This week I helped to completely redesign our project. We have moved to a design which is constructed from 8020 aluminum beams bolted together. This allows us to eliminate welding and the design is now much sturdier. The frame is made from four vertical legs, each 6 ft long with 3” by 3” cross sections (8020 part number 3030), which are attached to two 6 ft beams running parallel to the floor with 3” by 6” cross sections (8020 part number 3060). The beams running parallel to the floor sit on four wheels, two of which are static and two of which are dynamic. The dynamic wheels are lockable, allowing the frame to be wheeled over the treadmill and locked in place. The 6 ft vertical legs are spanned by two 3” by 3” beams 51 inches in length (8020 part number 3030). One beam spans the two sides of the treadmill frame. It is a 3” by 6” cross section and is 42 inches in length (8020 part number 3060). The basic frame design is shown below.

The variable weight support system is accomplished with the system shown below:
The harness will attach to a cable fed through the pulley shown. This will pull the apparatus down about the pivot point shown, pushing the aluminum bar on the other side of the assembly upward. A strain gauge will be attached to the aluminum bar. This strain gauge reading will provide a reading from which the tension in the cable can be calculated. When the cable is pulled by an ATV winch, Dominic will be hoisted up, and more of his weight supported, this will cause the aluminum bar to press against the frame with a greater force and therefore a greater strain will be read.

This week, I designed the entire 8020 frame and made the CAD drawing in Solidworks. I also helped to design the weight support system, and then made the weight support system in Solidworks. Furthermore, I helped to investigate the electronic components needed to be implemented to make this design solution work. I called two 8020 distributors in Massachusetts and then emailed them to get a quote for the 8020 components. I also called Biodex and got a quote on their harness system. Finally, I called both of our clients and asked if they had viewed our optimal design documents. Linda Mahoney was without power, and had not yet viewed the document. Christiana Gondreau had not yet viewed the
document, but since we redid our design, we told her we would send her an updated copy for her to look at as soon as we could.