As indicated by the National Academy of Engineering, the understanding of nitrogen cycle has been deemed as one of 14 grand challenges in engineering of 21st century. Due to rapid population growth and urbanization, the stormwater runoff increased in quantity as well as its nutrient concentrations, which may trigger serious environmental issues such as eutrophication in aquatic systems and ecosystem degradation. This study focused on stormwater and groundwater quality control via Biosorption Activated Media (BAM) which can be coupled to enhance the nutrient removal potential as an emerging Best Management Practices (BMPs). BAM was tested in this study with respect to not only the nutrient removal performance but also its influential factors such as the presence of toxin and carbon sources that may affect the removal effectiveness. In addition, the impacts of carbon and copper on the microbial ecology that deeply effect the nitrification and denitrification processes were explored through the identification of microbial population dynamics. To further enhance the recover and reuse the adsorbed ammonia, a new media called Iron Filing Green Environmental Media (IFGEM) was developed based on BAM, with the inclusion of iron filing as the key component for nitrate reduction. The functionality of IFGEM has been systematically analyzed with respect to several key factors including influent nutrient concentrations, pH values, and temperature. It showed promising nutrient removal and potential for nutrient recovery simultaneously.

Major: Environmental Engineering

Educational Career:
Bachelor's of Agricultural Structure & Energy Engineering, BS, 2011, China Agricultural University
Master's of Ecology, MS, 2014, Shanghai Jiao Tong University

Committee in Charge:
Niâ€“Bin Chang, Chair, Civil, Environmental and Construction Engineering
Boo Hyun Nam, Civil, Environmental, and Construction Engineering
Kelly Kibler, Civil, Environmental, and Construction Engineering
Martin Wanielista, Civil, Environmental, and Construction Engineering
Qipeng Zheng, Department of Industrial Engineering and Management Systems

Approved for distribution by Niâ€“Bin Chang, Committee Chair, on September 27, 2018.

The public is welcome to attend.