

**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  
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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.