This past summer I, Andrew Folkerts, worked with Professor Harper in the field of biophysics focusing our study on the lipid monononadecenoin (MNd) to contribute to a much larger project to try and understand how lipid structure affects phase structure and characteristics. We went about studying this lipid using multiple methods. One way we studied the lipid was using a differential scanning calorimeter (DSC) that changes the temperature of the sample and monitors the heat flow from the sample during that process. A lipid phase transition will create a bump on the heat flow vs. temperature data graph and we can then analyze the location and size of that bump to understand the phase transition. We also used polarized light microscopy (PLM) to reaffirm what phase we actually are looking at. Different phases would either allow or not allow light through cross polarizers (polarizers at 90 degrees to each other) and that data then helps identify phases. My job consisted of making lipid samples to run in the machines, collecting data, analyzing data, organizing data, and making graphs. With the experience that I have gained working in the lab I am then able to discuss the theory with Professor Harper concerning the data collected along with discussing other research papers.

Since the ultimate goal also includes knowing the structure of the lipid we also sought to collect data on the lipid itself. We collected neutral buoyancy data to get density measurements and small angle x-ray diffraction to get other structural information. With this information and previous information about the molar mass of the lipid we could then calculate many other important characteristics of the lipid.

With the structure of the lipid known and the characteristics that the lipid forms we can contribute to the understanding of lipids. As more is known about lipids the more can be done with them. Lipids can be used to crystallize proteins and the correct lipid matrix can also be used for drug delivery. The field of lipids has many promising applications and we are excited that we were able to advance knowledge in this field this summer.

Thus far we have collected good kinetics data on the lipid. Some of the data is similar to a companion lipid and other data was unexpected and we are yet trying to make all of the data make sense. Throughout the summer I have grown a lot as a student as well. I always knew how to work but I learned a lot of how to problem solve and make important decisions for the projects benefit. I have also gained a much greater appreciation for research and have honed my science abilities as I have discovered how to conduct research.