FIU Applied Research Center

# DOE Fellows Lecture Series featuring

## Dr. Annie B. Kersting

### Director of University Relations & Science Education, Lawrence Livermore National Laboratory

## "Plutonium in the Environment: Can we Predict its Subsurface Behavior?"

**Dec 15, 2016 @ 2:00 PM | Applied Research Center Room 2186**

There is an acute need to expedite progress toward a permanent storage facility that can safely isolate long-lived actinides and fission products from the biosphere. Significant uncertainty remains on how to safely store long-lived radionuclides that will make up the majority of the dose after a few hundred years.

Plutonium (Pu) is of particular interest because of its high toxicity and long half-life ($t_{1/2}$ $^{239}Pu$ 2.4 $x10^4$ yrs). The chemical interactions of Pu are dependent on its oxidation state, which in turn control its stability and solubility. Understanding the interplay (the bio-geo-chemistry) between Pu and the repository environment is necessary to predict the conditions for which Pu will either migrate or remain immobile. A mechanistic understanding of the surface structure and reactivity of coupled Pu–mineral, Pu–organic ligand, and Pu–microbe, interfacial processes is needed to advance our understanding. To elucidate the mechanisms controlling Pu transport, we have investigated Pu sorption and desorption rates from mineral, organic and microbe surfaces over a range of concentrations found in the environment. Field and laboratory experiments show that the both inorganic and organic matter play an important role in stabilizing Pu in solution and on mineral surfaces. The presentation will provide an overview of the current understanding of the behavior of Pu in an effort to develop a conceptual model of Pu subsurface behavior.

**DOE-FIU Science and Technology Workforce Development Program**
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