# Abstract IBL Post-Error Slowing

Post-error slowing (PES) refers to the phenomenon of reduced response time to a stimulus after an erroneous response. We want to investigate whether a similar phenomenon exists in mice using the public "behavioral data" set collected and released by the International Brain Laboratory (IBL; https://data.internationalbrainlab.org/).

In the respective two-alternative-forced-choice (2AFC) perceptual decision making task mice have been trained to respond to a visual stimulus by turning a wheel in order to get a reward. The stimulus is presented at one of two locations (left or right) to indicate the required turning direction of the wheel. It is also presented at four different contrast levels where higher contrasts are easier to detect and, hence, easier to respond to. We intend to analyze the available data to reveal whether there is a detectable difference in post-error versus post-correct response times which may indicate a PES-like phenomenon in mice. We hypothesize that the most impactful predictor for prolonged response time would be the prior response (correct vs. incorrect).

However, other factors may, too, contribute to a longer response time such as signal contrast or location, the randomized delay of stimulus onset, or whether the trial happened earlier or later in the session. To assess the relative weight of multiple features to predict prolonged response time, we are going to fit a Gaussian generalized linear model (GLM) with response time as the outcome variable. As features, we will include the prior response(s), signal contrast, signal position, delay of stimulus onset, and the session phase of the respective upcoming trial.

First, we will train and test the model on the data of one lab. Then we are going to evaluate performance generalization across data coming from other laboratories. We expect the largest weight to be on the prior response such that an incorrect prior response would lead to a longer response time as seen in the phenomenon of post-error slowing. Findings may add to and substantiate the idea of different internal states in mice which are thought to dynamically update the mice’s decision strategy throughout a multi-trial session.