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Oral

## [3O08m-3]Decision Making

Fri. Jul 31, 2020 11:10 AM - 12:10 PM Room 8

**\*Videos are available throughout the meeting period.**

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### [3O08m-3-02]Neural encoding and decoding of auditory cortex during perceptual decision making

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Neurons in auditory cortex encode auditory stimuli, but the precise encoding can depend strongly on task-relevant variables such as stimulus or reward expectation. This raises the question: If the cortical representation of the stimulus varies with task-relevant variables, how can areas downstream of auditory cortex decode these representations? One possibility is that decoding in downstream areas also depends on these task-relevant variables. To address this question, we developed a two-alternative choice auditory task for head-fixed mice in which we varied either reward expectation (by varying the amount of reward, in blocks of 200 trials) or stimulus expectation (by varying the probability of different stimuli). The task was based on our previous study (Marbach and Zador, bioRxiv, 2016) in which mice selected left or right spout depending on the frequency of tone stimuli (low or high). We used two-photon calcium imaging to record populations of neurons in auditory cortex while mice performed the task. We found that varying either reward or stimulus expectation changed neural representations (i.e. stimulus encoding). However, the optimal decoder was remarkably invariant to different encodings induced by different expectations. The discrepancy between the neural encoding and decoding could be that the prior encoding was independent from the sound decoding in the auditory cortex. Our results suggest that stimuli encoded by auditory cortex can be reliably read out by downstream areas, even when the encoding is modulated by task-relevant contingencies.