhanced Aeration and Scum Recovery for Physical Removal of PFAS from Wastewater. 2023-2024. Schaefer (CDM Smith, PI), Lee (co-PI).

USDA-FSA. Overall PFAS Fate During Optimization of PFAS-contaminated Livestock Composting, Stabilization and Use. (2023-2025). Total: \$323,961, Lee (PI), Choi (co-PI)

USDA-CIG-Maine. Biochar Use to Reduce Crop Uptake of PFAS and Improve Soil Health. 2023-2026. Carpenter (Northern Tilth, PI), Lee (Purdue co-PI)

USDA-FSA. PFAS Mitigation Strategies and Effects of CRPs on PFAS Fate. 2023-2027. \$500 K. Lee (PI)

NIH. Role of military relevant chlorpyrifos exposure in Parkinson's disease relevant dopaminergic neurotoxicity (2022-2025). \$ 1.2M, Cannon (PI), Lee (co-PI, Purdue)

SERDP ER22-3158: Electrocatalytic Reduction of PFAS in Groundwater and Aqueous Concentrates, (2023-2026), Total: \$ 989K Chaplin (PI, UIC), Lee (co-PI, Purdue).

WRF 5214. Direct In-situ Measurement of PFAS Transformation and Leaching from Land-applied Biosolids. (2023-2024) Total: 150K. PI (Schaefer, CDM Smith), Lee (co-PI, Purdue)

EPA National Priority/WRF. Unregulated Chemicals in Biosolids: Prioritization, Fate and Risk Evaluation for Land Applications (2021 – 2026); Total \$ 1,497,907, Purdue \$585,000, Lee, Purdue PI; Led by Water Research Foundation.

EPA National Priority Grant. Evaluating PFAS Occurrence and Fate in Rural Water Supplies and Agricultural Operations to Inform Management Strategies (2020-2025); Total EPA \$ 1,609,344; Lee PI)

HRSD Match to EPA National Priorities Grant. Evaluating PFAS Occurrence and Fate in Rural Water Supplies and Agricultural Operations to Inform Management Strategies, 2021 – 2024, Total: \$ 340,000, Lee (PI)

SERDP ER-1491. Upscaling Reactive Electrochemical Membrane (REM) Reactors for the Oxidation of Perfluoroalkyl Compound Contaminated Water, 2021 – 2024, Total: \$ 972,820, \$ 336,402 (Purdue), Chaplin (PI, UIC), Lee (co-PI, Purdue)

NAWI. Electrocatalytic Destruction of PFAS using a Reactive Electrochemical Membrane System, 2022-2024. Total: \$ 1,912,295, Purdue (\$ 244,326), Chaplin (PI, UIC), Lee (co-PI, Purdue)

EPA-G2022-STAR-A1/Protein Binding Affinity as the Driver for Studying PFAS Mixture Toxicity, 2022-2025, Total \$ 725,481, Sepulveda (PI), Lee (co-PI)

USGS-104G. PFAS Precursor Bioaccumulation and Biotransformation in Agriculturally Impacted Wetland Food Webs, 2022-2025, Fed Total \$243,721 (plus matching \$243,776), Sepulveda (PI), Lee (co-PI)

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