MPIDS Colloquium

MAX-PLANCK-GESELLSCHAFT

Vision to Behavior - Neural circuits for sensorimotor decision-making in zebrafish

Prof. Herwig Baier

Max Planck Institute of Neurobiology
Genes – Circuits – Behavior
Martinsried, Germany

How objects are encoded in the brain and how their identification and localization results in finely tuned motor responses is largely unknown. We are investigating the prey capture behavior of larval zebrafish as a model system to address this question. Machine vision analysis of prey capture kinematics in free-swimming larvae suggested that dedicated circuits exist that control orientation, pursuit and capture strike movements. We found that a dot moving horizontally across a miniature LED screen evoked typical prey-capture maneuvers in head-immobilized fish larvae. This response is selectively tuned to size and speed of the stimulus. With two-photon GCaMP6 imaging, we identified a pretectal area that responded robustly to the optimal prey stimulus. Laser ablations showed that this area is necessary for prey-catching behavior. Interestingly, the RGCs projecting to this area fall into just two morphological and genetically identifiable classes. We similarly identified distinct pathways for the detection of looming visual stimuli and of optic flow. Optogenetic perturbations and imaging of downstream neurons are beginning to reveal the circuits underlying visuomotor transformations.

Wednesday, June 28th, 2017 at 2:15 pm

MPIDS, Prandtl lecture hall, building AI, Am Faßberg 11, Göttingen

Max Planck Institute for Dynamics and Self-Organization
Nonlinear Dynamics
Prof. Theo Geisel
Email: geisel@nld.ds.mpg.de, Phone: +49-(0)551/5176-400
Am Faßberg 17, 37077 Göttingen, Germany