

Data file and script descriptions and notes for “Neurons responsive to global visual motion have unique tuning properties in hummingbirds” figshare supplement.

Edited by A. H. Gaede and B. Goller on 12 December 2016

Data directories:

2015-CALAN-PSTH-direction

Firing rates for single cells from the direction experiment in hummingbirds. Data columns are: Direction, speed, firing rate in each of 20 time bins (each 250ms, total 5 second recording). NaN indicates a 5-second rest between stimuli. 0 degrees = temporo-nasal, 90 degrees = down

2015-CALAN-PSTH-speed

Firing rates for single cells from the speed experiment in hummingbirds. Data columns are: Direction, speed, firing rate in each of 20 time bins (each 250ms, total 5 second recording). NaN indicates a 5-second rest between stimuli. 0 degrees = temporo-nasal, 90 degrees = down

2015-ZF-PSTH-direction

Firing rates for single cells from the direction experiment in zebra finches. Data columns are: Direction, speed, firing rate in each of 20 time bins (each 250ms, total 5 second recording). NaN indicates a 5-second rest between stimuli. 0 degrees = temporo-nasal, 90 degrees = down

2015-ZF-PSTH-speed

Firing rates for single cells from the speed experiment in zebra finches. Data columns are: Direction, speed, firing rate in each of 20 time bins (each 250ms, total 5 second recording). NaN indicates a 5-second rest between stimuli. 0 degrees = temporo-nasal, 90 degrees = down

PIGEON-PSTH-direction

Firing rates for single cells from a direction experiment in pigeons by D. R. Wylie. Data columns are: Direction, speed, firing rate in each of 20 time bins (each 250ms, total 5 second recording). NaN indicates a 5-second rest between stimuli. 0 degrees = up, 90 degrees = temporo-nasal. Note that the speed is different, and many different directions are used.

Example bootstrap output

Three sample outputs from running the bootstrap simulations in R. These are provided for reference, the scripts are also provided.

PSTH_examples_figureS1

Data for *PSTH_from_spike2_plot.R* script showing the time course of a cell response.

Data file:

LM_dir_and_vel_pigeon_BG_edit.csv

A file with preferred speed information for a set of LM cells recorded in pigeons by D. R. Wylie. The firing rate information was not available, only the preferred speed.

Analysis scripts:

NOTE: All analysis scripts require a path to be provided to a data folder. We suggest that all uploaded files be placed in a single folder on the desktop. The script should then be edited to provide a path to this single folder.

Example:

Place all uploaded files into a single folder named 'gaedeetal 2016'

Insert the following path where requested: C:/Users/USERNAME/Desktop/gaedeetal 2016/

A script line that reads: `dir <- INSERT PATH TO "PIGEON-PSTH-direction/"`

Would become: `dir <- " C:/Users/USERNAME/Desktop/gaedeetal 2016/PIGEON-PSTH-direction/"`

The following packages are used in at least one of the scripts:

tidyverse, readr, circular, ggplot2, nlme, multcomp, lme4

The stimulus speeds in the data files are reported in pixels/frame. They are converted to degrees/second in the analysis scripts.

Direction analysis scripts:

prefdir tuning plot.R

Plot direction tuning for cells in all three species and density plots for different distances from the preferred direction (Figure S2).

zf calan prefdir bootstrap nested.R

Analyze and simulate firing rate data for the direction experiment in zebra finches and hummingbirds (Figure 2).

pigeon prefdir bootstrap.R

Analyze and simulate firing rate data for the direction experiment in pigeons (Figure 2).

Speed analysis scripts:

zf calan cell match tuning w nonlin speed fit.R

Fit sigmoidal function to speed tuning curves for cells in zebra finches and hummingbirds and compare the parameters of these fitted functions. Provides tuning statistics for comparison of zebra finches and hummingbirds.

zf calan cell match tuning -for figshare.R

Analyze direction and speed data for hummingbirds and zebra finches. Provides plots for speed tuning width (Figure S3), and preferred speed data for hummingbirds, zebra finches and pigeons (Figure 3).

zf calan prefspeed bootstrap.R

Bootstrap firing rate data for the speed experiment (Figures 4, S3). There is no pigeon simulation for the speed experiment.

Scripts for other figures:

Gaede_2016_small_multiples-figshare.R

Plot the firing response of a single cell (Figure S4). See comments in the script file for information on how to select a cell.

PSTH_from_spike2_plot.R

Generate peri-stimulus time histograms that illustrate the response of a cell over the course of a 5-second stimulus trial (Figure S1).

Speed_tuning_graphs-figshare.R

Plot speed tuning curves for single cells (Figure 4). See comments in the script file for information on how to select a cell.