Vantage Performance Materials is a constituent of Vantage Specialty Chemicals located in Gurnee, IL. It is a batch surfactants plant that makes hundreds of products that have applications in many different industries such as cleaning, food, oil, gas, and many more. Vantage has another location for co-ops on the South side of Chicago and that is a continuous plant with a much narrower product focus.

 I spent my second session at Vantage in the R&D lab. I was paired with a synthesis chemist and an analytical scientist and got chances to see both sides of how R&D operates. My projects were essentially split between synthesis and analytic projects, however, by the time I completed my analytical projects I had enough knowledge to run analytical tests on the products that I synthesized.

 My analytical projects introduced me to many analytical instruments such as gas chromatography (GC) – both FID and MS – GPC, FTIR, and some other less known instruments. I primarily used GC for majority of my projects. My main analytical project revolved around validating the purity of various seed oils. To do this, I had to learn the extraction method created by the previous co-op and then validate the method. After validating the extraction method, I performed approximately twenty extractions and then ran the samples and analyzed the data. We were able to identify some of the chemical structures that we were testing for, however, we were unable to accurately validate any of the oils that we tested so the project was put on hold and will likely be picked up by a future co-op.

 My synthesis responsibilities focused on scale up. This was a pleasant surprise for me, because past co-ops typically have more chemistry related projects rather than ones relating directly to chemical engineering. One of my projects involved building a model to synthesize a product in a semi-continuous rather than batch process. To do this, I spent several hours researching different reactor types, and then met with an engineer to have him proof read my design. After receiving the okay from the engineer, I purchased a pump, the column, and other fittings that I needed to create the model reactor. Once the model was constructed I went through many different experiments to find the optimal catalyst loading, reaction time, and raw material ratio. I ran into many challenges throughout this process and often had to order different parts or set up more meetings with the engineers to help trouble shoot issues.

 My other synthesis project also revolved around scale up; however, it dealt with the batch pilot reactor that we found in storage. The reactor is old and needed replacement parts so most of my time on this project involved meeting with the safety team to order new parts and engineer out as many safety hazards as possible for successful use of the reactor. The secondary containment for the reactor did not arrive by the end of my session, so unfortunately, I was never able to use the reactor.

 Overall my time in R&D was a blast! My supervisors were phenomenal, and my projects had a direct effect on the bottom line of the company which I thought was awesome to be able to do as a co-op. Although I did enjoy my time in R&D, I don’t see the lab as my future work place environment moving forward. I also gained a lot of useful knowledge in scale up, process design, and general product chemistry and usage which will help me moving forward both at Vantage and in chemical engineering. It was a fun, informative, and successful summer and I look forward to returning for my next session in January of 2020.