Bioengineering 278: Magnetic Resonance Imaging Laboratory
Winter 2014
Lab 7

For this lab you will be using stock GE pulse sequences to examine blood flow in the heart. Place a live human in the scanner, use the 8 channel torso array coil, and connect the pulse oximeter or ECG leads to the subject. Use breath holding for all data, and the automatically reconstructed dicom images.

1. **Ejection Fraction**. Ejection fraction is defined as the fraction of the left ventricular blood volume at end diastole that is ejected by end systole. Collect at least 5 short axis cine images with 10 or more cardiac phases. For each slice, measure the area of the blood pool at the largest and smallest cardiac phases, and use these to estimate the ventricular volume at these phases. Estimate the EF (**3 points**), the absolute stroke volume (**3 points**), and the cardiac output (**3 points**) of the subject and compare to literature values (**3 points**).
2. **Flow through aorta.** Collect a cine phase contrast image at the root of the aorta. Use the FastCard cine phase contrast pulse sequence, the 'phase difference' option, and under 'User CVs' disable the magnitude masking option. Calculate the total flow through the aorta over the cardiac cycle, use this to calculate the cardiac output, and compare to your estimate of cardiac output from Part 1 (**8 points**).