

The platform which Culbertson Group is developing requires autonomous operation which requires programming those operations. The LabView graphical programming language was used to control both a stepper motor and a DC motor through an Arduino computer. The program integrates the sample preparation stage where a biological sample will be mixed with nanoparticles to isolate the macromolecules of interest with the sample detection stage where those macromolecules will be released from the nanoparticle for analysis. This adds to my earlier work on disulfide bond reduction which also bridged the gap between sample preparation and sample detection.

A program was developed during this semester which integrated the sample preparation stage with the sample analysis stage by mixing the magnetic nanoparticles in a biological sample to bind the macromolecules of interest to the nanoparticle surface. Those magnetic nanoparticles will then be transferred to a reduction chamber where the macromolecules will be freed from the nanoparticles by reducing the disulfide bond with Tris(hydroxypropyl)phosphine. These macromolecules will then be analyzed by isoelectric focusing and measuring the fluorescence. The program which was developed this semester is capable of performing all these operations on an integrated, user-friendly control screen and the program is production ready.