A. Briefly describe overall research program at your laboratory.

https://professorrichardsonresearch.wordpress.com/

Humanity is besieged with the constant onslaught diseases daily, and we are slowly falling behind in this battle. We have witnessed outbreaks of salmonella that has bedeviled our food supply; hospitals are constantly plagued with *Staphylococcus* infections that are resistant to antibiotics, and in one national park over 10,000 people were potentially infected by hantavirus. New weapons are needed in the fight to help detect, inhibit, and prevent these infections. Dr Richardson’s research is focused at looking at novel means to detect, prevent/inhibit diseases that plague our community. For the INBRE program this summer the Richardson lab is focused on two projects.

**Environmental Bacteriophage**

This project focuses on collecting water samples throughout Georgetown and Horry County looking for naturally occurring bacteriophages in our aquatic environments. Bacteriophages are an important part of our ecosystem that helps control and maintain proper bacterial populations. As bacterial populations increase so does the population of the bacteriophages. This project focuses on looking at the factors involved in the bacteriophage population in residential and commercial retention ponds in the area. Is there a difference in the bacteriophage population between these two ecosystems and what are those differences? What factors are responsible for these differences? This project will also collect and analyze these bacteriophages for their potential commercial value. Often, during the summer months, beaches are closed due to spikes in the bacterial population in the ocean. These blooms can be control using these naturally occurring bacteriophages and as such limit the time beaches must close due to bacterial blooms. These bacteriophages can be used to help use better manage and clean up our beaches when the conditions call for the beaches to be closed due to unsafe water conditions.

**The Heartworm Project**

The Heartworm project is monitoring diseases in our community by collecting insects and detecting the heartworm parasite that live inside them. We will be using CDC light traps to collect and identify insects. We will then develop a screening process to detect the genomic signature of heartworm. Monitoring our community and environment is the best plan to get advanced warnings of potential threats to our community before they manifest themselves in the population. The idea is to develop a new screening mechanism for our community to the threat of Heartworm.
B. Briefly describe specific project(s) for your teacher

Any project listed above plus any techniques that our lab has experience with. I am also open to working with a high school teacher and develop labs they would like to introduce into their classroom.

C. Will any other people (post docs, grad students, undergraduate students, colleagues, etc.) be involved directly with your teacher?

Yes, but it will mostly be me. You will also work with the students in my lab during the summer.

D. Will you require any advanced reading/preparation for the teacher? If yes, please briefly describe.

I have material for them. (lab procedures for our specific lab, literature) I will provide all material needed for training, techniques and literature.