DZNE German Center for Neurodegenerative Diseases within the Helmholtz Association

CHARITÉ UNIVERSITÄTSMEDIZIN BERLIN

NEUROCURE Cluster of Excellence

EINSTEIN CENTER Neurosciences

Einstein Center for Neurosciences Berlin

Neuroscience Colloquium

Summer Semester 2018

Lectures are held Thursdays, 5 p.m.
Venue: Paul-Ehrlich Lecturehall, Virchowweg 4, next to CCO

Michael Orger

CENTRO CHAMPALIMAUD, NEUROSCIENCES, LISBOA, PORTUGAL

Neural circuits mediating visually guided behaviours in zebrafish

We are interested in the innate behaviors of animals and the neural circuits that produce them. Larval zebrafish are an excellent model to address this question, since their behavior is straightforward to quantify; their small transparent brains allow single-cell resolution, whole-brain imaging, and, even at a week old they show a variety of robust sensorimotor behaviors. For example, they orient themselves to and follow the direction of optic flow, capture moving prey and avoid threats. We used a behavioral set-up that allows online high-speed tracking of several freely swimming zebrafish larvae, and simultaneous presentation of visual stimuli, to record swimming behavior of 6 to 7 day-old larvae under a diverse set of conditions. We developed a simple unsupervised clustering method that can robustly identify different swim bout categories based on kinematic criteria. In our assay, larvae show a small set of preferred swim patterns, which systematically tile a region of kinematic space. While some patterns are used broadly across many conditions, others are used only in specific contexts. By analyzing the sensory stimuli preceding different bout types in freely swimming fish in social or feeding contexts, we could associate different bout types with distinct sensorimotor responses. We use in vivo calcium imaging to investigate how visual cues, such as motion and luminance, that drive these behaviors are processed in the retina and downstream regions, using transgenic lines that express genetically encoded indicators in defined neural populations. 3D registration to a reference brain anatomy allows comparison of activity maps across animals, and reveals a striking degree of stereotypy in functional organization.

Location: Paul Ehrlich-Hörsaal,
Charité – Universitätsmedizin Berlin, Campus Mitte
Virchowweg 4, next to CCO

Date: **Thursday, April 19th, 5 p.m.**

Host: Benjamin Judkewitz

The Neuroscience Colloquium is supported by:
DZNE e.V. German Center for Neurodegenerative Diseases;
Einstein Center for Neurosciences; **NeuroCure** Cluster of Excellence.
Organized by NeuroCure and Institute for Neurophysiology: Christian Rosenmund;
Contact: heidi.pretorius@charite.de