Automation of aspects of a common lab procedure called density gradient centrifugation. This tedious and challenging manual process's purpose is to isolate peripheral blood mononuclear cells (PBMCs) from a whole blood sample. PBMCs are mostly comprised of immune cells so this process is important in the immunology field.

Scope:
The primary scope item is to design and build a prototype system that automates the blood layering step of the protocol. This is a difficult step where diluted blood is carefully dispensed into a Falcon tube on top of density gradient medium (Ficoll-Paque). The automated system will layer the blood onto the ficoll successfully every time. This manual process is done with a pipette and requires the tube to be angled at different amounts throughout the dispense, and the dispense speed and dispense location must vary throughout the dispense as well. The process looks like: