Class project: Biomechanical Comparison of Two Conditions
BIOE/ME 481: Whole body musculoskeletal biomechanics
Dept. Mechanical Science and Engineering
University of Illinois at Urbana-Champaign
Developed by: Asst. Professor Mariana Kersh
Spring 2021

Project goals:
The aim of this project is for you to apply some of the musculoskeletal biomechanics principals you have learned in this class. The goal is to (attempt to) answer a musculoskeletal biomechanics related question.

Metrics that you will be required to analyze include:
- Joint angles
- Joint torques
- Muscle force estimates

Work in groups of 3 or 4.

You will collect video-based motion capture data of the conditions. Your condition must include ground reaction force data from the literature.

You will also practice writing a scientific proposal and develop your own experiment and associated protocols. Coordination, logistical planning, troubleshooting, and people management skills will also be honed. Your presentation skills will be evaluated with a final video submission at the end of the semester.

Timeline, Deliverables (in italics) and point value
March 3: Project proposal assigned
Mar 17: Proposal due (20%)
4 credit hour students: Turn in 2 extra pages of literature review/background for your project
Mar 22 - Apr 15: Recruit, collect data – raw data files uploaded to Box (20%)
April 26: Preliminary results PPT files due (20%)
May 5: Video presentations due (20%)
May 7: Technical abstract due (20%)
Experiment options

Effect of X on joint angles/muscle forces during activity Y

X:  - muscular fatigue
    - brain fatigue
    - different exercises
    - distractions
    - use of an object: backpack weight, marching band drummers (novice vs. experienced)

Y:
- walking
- fast walking
- stairs up
- stairs down

Any other tasks that you can find ground reaction force data from the literature and that you can safely record.