Lower leg injuries are the number one reason that people stop participating in sports and other recreational activities and ankle sprains are the most common of these injuries. The subsequent decrease in physical activity due to ankle sprains can have chronic consequences that are often serious. One such consequence is chronic ankle instability (CAI). CAI is a condition that is characterized by an overall loss of function and stability in the ankle that can predispose the ankle to frequent sprains. A complication of CAI is the eventuality of arthritis in the ankle joint, which means a lot of future pain.

The existing literature on CAI suggests that one reason people get CAI is due to an issue in the nervous system. The nervous system that is necessary to the ankle is comprised of a sensory and muscular division. The sensory division detects changes in the external environment such as pressure, heat, and texture among other things. When these receptors are sending faulty, or not enough, information to the brain, they can make the ankle susceptible to an injury.

My study aims to test the ability of the brain to digest different sensory information that is being fed to it. I will do this by placing the foot on different textures and measuring the ability of a subject, with CAI, to balance on a force plate with a single leg. My theory is that with different textures, the subject with CAI will have different difficulties in stabilizing themselves in accordance to those respective textures (more texture, more difficult). This ability is called "reweighting" because it is a measure of the brain's ability to translate the sensory information from the ankle and pick the information that it wants to rely on. I hypothesize that the brain will initially have trouble reweighting with textures that are not natural to our feet, which will be observed as poorer balance. However, with training over time, this ability can be improved through balance testing that stresses sensory reweighting.

The purpose of this study is to further our knowledge of sensory reweighting in patients with CAI to ultimately improve rehabilitative efforts. A third of people who hurt themselves during physical activity do so through spraining their ankle. A third of that population develops CAI, and the majority of the population with CAI develop arthritis in the ankle. This study will help those who have CAI with rehabilitation, and even act as a preventative measure in regards to further ankle sprains.