Beginning of Class

- Download Anaconda(full distro) now so wifi works later
- Assignment 4 updated to include ffmpeg instructions

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Project Pitches

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History of Foldable

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Anaconda Installation

- In Class Exercise

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GROUP assignment 5

- Using the results from Tuesday's assignment (or at least the same methods), please find the answer to as many of these questions as possible, for your team's animal / subsystem / motion(gait).
  - What is the animal / subsytem / motion(gait) pair you are studying?
  - List the biomechanics references you have already found
  - List other bio-inspired robots based on the same platform
  - List the typical body mass, for as many different body parts as possible
  - Find other values
    - speed of the animal while walking / running
    - if running, does the animal leave the ground?
    - typical stride length
    - maximum height off the ground in a stride

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GROUP Assignment 5

- What is the total energy used to complete a single locomotion cycle? What is the power required? How did you calculate this?
- How much respiration energy / power is used? If you can't find it, are there references for a similar animal you could scale? Can you find a reference that tells you how to scale respiration energy across different size animals?
- Find the ground reaction forces involved with completing a typical locomotion cycle.A figure from literature (with the appropriate references) of the animal during a locomotion cycle typical of the one you are studying will suffice. Make sure you include the units
- Supply a figure from literature of the animal's skeleton, exoskeleton, shell, rigid structure. How many moving parts are there in the biological system?

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GROUP Assignment 5

- Draw the simplest representation of the system you can. How many rigid bodies are there? How many can be approximated as massless(1/10 of the total mass or less)? Where are the springs? Where is the (main) motor?
- Draw free body diagrams for those bodies.
- Based on mass a knowledge of the duration and magnitude of the ground/world reaction forces involved in a single stride, what forces/torques would be required at the motor to add enough energy to the system at the ground? What power?
- Look online for a motor and battery which can supply that power. Motor efficiencies may be as high as 95%, but let's assume you find a cheap motor near 50-60% efficiency. How much does it weigh? What are the mechanical watts/kg for motor/battery vs animal? Which one is more efficient? What about after you factor in your structure weight?
- Discuss whether/how you will need to scale your robot up or down, or how you can mitigate the differences.

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After Class

- Complete Survey

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Groups

- Create your group on Blackboard
- Will help with grading submissions
- You may switch, but unless you find new partners you will be consolidated.
- *Limited to 2.