A. Briefly describe overall research program at your laboratory.

Most of the early and traditional medicines were either foods or natural products. This includes the consumption of many popular foods and drinks. The focus of the work in the Budner lab is to investigate these complicated mixtures to understand the chemistry and the concentrations of potentially medicinally important compounds. The current for the group during the summer will be on honey and kombucha.

Analysis of Honey:
The focus of this research is on the investigation of the transfer of allergens into local honey. Common advice is to combat the development of seasonal allergies after moving to a new location is the consumption of local honey. That many of the triggers of these allergies are transferred to the honey and that by regular exposure to these your body will develop a familiarization with these compounds and with therefore reduce the intensity or even eliminate these new seasonal allegories. However, limited research has been done into this phenomenon, therefore the focus of our research is the development of analysis methods for honey in order to characterize the chemical composition of local honeys. This will include the analysis of the aromas using gas chromatography, the metal content using atomic absorption spectroscopy, and potentially NMR.

Analysis of Kombucha:
Kombucha is made by fermenting sweetened tea using a symbiotic culture of bacteria and yeast (SCOBY) and is known for its unique aroma and acidic flavor. Kombucha has started to gain popularity for the reported health benefits such as increased weight loss to helping to fight cancer. While the composition of kombucha has a wide range of variations little is known about the impact the water’s chemistry has on the fermentation and the resulting kombucha. This project is to investigate the impact of calcium, bicarbonate, sulfate, and chloride concentration has on the fermentation and aroma chemistry of kombucha. The fermentation will be monitored by measuring the pH, titratable acidity, color, sugar concentration, and total polyphenols regularly from inoculation to the end of fermentation. In addition, the chemical composition of the volatile and semi-volatile aroma will be characterized using GCMS.

B. Briefly describe specific project(s) for your teacher:

The teacher will start the project by familiarizing themselves with some of the current literature in the areas of honey and kombucha and common analysis methods. In addition, the teacher will become proficient at making solutions at the trace level and learn to the analytical instruments needed for this type of work. The teacher will then select a subproject within the later research area and work toward accomplishing the goals outlined in
consultation with the supervisor. However, in general the teacher will be adapting methods available within the literature for the analysis of honey and kombucha. We will have progress report/journal club meetings as a lab, and everyone takes turn to present a research article and their progress on their project. We will also work as a group to develop a scientific review article. Lastly, during the process of conducting experiments, he/she will learn how to do literature search, interpret data, formulate hypothesis and write a manuscript in a scientific format. In addition, the study of food can be widely applied to the classroom when the teacher returns, and student projects can be developed with a range of complexity for a range of student understanding and available resources.

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

As this is a relatively new area of research the teacher would work primarily with myself but there will be at least two other undergraduate research students working in the laboratory on other projects.

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

In advance, the teacher will need to attend lab safety training through Coastal Carolina University. And background information/literature will be posted prior to start of the project on my website.