



# THESIS DEFENSE

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## DIRECT IN SITU MEASUREMENT OF PFAS LEACHING AT A LONG-TERM LAND-APPLIED BIOSOLIDS SITE

Per- and polyfluoroalkyl substances (PFAS) are a group of synthetic chemicals known for their persistence in the environment and potential health risks. PFAS are linked to several adverse effects in human and wildlife health. The detection of PFAS in biosolids has raised concerns about their use in agricultural and land application practices. This is because some PFAS are known to enter the food system through plant uptake and others can leach into groundwater. The purpose of this study was to examine the PFAS profile in soils and porewater with depth at an agricultural site with historical biosolids applications. The site selected has received biosolids at agronomic rates for corn for approximately four decades. This study utilized a total of six lysimeters, three each at two and four feet, to monitor PFAS leaching in soil. Five porewater sampling events and three soil cores, taken in one-foot increments before the 3-month study, were analyzed for 54 PFAS and in line with EPA 1633 method. Soil characteristics such as texture, moisture, and total organic carbon (TOC) significantly influence PFAS transport and sorption capacity within the soil profile, impacting PFAS distribution across soil depths. PFAS in the soil profile decreases with increasing depth and exhibits a direct correlation with TOC. In porewater, short-chain PFAS proportionally dominate, with heightened concentrations observed in shallow pores. Soil characteristics act as significant barriers to PFAS leaching from biosolid sites. Less than 0.1% of PFAS leaches from the impacted soil annually, underscoring the importance of understanding PFAS transport dynamics for effective environmental management.



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### BIO

Jamie Klamerus is enrolled in the Ecological Sciences and Engineering (ESE) graduate program pursuing an Environmental and Ecological Engineering Master's degree. She graduated from the University of Minnesota- Twin Cities with a BS in Environmental Engineering in 2020. She spent 2 years in environmental consulting before attending Purdue to research the complexities of PFAS fate and transport in agricultural systems from biosolid land applications with Dr. Linda Lee.

## DR. LINDA LEE

Advisor

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