Decoding perceptual decisions in flies

Hokto Kazama

Living organisms make decisions according to the information they gather from the environment. A major goal of our lab is to understand the circuit mechanisms underlying these perceptual decisions. Specifically, we aim to formulate a decoding model that explains sensory-evoked behavior from neural activity. Creating a comprehensive model necessitates an access to a large number of neurons coding the information, but this can be a challenge. We therefore turned to the olfactory circuit of fruit fly *Drosophila melanogaster*, which is numerically simple yet possesses many anatomical and physiological similarities to that in vertebrates. We use two-photon calcium imaging to probe responses in most of the second-order olfactory neurons. In parallel, we monitor behavioral responses to odors in a flight simulator. In this lecture, I will discuss how these approaches can be combined to build a neuronal decoding model that predicts flies’ responses to novel odors in a context-dependent manner.