

COURSE PROJECT

BME 599 ~ Modeling & Simulation of Human Movement

Objective of Assignment

The purpose of the project is to combine as many concepts from the course as possible to perform a study that will allow you to see “how all the pieces fit together.” This project is designed to be completely open-ended and you will have free reign to pick a topic in the field of biomechanics that you are interested in. You should meet with me to determine a suitable topic. My hope is that by the end of the project, you will have a solid understanding of how geometric modeling, kinematics, forward and inverse dynamics, and optimization all play an important role in the analysis of the human musculoskeletal system. This project will give you a chance to deepen your knowledge in an area of biomechanics that interests you. I expect that you will remember what you learn from this project long after the class is over.

The course project is closer to an actual short-term research project than to a homework assignment. Thus, you will encounter problems along the way that the instructor will not necessarily know how to resolve. You will therefore need to use the same skills necessary to perform successfully in a research lab – creativity, ingenuity, tenacity, and resourcefulness. OpenSim user manuals, tutorials, and user group, along with other students in the course will all be critical resources for completing your project successfully.

Project Research Meetings

It is my hope that you start working on your project early. Note that the semester consists of 16 weeks (2 of which are reserved for presentations and 1 of which is your Spring Break). To help you stay on task, you are required to set up 3 research meetings with me. These meetings will give me a chance to get to know you better and give you feedback that I hope will be helpful.

- Week 6 (2/15-19). We’ll talk about refining your chosen research topic and potential directions for the paper. *Proposal should be emailed a week in advance of this meeting*
- Week 10 (3/15-18). *An outline of your report (conference abstract) should be written by this meeting.* Note that you may not have any data or results at this point, but your Introduction section should be completed. Your figures and tables may not be completed, but you should have a sketch or an idea of how you want to present your results.
- Week 13 (4/4-8). We’ll review the status of your project. You should be almost done or have a general idea of what to do to complete your project. As with any research, however, there may be unforeseen problems. We will brainstorm and discuss some potential solutions to finish your project.

This portion of the project is worth 5% of your total grade. *I am more than happy to meet with you before these dates; however, if you fail to hold your research meetings, you will lose grade points.* Also, feel free to discuss your topic with me at any time, if you would like some additional help. To sign up for meetings, simply submit a calendar event here: <http://rrq.utk.edu/resources/calendar.html#SubmitEvent>.

Deliverables

1. PROPOSAL

An example proposal is available online. This is due a week before your first meeting with me. This will be part of your project report grade.

2. REPORT

A conference-style abstract formatted similar to a 3D Analysis of Human Movement Society abstract. The abstract template will provide the guidelines for the abstract while the sample abstract will provide the content you should present. You can use the template and sample abstract to replace/modify for your own abstract. The length of the abstract should be 2 to 4 pages. *A PDF of the abstract should be emailed to me by midnight on April 29.* This portion of the project is worth 20% of your total grade.

3. ZIPPED FILE OF YOUR PROJECT

A zip file of your project should be emailed to me. This should include your model file(s) as well as any other files needed to complete and perform your project.

4. PRESENTATION

A course project presentation summarizing the problem you addressed in your conference-style abstract, your methods, your main results, and a brief discussion. Your presentation should be no more than 15 minutes (plus a 5-minute question and answer period). The presentation will be timed so you will not be allowed to go over. Presentations will be given in a mini-conference format during the last 2 weeks of the semester. I will assign your presentation date at least a week prior to your presentation. This portion of the project is worth 10% of your total grade.