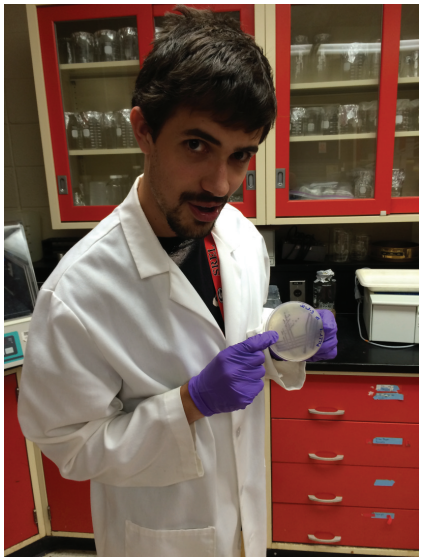
INVESTIGATING THE INCIDENCE OF ANTIBIOTIC RESISTANCE IN BIOFILM BACTERIA

Nathaniel Z. Fox[1,2], Demarcus Rainey[1], Courtney Burckhalter[1] and J Vaun McArthur[1]
[1]UGA Savannah River Ecology Laboratory, Aiken, SC
[2]Kenyon College, Gambier, OH

Mentor: J Vaun McArthur

The rise of antibiotic resistant pathogens is a rapidly growing global health issue. In the United States alone, the Centers for Disease Control estimates over 2 million infections and 23,000 deaths are directly attributable to antibiotic resistant bacteria. It is well known that overprescribing and misusing antibiotics are main driving forces behind the alarming development of these resistant pathogens. However, it has also been shown that extensive exposure to heavy metals, such as mercury and nickel, also confers antibiotic resistance in bacteria, even without prior exposure to antimicrobial compounds. With this in mind, we sought to describe the relationship between environmental radioactive contamination and antibiotic resistance in the freshwater bacterial biofilm communities located on the Savannah River Site. We used biofilm habitats placed in five freshwater ponds with varying levels of radioactive ^{137}Cs to grow communities of bacteria. We then collected a total of 40 biofilm samples among the five sites, isolated ten pure colonies from each sample, and screened each isolate against a suite of five different antibiotics. The results of these screens revealed that antibiotic resistance trends upward as local radiocesium content increases. However, these results are not significant enough as a whole to make any definitive claims as of yet. Indeed, work is ongoing to do a more thorough antibiotic resistance analysis using 23 different antibiotics in 26 unique combinations, which we hope will describe the relationship more concretely.



Nat in the lab.