**Oregon State University**

**Actuator Dynamics**

**Open-Loop Actuator Analysis**

**Presentation Due: Wednesday, Week 7**

* Open-loop analysis: How does the actuator behave with no control, just inputs?
* Given
  + The actuator your team has selected
  + A sinusoidal input
* Consider
  + A fixed load position
  + A free load position
  + Anything else that seems relevant
* A good reference for terminology and analysis approach can be found [here](ftp://www.ai.mit.edu/people/dwrobin/pdf/phd_thesis_proposal.pdf).  Check the “Highlights of Thesis Results” section in the introduction.

**Deliverables**

* Input/Output frequency plots of actuator model.  Bandwidth and bode plots
  + Find the small force bandwidth, and generate an open-loop [bode plot](http://www.mathworks.com/videos/understanding-bode-plots-what-are-they-2-of-4-76212.html) (or similar - a frequency plot in the same style is fine)
  + Find the large force bandwidth, and generate an open-loop bode magnitude plot
* Animation of the actuator’s motion, so we can see and understand it, and gain intuition.
* What are reasonable model parameters?

Goals

* Understand the actuator’s dynamics with feed-forward trajectories, and no feedback.  Does it bounce? Does it drag? What does it look like? What are the obvious errors that you’re going to need to control around if you want to achieve some task?