I am starting a new project with Prof. Salthouse’s group to develop electrochemical sensors for measuring the concentration of analytes. In these sensors a chemical reaction donates and electron to or takes and electron from and electrode. By measuring the movement of charge in the electrode, the rate of the chemical reaction can be measured. Commercially, these reactions are used in blood glucose meters.

My goal for this summer research experience is to develop assays for quantifying the amount of Horse Radish Peroxidase (HRP) using 3,3',5,5'-Tetramethylbenzidine (TMB) electrochemistry. Other research groups have reported sensitive electrochemical measurements of TMB redox operations catalyzed by HRP. These groups have used the traditional chemistry cyclic voltametry equipment consisting of a dedicated potentiostat; gold, platinum, and carbon electrodes; and manual handling of liquids.

My first goal is to determine which cheaper electrodes can be used to perform the measurements. My second goal is to develop a simple electronic circuit to replace the potentiostat. Finally, I will integrate the system into a microfluidics system.