DMNS FAIR

Queens College, City University of New York Division of Mathematics and Natural Sciences Faculty Achievement In Research

MY NAME: Ashaki A. Rouff

MY DEPARTMENT: Earth and Environmental Sciences

MY RESEARCH (IN SIMPLE WORDS THAT CAN BE UNDERSTOOD BY ANYONE ON THE Q64 BUS):

I want to understand how metals dissolved in natural water "sorb" to the minerals that constitute rocks, to predict how contaminants are transported in soils and groundwater. This is important because if a dissolved metal likes to attach to a certain mineral, when the two meet the metal will be removed from water, limiting its mobility. In such instances, the metal will also be less bioavailable to organisms, including humans, and therefore less harmful.

In my lab we determine how water composition, e.g. pH and other dissolved substances, affect the amount of metal removed by a specific mineral. I then use x-rays at the National Synchrotron Light Source at Brookhaven National Laboratory to identify the metal location in or on the mineral. This tells us about potential mobility because a metal that prefers to sit inside the mineral structure is much less likely to be transported compared to a metal that is sitting at the surface.

This research can be applied to any setting where metals may come into contact with solids. For example, to identify sorbent materials for clean-up of contaminated industrial water, or even to understand how metals interact with minerals in bones and teeth in our bodies. One of my current projects focuses on a phosphate mineral that forms in animal and human wastewater, and that may be recyclable as fertilizer. Because some of these wastes can contain high levels of toxic metals, we want to be aware of any potential interactions. Right now we are trying to determine if and how metals such as arsenic and chromium associate with this mineral.

MY RESEARCH IN 140 CHARACTERS (OPTIONAL, MAY BE LEFT BLANK):

I am a Geochemist researching sorption of metals with minerals so as to predict contaminant mobility in the environment.