## Final project guidelines

Your final project consists of a project report (25pts) and a final presentation (10pts). You are allowed to have one project for both ANSYMB1 and ANSYBM2. However, keep in mind that the two classes have separate project requirements so, if you decided on only doing one project, you will need to make sure that all requirements are met. General details for all projects are described below:

Final report:
The final report should include a background/introduction, methods, results, and conclusion sections:

*Background:*
This is where you describe your proposed project, its benefits, and any other relevant information. Generally, this section starts with a statement of the problem or question you are trying to solve. Describe why what you are doing is interesting or relevant to biomechanics and/or society. Then, describe all past research that is relevant to your project design, questions, and approach. Make sure to cite all of your references and include descriptions of past findings, past experimental designs, and, when relevant, past designs of robotic systems. Finally, conclude with a brief summary of what you will do to address your question and what you expect to see based on the past research you presented. This section should be around 2 pages long.

*Methods:*
This is where you should describe your approach and experimental designs. Depending on your project, this section may focus more on robotic design and descriptions of controllers, devices, and so on. This section needs to be detailed enough that, if anybody wants to recreate your experiment/device, they can follow the description here. In some cases, figures would be appropriate to show your experimental setup, or describe your device. Be careful not to list any results here, this section is only a description of your setup. This section can range in length but will probably be 1-2 pages long. Again, just make sure you talk about all necessary information/descriptions.

*Results:*
Use this section to describe your experimental findings and/or device validation results. Do not describe your conclusions and interpretations here (save that for the next section) but instead just summarize your results (e.g. any differences/similarities you found, how a device performed during testing, etc.). Depending on your project, this section will also likely vary in length.

*Conclusions:*
Finally, this is where you should describe your interpretations of your findings. In particular, but not limited to, are your findings what you expected? Is your device performing as you would have liked? What can you interpret form your findings? Are they consistent with past research? Make sure to reference your results where appropriate and talk about why you think your

findings support your conclusions. Finally, discuss any limitations of your project (i.e. what could you have done differently? what would be a good thing to do for future studies?). This section will constitute a significant portion of your grade and you will be evaluated on your ability to interpret results, analyze your findings, and draw conclusions relevant to biomechanics.

Final presentation:

The final presentation should be anywhere between 10-15minutes long. If you are doing one project for both classes, your presentation will likely be on the longer side, since you will need to describe parts relevant to both classes. Similar to the final report, you will need to give a brief introduction to the problem/question you are trying to solve/answer, along with relevant references to your literature search. Then, focus on your methodology and results, ending your presentation with your final conclusions.

ANSYMB 1 project requirements:

Since this course focuses on the analysis of biomechanical data, your project for this class requires you to include data that you either collected or obtained (from us or publicly available databases) from some sort of human or animal movements. This includes ground reaction forces, kinematics, EMG, metabolic, and other data we have discussed in class. Data analysis should span two or more different types of movements (that you will compare) or focus on one movement but use several types of data for analysis. Any movements analyzed should not be anything we have previously done in class. In other words, analyzing ground reaction forces from two different types of movements will not be sufficient. If you would like, we can arrange for you to collect data within the lab.

ANSYMB 2 project requirements:

ANSYMB2 focuses more on constructing real-time control systems with Matlab Simulink and Arduino. Therefore, your ANSYMB2 project requires you to control at least one actuator system and generate any movements which are related to human movements or biomechanics. This includes a mechanical setup, I2C/SPI/UDP communication, motor speed/position/torque control, and may be a bit human movement analysis (e.g. joint angle, toque, power). If you would like, you can use the basic motor test-bed in our lab as your starting point.