ARSENIC SPECIATION IN WASTEWATER, PLANTS AND BIOFILMS AND EFFECTS ON REMOVAL IN LABORATORY-SCALE CONSTRUCTED WETLANDS. **Antoine Hnain[1]**, Iris Koch[1], Debora Meira[2] and Kela Weber[1], [1]Royal Military College of Canada, Department of Chemistry and Chemical Engineering, 13 General Crerar Crescent, Kingston, ON K7K 7B4, Canada; [2]Argonne National Laboratory, 9700 S. Cass Avenue, Lemont, IL 60439, U.S.A. (antoine.hnain@rmc.ca)

Twelve lab-scale wetlands divided into 4 treatments (non-aerated planted and unplanted, aerated planted and unplanted) were used to study the speciation and removal of 1 mg/L of As(V). More specifically, the goal of the study was to examine how arsenic speciation changed in the wastewater over time as well as examine the speciation of arsenic in the biofilms and plants to try and explain the differences in arsenic removal abilities for non-aerated and aerated systems. Our results showed that non-aerated mesocosms removed more arsenic than aerated mesocosms. Only non-aerated systems contained a higher proportion of methylated arsenic species likely due to microbial activity while speciation was unchanged for aerated systems by day 6 for weeks 1, 6 and 14. Only biofilms from non-aerated systems contained As(III)-S species and formed pyrite which both retained arsenic through precipitation and As(V) adsorption, respectively. Arsenic, sulfate and iron reducing bacteria in the non-aerated biofilms may have lead to the formation of As(III)-S precipitates and As(V) adsorbing pyrite. Although plants for non-aerated mesocosms removed more arsenic than aerated mesocosm, there was no clear pattern of arsenic speciation in the plants that would help explain arsenic removal.