1. Data:
   1. NEV file – 30kHz sampling rate
      1. Spike Electrodes [1 - 32]
      2. Spike Timestamps in 0.33 millisecond
   2. NS4 file – 10kHz sampling
      1. Acc\_x
      2. Acc\_y
      3. Acc\_z
      4. Gyr\_x
      5. Gyr\_y
      6. Gyr\_z
   3. CSV file – 30Hz sampling rate
      1. Timestamps – in milliseconds
      2. Acc\_data
      3. Gyro data
      4. Position data
2. Get firing rate – count the number of spikes for each neuron in each 0.1 millisecond time gap before the behavior data sample.
3. Get smoothed firing rate – convolve with Gaussian distribution with
4. Build a GLM for behavior -> firing rate with Poisson distribution and log link function:
   1. Data to build models:
      1. Variabels: 0.1 millisecond per sample
         1. Acc\_x
         2. Acc\_y
         3. Acc\_z
         4. Acc\_mag
         5. Gyr\_x
         6. Gyr\_y
         7. Gyr\_z
         8. Gyr\_mag
      2. Response: smoothed firing rate, 0.1 millisecond per sample
   2. Find the best delay between data and firing rate:  
        
      where Dev – is the deviance of the model:  
        
       – is a model we build

- an ideal model which fits all the data

* 1. For the find a GLM and try to add more variables: [y(t+0), y(t+1), y(t+2) …] Look for p-values of this variables. All of them are except y(t+0) => we can base a model on one sample of observations.
  2. Build a model with optimal time shift and based on one sample of observations

1. STA.
   1. For each neuron find Spike-Triggered Average
   2. Find the STA for a random spike train. Generate random spike trains and compute STA for them. Get average.