# FENS 2018 Berlin

***Satellite Symposium "Resolving the brain circuitry: a story of tools, experiments & models"***

**6th July 2018, Harnack-Haus of the Max Planck Society**

The satellite meeting "Resolving the brain circuitry: a story of tools, experiments and models" will be jointly organized by three DFG-funded Priority Programs (**SPP 1665** "Resolving and manipulating neuronal networks in the mammalian brain – from correlative to causal analysis", **SPP 1926** "Next Generation Optogenetics - Tools and applications" and **SPP 2041** "Computational Connectomics"). The event will take place on July 6th at the Harnack-Haus of the Max Planck Society in Berlin.

The symposium aims to summarize the recent knowledge gain in understanding the mechanisms of brain wiring by introducing newly developed tools for the interrogation of neuronal circuits and analytical approaches designed to model the network connectivity. Talks by six internationally renowned speakers will be complemented by recent scientific highlights from all three Priority Programs.

The main aim of the **SPP 1665** is the elucidation of causal relationships linking neuronal activity and behavior in mammals. The recent technical development (new recording and imaging techniques, new optogenetic tools) are used to monitor, manipulate and understand information processing from single neurons, microcircuits and large-scale neuronal networks to sensory-motor and cognitive behavior. Analysis of network dynamics and modeling allow functional evaluation of mechanistic hypotheses and back-up the links to behavior. To this end, "experimenters", i.e. researchers resolving or manipulating neuronal activity, "toolmakers", i.e. researchers developing and validating the recording and manipulation methods, and "analysts", i.e. researchers analyzing network dynamics or dissecting the functional readout team up. The tool development and computational approaches are addressed in more detail in the SPP 1926 and 2041, respectively.

The **SPP 1926** aims to identify natural light-sensitive proteins with specific functions, to be harvested as novel optogenetic tools, to modify existing tools, or to design novel ones in the lab. The new optogenetic tools are characterized by biophysical methods to enable a precise understanding and further modification for specific applications. Importantly, they are implemented in cells and animal models, to prove their utility. In addition, small-molecule opto-chemical tools are being pursued, novel targeting techniques for cell-type specific expression in the brain, as well as novel hardware for bringing light into living tissue.

Recent years have seen remarkable progress in our ability to reconstruct wiring diagrams from the scale of local neural circuits to large-scale wiring patterns between entire brain areas. High throughput approaches promise to produce data sets of unprecedented size at unprecedented speed. As experimental techniques are maturing, the new **SPP 2041** will address the growing need to develop computational approaches to facilitate the automated reconstruction of connectivity from experimental approaches, to support the curation and open-access distribution of large-scale data sets, to undertake systematic analysis of complex connectivity networks, as well as use computational modeling and theory to better understand these data sets.

For registration please send an email to Kathrin Harringa (harringa@zmnh.uni-hamburg.de). Refreshments will be provided during the meeting.