

# University of Maryland

## Neuroscience and Cognitive Science Seminar

### *Algorithms and neural circuits in odor-guided behaviors in mice*

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We are interested in odor-guided behaviors in terrestrial animals – for example, odor object segmentation, and odor source localization in fluctuating environments. To help us understand them, we have developed behavioral tasks in mice using stimuli and situations that approximate natural settings, while allowing electrophysiological recordings, high-resolution optical imaging and optogenetic manipulation. I will discuss two related projects that combine behavior and neural recordings with computational approaches.

The first project aims to understand how mice parse complex odor stimuli. In a cluttered sensory environment, animals must segregate objects of interest from ever varying backgrounds, and often categorize them for decision making. We have found that mice can be trained to recognize individual odorants embedded in unpredictable and variable background mixtures with high degree of success. I will discuss how we can relate neural representations of odor mixtures in the mouse olfactory system and the performance of mice in this task.

In a second project, we are investigating the behavioral strategies that mice use for tracking odor trails using a treadmill system that prints odors in real time, while monitoring the position of the mouse's nostrils by multiple video cameras. We also record sniffing patterns of mice during trail tracking using a wireless respiration detector. I will present behavioral results from these experiments, from which we aim to infer the algorithms used by mice to track odor trails, as well as the neural circuits implementing these algorithms.

**Friday, February 9, 2018**

10:15am, Room 1103 Bioscience Research Building

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