Delivering drugs from the nose to the brain has multiple advantages over the current intravenous delivery method. The reason that this is not the current method of treatment is because of the deficiency in methods to ensure the drug can navigate the nasal passage to the appropriate location where the tissue between the brain and the nasal cavity is thinnest called the olfactory epithelium. While there are vast options of nasal delivery devices available on the market, devices designed for selective olfactory deposition have not yet been found. Therefore, it is critical to search for more effective drug-delivery strategies that can directly deliver drugs to the olfactory region.

The first step in developing a device that provides a path straight to the olfactory region was testing if an electric field could influence the path of the particles. This was done with the computer modeling software Comsol. Next, to create a device for the drug delivery was to create a 2 dimensional model of nasal passage using a computer modeling software. With this model we were able to test several different geometric arrangements of electric forces that would drive the drug particles to follow a desirable path. Once a path was found, the next step is to reproduce these results with a 3 dimensional model.

This summer has provide me with the opportunity to gain insight and experience in the whole process of taking an idea from its conception to the beginning stages of a useful product. It gave me the chance to experience the application of concepts that I have been learning in course work and apply them to something that can be useful to someone in the future.