# RELEVANCE OF DIATOM SPECIES COMPOSITION TO BIOFILM-BASED STREAM ECOSYSTEM PROCESSES: POSSIBLE MECHANISMS AND RAMPANT SPECULATION.

Christopher G. Peterson[1], Allison D. Daley[2], Kathryn N. Kalscheur[3], Shannon M. Pechauer[2], Kimberly A. Gray[3] & John J. Kelly[2]

[1]Environmental Science Department &

[2]Department of Biology, Loyola University Chicago, Chicago, IL 60660

[3]Department of Civil & Environmental Engineering, Northwestern University, Evanston, IL, 60208

Stream biofilms are often recognized as 'hot-spots' for microbial metabolic activity that drives larger-scale ecosystem processes. The relevance of internal, structural attributes of biofilms to variation in rates of these processes or functional efficiency are rarely considered or examined. Our research focuses on assessing the degree to which variation in the species composition of algal assemblages within stream biofilms influences the quality of organic carbon used by resident bacteria to fuel metabolic activity that ultimately controls biogeochemical processes, such as denitrification, within stream ecosystems. As part of this effort, we characterized the taxonomic structure of algal and bacterial (as 16s rRNA variants) assemblages, and quantified the matrix-associated organic material (via Pyrolysis [Py]/ GC/MS) within diatom-dominated biofilms of varying ages from 6 suburban streams in the Chicago metropolitan area (DuPage County), and examined possible links among these attributes and denitrification potential (DNP) within biofilms. For each study stream, we selected two samples from a larger pool generated from a 12-wk successional study for Py/GC/MS analysis to maximize representation of different dominant diatom species and biofilm-based DNP. Ordination analysis showed broadly similar patterns of separation among study sites in algal and bacterial taxonomic structure, and biofilm organic signatures, with sites exposed to waste-water treatment plant effluent exhibiting both greater separation from other stream sites and greater distance between replicate samples. From our data, no definitive link was evident between biofilm DNP and either algal or bacterial taxonomic composition. However, significant relationships were found between variation in the nature of organic signatures within biofilms and biofilm DNP.

ORAL