

**Soil and Water Sciences Department
Graduate Student Exit Seminar****Speaker:** **Katelyn Foster**
M.S. Thesis Degree Candidate**Advisor:** Dr. Patrick Inglett**Title:** **Nitrogen Export in Watersheds: Exploring NO₃⁻ Attenuation in Sandy Soils from a Humid Subtropical Climate****Date:** Monday, March 13, 2017**Time:** 3:00 pm – 4:00 pm**Location:** McCarty Hall A, Room G186

Denitrification is a pathway of NO₃⁻ removal in the soil and groundwater, and remains a widely misunderstood pathway in all different types of ecosystems. Locating the spatial and vertical distribution of denitrification hotspots, and determining what contributes most to their heterogeneity at different scales is important because this process can ultimately influence important remediation strategies, like source tracing using stable isotopes and nitrogen models implemented into nutrient budgets, used for impacted watersheds. Currently, few data sets exist that detail vertical distribution of attenuation processes in soil from the surface to groundwater, and other soil denitrification studies that address controls on its spatial distribution and variability are performed in locations and in soils that can maintain high WFPS (fine-particle soils), or in situations with coarse textured soils, use WFPS greater than 50%. The tendency to only examine the effects on terrestrial denitrification in higher WFPS settings has created a gap in information on what controls denitrification in systems where low WFPS is common for in-situ conditions.

To address the vertical distribution of denitrification, this study compared and analyzed trends between nutrient concentrations, redox potentials, potential denitrification, and NO₃⁻ and TN stable isotopes in soil profiles. Vertical distribution of potential denitrification rates were highest at the soils surface, and coincided with enrichment of NO₃⁻ stable isotopes, indicating that denitrification can cause significant enrichment of NO₃⁻ stable isotopes in soil. However, results of the ratio of δ¹⁵N/¹⁸O – NO₃⁻ for these depths indicate that other soil processes in are affecting the NO₃⁻ stable isotope value. To assess controls on spatial variability of denitrification, the effects of temperature, low WFPS, and varying NO₃⁻ concentrations were compared in sandy soils collected from different land uses. Temperature exerted the strongest control over denitrification, followed by confounding effects of WFPS and nutrient concentrations. Predicted denitrification rates from three different sub-models were tested against actual denitrification rates, and correlations between predicted and actual were improved with the substitution of literature coefficients with calculated coefficients from field measurements.

For our off-campus students, off-campus faculty, and on-campus students who cannot attend, this seminar can be viewed via live or watched at a later date via this link: [Katelyn Foster](#). In addition, all seminars are archived for viewing on our [SWSD Seminar Page](#).