



BLUMENBACH LECTURE

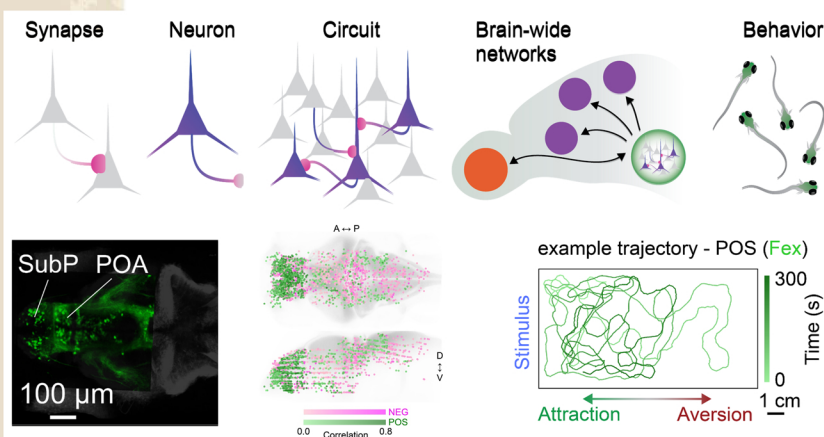
VORTRAGSREIHE DES
JOHANN-FRIEDRICH-BLUMENBACH-INSTITUTS
FÜR ZOOLOGIE UND ANTHROPOLOGIE

How the Brain Turns Odors into Behavior State, Valence, and Action in the Zebrafish Brain

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Olfactory Memory and Behavior (Zebrafish Neurobiology)

How does the brain transform odors into behavior? Olfaction guides essential behaviors such as food search, social interactions, and threat avoidance, yet the neural mechanisms that link chemosensory signals to action remain incompletely understood. Our studies in larval zebrafish combine behavioral assays, tail tracking, and brain-wide two-photon calcium imaging to examine how chemosensory cues are represented across the brain and lead to motor output. Our results show that opposite-valence stimuli evoke distinct navigational strategies and recruit distributed but coordinated neural populations, indicating that stimulus identity, valence, and behavior-related activity are represented in partially distinct but interacting circuits. I will discuss emerging evidence that odor-guided behavior is not fixed, but shaped by internal state and experience. The results suggest that the behavioral meaning of a stimulus changes with context and previous outcome, providing a way to study how valence representations are updated in the brain. Finally, I will outline how this work connects to broader efforts on interoception, including ongoing projects on cardioception, aimed

to understand how internal bodily signals influence neural processing and behavior. These studies provide a brain-wide framework for linking sensory valence, state, experience, and internal physiology to behavioral output.



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