



Kruzel, K., Vulava, V., "Biogeochemical dynamics of nutrients in stormwater and coastal lake environments."

#### Kesli Kruzel Research Statement:

The research I will be conducting with Dr. Vijay Vulava will study nitrogen and phosphorous behavior in three stormwater lakes from the Charleston area. Water samples from the lakes and their different inflow and outflow sources will be taken and analyzed. Samples will be analyzed for specific nitrogen and phosphorus inputs, outputs, transformations, residence times, and transport mechanisms. With the data collected from these lakes, a systems model will be developed and have the potential to be applicable to thousands of stormwater lakes which are so common along the northeast coast. Nitrogen and phosphorous, the two major fertilizer pollutants that we will study, undergo many processes in these lake environments. With an excess of these pollutants, problems such as eutrophication, which limits the availability of oxygen in the water column, and an excess of Duckweed, which can limit sunlight which reaches the water column and depletes oxygen, may arise. Understanding the hydrological, physical, and biogeochemical processes which these nutrients undergo may help find solutions to these issues in the future. The project timeline will take place over the course of ten weeks and will include training and site visits for the first week. For the following six or so weeks, sample collection and analysis will take place. Next, two weeks will be reserved to develop the system models, and the last week will be used to create the final presentation of data and the research report. In the future, I am hoping to work in an environmental science related field concerning sustainable solutions to environmental issues. Preferably, my career will include work on local community-sized projects. To be able to find solutions, first we must find the problems and be able to understand and quantify them such as we will be doing in this project. This project will be perfect to allow me a glimpse into the work which will be required in order to understand local environmental issues, especially seeing how this project will be so applicable to many similar communities. As a safe and healthy environment is what I want to help work towards in my future career, this project would be a perfect opportunity for me to learn and practice my field, laboratory, and problem-solving skills.

During the summer of 2020, I took part in a research project at The College which studied the contribution of tire wear particles to water pollution. Though my time with this project was shorter than originally planned because of coronavirus, I still got experience with sample collection in the field and sample processing in the laboratory. I also had the opportunity to branch off from this project and do my own independent study during the fall 2020 semester, which mainly focused on the effects of H<sub>2</sub>O<sub>2</sub> on tire wear particles during sample digestion of organic matter.