

**You are invited to the Biophysics Seminar by**

**Dr. Lior Appelbaum**

The Faculty of Life Sciences and the Multidisciplinary Brain Research  
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**Tuesday, April 9<sup>th</sup> at 14:00**

**Physics Department, Seminar Room (3<sup>rd</sup> floor)**

**Visualizing single circuits and synapses in live model  
animals for brain disorders**

A fundamental question in neuroscience is how multiple synaptic connections develop into neural circuits that generate behavior and adapt to changing external inputs. Indeed, deficiencies in synaptic connections are associated with sleep disorders and psychomotor retardation. Which circuits are deficient and what is the molecular mechanism of these diseases remains mostly unknown, since the circuit wiring is hidden within the opaque mammalian brain. The high throughput transparent zebrafish model allows to non-invasively determine patterns of structural synaptic plasticity and to study in live vertebrate the genetic basis of brain disorders. Importantly, it provides a system to visualize longitudinally structural changes of multiple brain circuits in the live vertebrate at single synapse resolution. Using genetic manipulation, two-photon imaging in live fish and video-tracking of behavior, we determine functional interactions between genes, structural synaptic plasticity, sleep disorders and psychomotor retardation.