

# School of Earth and Environmental Sciences Colloquium Series

**Dr. William Blanford**

## **Case study in applied environmental technology: Development of antimicrobial medias for water treatment**

**Wednesday, Oct. 11<sup>th</sup>**

**12:15-1:30 PM**

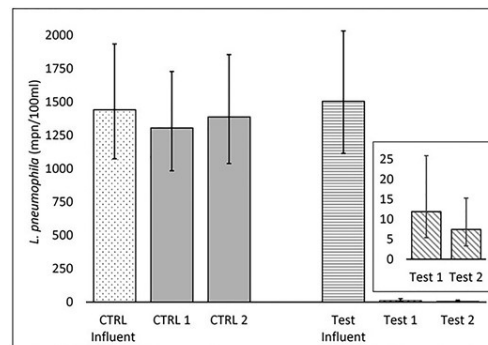
**Science Bldg. C-207**

**Zoom ID:**

**820 5441 6677**

**Passcode: 895367**

There are numerous public and private groups that support efforts by individuals at all levels to evaluate the unmet needs of stakeholders involved in environmental problems and development of new technologies and practices to



address them. This talk will discuss case study where numerous sources of support were utilized for training and executing on methods of market assessment and technology development targeted towards lower the microbial loads of water streams in environmental and engineering systems. Initial market surveys identified unmet needs to reduce bacterial loads in heating, ventilation, and air conditioning (HVAC) waters that have been associated with a series of fatalities in NYC. The technologies being developed to address this issue use the same class of biocides found in common products such as antibacterial hand soaps and disinfecting wipes, alkylated quaternary ammonium surfactants. Instead of freely dispersing those biocides in water, these technologies incorporate them into coatings and surfaces of porous media through which microbial laden waters are passed for treatment. Versions of the media have been examined for their antimicrobial performance and coating stability in aqueous environments. Initial column studies examining the porous media's ability to reduce bacterial loads in HVAC waters found average reductions of 94% from pre-flush levels ( $10^6$  colony forming unit (CFU)/mL) when assessed with R2A spread plates. With this proof of concept, two versions of the media were evaluated for potential coating components released during aqueous exposure. Neither released measurable volatile organic compounds (VOC) components, but one did release bisphenol A and ABDAC compounds. Subsequent column tests of the more durable coating were conducted using cultures of interest in industrial water and demonstrated significant reductions in neutralized post-column *Enterococcus faecalis* samples and near complete loss of *Legionella pneumophila* in non-neutralized fluids, but lower reductions in *Pseudomonas aeruginosa*.