

## Weekly report

### 1. My *Goals* from last week

- Find a mechanical model quantifying force required to cut tissue
- Simulate ball motion in MATLAB using a sine wave and triangular wave force profiles, across a range of frequencies
- Study feasibility of adapting impact driver mechanism to the piledriver

### 2. My *Accomplishments* this week

- a. Goal 1:
  - Obtained useful, well-validated analytical models for tissue cutting forces from the following RA-L paper:  
**Mechanics of Tissue Cutting During Needle Insertion in Biological Tissue** - Mohsen Khadem, Carlos Rossa, Ron S. Sloboda, Nawaid Usmani, and Mahdi Tavakoli (2016)
  - Tissue/needle parameters need to be experimentally measured to use model
- b. Goal 2:
  - In process. Results will be uploaded next week
- c. Goal 3:
  - Understood force-to-torque conversion mechanism of impact driver
  - Feasibility and effectiveness of adapting mechanism to milli-scale needs to be discussed with Dr. Becker

### 3. My *Goals* for next week

- Simulate ball motion in MATLAB using a sine wave and triangular wave force profiles, across a range of frequencies
- Make Mathematica demo of resonant velocity variation with respect to input parameters

### 4. What I need Dr. Becker to do:

- a. Help decide how to obtain parameters for analytical model in Khadem et.al. paper