Nitrogen (N) transport from urban landscapes is a dominant contributor of N in urban coastal waters. This study investigated N transport in three junctions in urban environment, comprising of residential stormwater runoff, stormwater pond outflow, and stream waters of an urban watershed that drains into Tampa Bay estuary. The specific study objectives were to investigate 1) the sources and compositional forms of N, including the often overlooked organic N forms in these urban waters, 2) the variability in bioavailability of dissolved organic N (DON) in urban streams, and 3) the rainfall variables that influence N mobilization from an urban residential catchment to stormwater runoff. Among all N forms, DON was the dominant N form in residential stormwater runoff, stormwater pond outflow, and stream waters. Particulate organic N (PON) was commonly the second most abundant N form in all waters, and was shown by isotopic characterization of $^{15}$N and $^{13}$C in particulates to be derived from a mixture of residential grass clippings and oak detritus. Nitrate ($\text{NO}_3^-$) was the dominant inorganic N form, and its input was controlled by the mixing of multiple sources such atmospheric deposition, $\text{NO}_3^-$ fertilizer, $\text{NH}_4^+$ fertilizer, soil and organic N and biochemical processes (e.g., nitrification and denitrification). Whereas atmospheric deposition was the leading source of $\text{NO}_3^-$ in stormwater and the stormwater pond, the stream waters showed virtually no influence of atmospheric N, likely due to the fact that atmospherically derived $\text{NO}_3^-$ is rapidly processed and flow in the study river is influenced by groundwater contributions. Bioassays of the DON pool in the stream waters indicated that a portion of it was bioavailable and can be a potential source of N for riverine bacteria. This DON was more reactive moving from river headwaters to the estuary, suggesting a shift from refractory to more labile organic pool moving downstream. Rainfall variables such as amount, duration, intensity, and flow volume had varying controls on the transport of N sources, with DON strongly controlled by rainfall intensity and inorganic N transport more controlled by rainfall duration and flow volume. Given the dominance of DON in all urban waters sampled, and it’s bioavailability in the river, this study suggests the importance of integrating all N forms, especially reactive DON, in nutrient management plans to control N transport to urban coastal waters.

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: [Siti Jariani Mohd Jani]. In addition, all seminars are archived for viewing on our [SWSD Seminar Page].