**JMU Chemistry and Biochemistry Seminar**
Friday, January 13, 2017
3:35pm in ISAT 159

## Identifying oil/marine snow associations and oil transformations in mesocosm simulations of the Deep Water Horizon Oil Spill event

**A. S. Wozniak**
Old Dominion University, Norfolk, VA

**Abstract:**
The Deep Water Horizon oil spill in the Gulf of Mexico stimulated the release of significant amounts of marine snow made up of dead/living plankton/bacteria and their exopolymeric polysaccharide substances (EPS). This conglomerate of organic materials interacted with both oil and the dispersant Corexit to form an association that promoted rapid removal from the water column and the resulting mixture became incorporated into sediments in and around the well site. Mesocosm simulations of this process demonstrated that Macondo-like oil has a tendency to become associated with the marine snow via either physisorption or chemisorption. Solid-state $^{13}C$ NMR performed by a new low-volume sample container and a quantitative pulse sequence readily distinguish this oil from marine snow that forms naturally. Moreover with this approach, one can evaluate quantitatively the amount of oil associated with the marine snow and compare this with independent estimates made by other approaches. The polar fraction of the sinking marine snow, which presumably contains any oil oxidation products that form during the mesocosm simulations, was further isolated via extraction with dichloromethane. These extracts were then analyzed by Fourier transform ion cyclotron resonance mass spectrometry in order to evaluate at the molecular level any potential oxidation effects on oil compounds that associate with the EPS. This approach enables the identification of potential oil degradation marker compounds and provide insight into oil transformation mechanisms that result from the oil/marine snow/dispersant interactions.

## Analyzing and disrupting Clostridium difficile host-pathogen interactions

Dr. David Courson
Old Dominion University, Norfolk, VA

**Abstract:**
*Clostridium difficile* infection is associated with more than 30,000 deaths and $6 billion in US healthcare spending per year. It is the most common hospital acquired infection in the US and is rapidly gaining antibiotic resistance, leading the CDC to declare it an urgent public health threat. *C. difficile* is an obligate anaerobe. historically making it extremely difficult to work with in laboratory settings.

Work in the lab focuses on understanding *C. difficile* antibiotic survival and host-pathogen interactions with human gut cells using a combination of biochemical analysis and novel live-cell imaging techniques. Future work will focus on finding small molecule inhibitors that either directly limit *C. difficile* pathogenesis or increase its susceptibility to existing antibiotics.