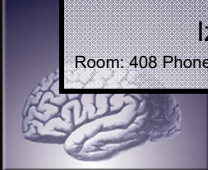



Signal & Data Analysis in Neuroscience

2016

Part 6: Event Related Activity

Izhar Bar-Gad

Room: 408 Phone: 7141 Email: izhar.bar-gad@biu.ac.il










Overview

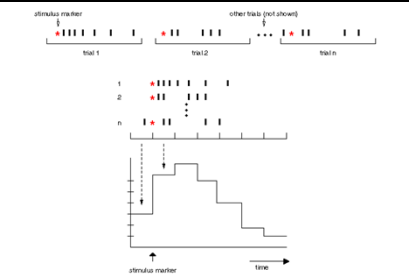
- Event related activity
- Event related interaction

Abeles M. Quantification, smoothing, and confidence limits for single-units' histograms. J. Neuroscience Methods, 1982; 5: 317-25.

IBG










Peri-Stimulus Time Histogram (PSTH)

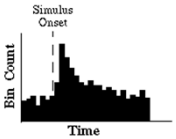


- Peri = Surrounding.
- Sometimes called **post**-stimulus time histogram when considering changes only after the event

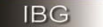
IBG




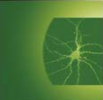





PSTH

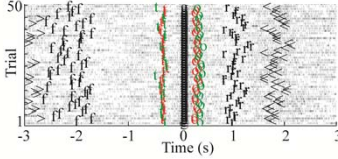
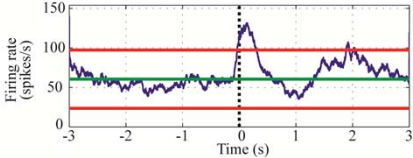


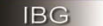
- Normalization
 - Count
 - Probability
 - Rate
- What is the determining factor:
 - Maximum response.
 - Length of the response.
 - Area (integral) of the response.







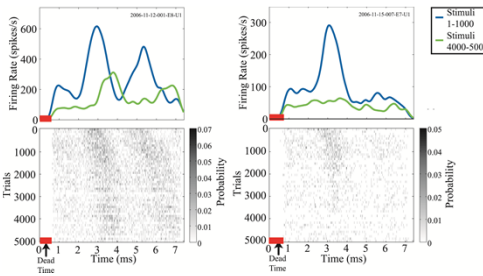
Behavioral PSTH

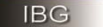






Non-stationary response



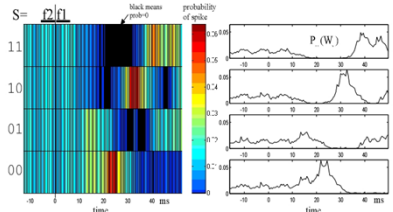





PSTH matrix

The peristimulus time histograms (PSTH) of various binary sequences can be combined in a PSTH Matrix: for each binary sequence S of length L bits count the number of spikes in windows of size W . The matrix of response probabilities can be calculated by normalizing by the number of times, N , each sequence was shown.


PSTH probability matrix for 2 fixed frames; $L=2$, $N=8192$, $W=0.5$ ms.





Overview

- Event related activity
- Event related interaction



Shift predictor I

- Remove non direct effects from the correlation.
- Example: all neurons tend to elevate their firing during activity/stimulus.
- Shift (or realign) according to trials/stimulus.
- Shift may be preformed once or on multiple moves or permutations.

