

**Speaker:** Elizabeth Hong, Assistant Professor of Neuroscience; Chen Scholar

**Title:** What are the organizational axes of the olfactory code?

**Abstract:** Understanding olfactory coding is challenging due to the complexity of chemical stimuli, which are, by nature, complex, high-dimensional, and not easily organized along any obvious coordinate systems. We investigate this problem in the *Drosophila* olfactory system, which shares a basic circuit architecture with its vertebrate analogs. Olfactory inputs are randomly expanded onto a large population of third-order, mixed layer neurons, which, in the fly, are the principal neurons of the mushroom body, a major associative olfactory area in the fly brain. Large-scale calcium imaging of odor responses in defined olfactory populations revealed that representations of odor are sparse and structured in the mushroom body. In addition, odor relationships are significantly remapped between the input odorant receptor layer and the mushroom body, in a manner that deviates from the simple predictions of a sparse random expansion of olfactory inputs. We discuss our progress towards understanding alternative organizational frameworks by which odor representations are reformatted across successive stages of olfactory processing in the fly brain.