INTERNATIONAL PHD PROGRAM IN NEUROSCIENCE

Zenith

In collaboration with SmartNets
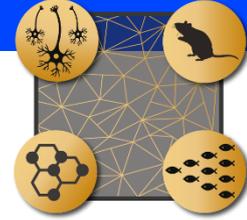
ZENITH SEMINARS

WEDNESDAY, 7 DECEMBER 2022 AT 5:00 PM (CET)

ARMIN BAHL
CENTRE FOR THE ADVANCED STUDY OF COLLECTIVE BEHAVIOUR
UNIVERSITY OF KONSTANZ, GERMANY

_____

NEURAL BASIS OF MULTI-CHANNEL INFORMATION INTEGRATION AND DECISION-MAKING

Decision-making is a long-studied topic in neuroscience. We have an increasingly good mechanistic understanding of the neural circuits that allow animals to temporarily integrate specific decision variables. However, it remains unclear how these circuits combine, often conflicting, information from multiple sensory channels to form a single decision. Recently, we have described how the larval zebrafish anterior hindbrain integrates visual motion to decide about swimming direction. Other studies, focusing on different sensory stimuli, have identified the same brain area as a central processing structure for sensory-motor control. This raises the hypothesis that the anterior hindbrain forms a general integration hub for decision-making. Here, we employ a combination of behavioral experiments, computer simulations, and two-photon functional imaging to algorithmically and mechanistically describe how larvae integrate motion and luminance cues. Our behavior experiments argue for a parallel arrangement with inhibitory crosstalk, in which separate modules temporally integrate information from distinct visual processing streams. Our imaging experiments support these findings, revealing distinct and partially overlapping activation patterns with slow temporal dynamics. Together, these results allow us to build detailed neural networks that will help us to describe in mechanistic detail how brains combine and evaluate information from multiple sensory sources.

_____

Armin studied Computational Neuroscience and Biophysics at the Humboldt University Berlin and the University College London. He then moved to the Max Planck Institute of Neurobiology in Munich to pursue his Ph.D. work on *Drosophila* visual system circuit neuroscience. For his postdoc, he switched to the lab of Florian Engert at Harvard University to explore how zebrafish larvae integrate visual motion cues and make motor decisions. Armin is now a group leader at the University of Konstanz where he seeks to elucidate the detailed algorithmic and neuronal mechanisms underlying this behavior.

TO JOIN THE SEMINAR, PLEASE CLICK HERE