**Tiffany Wang**

**UROP Faculty Supervisor: Benjamin Kocar**

**Term: Summer 2015**

**April 17, 2015**

**[Project Title]**

**Project Overview**

*Provide an explanation/background of your UROP project that includes with whom and where you are conducting research.*

Currently, natural gas from hydraulic fracturing resulting in a rapid increase of natural gas production within the United States. Fracking involve drilling deep underground into low permeability, natural gas containing shales and pumping large quantities of water, sand, and other chemicals at high pressure into those shales, fracturing them and releasing natural gas. . The natural gas, injected fluids, and natural shale pore water all return to the surface as produced waters, where the natural gas is separated out and the remainder is treated or disposed of. However, shale pore waters naturally contain elevated quantities of radium, and improper handling of the waste from this process could result in release of radium to the surrounding environment.

Radium isotopes are known to adsorb to many mineral surfaces, resulting in retention in the subsurface after accidental release. This retention, combined with the variation radium isotope half-lives suggests that they could be used as indicators for historic contamination due to fracking activities. However, there is limited understanding of the surface chemistry of radium adsorption, even in static conditions. This project’s goal is to study how radium adsorbs to different mineral surfaces and how radium may be transported in groundwater after an accidental release of produced water.

I will be working in Professor Kocar’s lab with graduate student Michael Chen in Building 48.

**Personal Role & Responsibilities**

*Describe what you are contributing to the project. Be specific about what your personal duties are and what you will be responsible for accomplishing throughout the term.*

I will be testing for the amount of radium adsorption to different compounds commonly found in the environment and creating isotherms based on the results.

**Goals**

*Explain what your personal goals for the UROP are, as well as what the overall aim is of the project.*

**Personal Statement**

*Briefly state why you are interested in this UROP and explain what you hope to learn from it.*

Fracking has allowed the United States to produce most of gas it needs. However, there are always environmental impacts that we need by wary of. Since fracking may be the United States’ primary source of gas for the time being, it is necessary to prevent harmful environmental impacts early on. This project would teach me more about the environmental impacts of fracking and how we can prevent the release of harmful chemicals in the future. In addition, I have had experience working in a lab before, but not for environmental chemistry related topics. Since I plan to have a career related to environmental chemistry, this is a good opportunity for me to see what exactly it may entail.