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Bonn Lecture Series in Neuroscience

Brain and attentional state dependent network dynamics in visual cortex

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Wednesday, June 08th 2016, 15:00h
Life & Brain, Seminar Room, Ground Floor

The mission of the Golshani laboratory is to discover how changes in the excitability and connectivity of neuronal ensembles results in autism and developmental epilepsies. By finding the specific microcircuit elements causing network dysfunction we hope to discover new treatments that will improve the lives of children suffering from these conditions. By looking at multiple models of these diseases we hope to find convergent evidence for shared physiological causes for these disorders. In our search for disease-related changes in neuronal network function we will also uncover how the healthy brain processes sensory information, lays down and erases memories, and makes decisions.

To make our discoveries we use simultaneous in-vivo two photon calcium imaging and in-vivo patch clamp recordings in awake behaving developing and adult model animals. These techniques allow us to record activity of large identified ensembles of cortical neurons as these animals perceive sensory information and make decisions. We hope to combine these techniques with optogenetic tools to manipulate the activity patterns of specific interneuronal subtypes.

Selected Publications

Bakhurin KI, Mac V, **Golshani P**, Masmanidis SC. (2016) Temporal correlations among functionally specialized striatal neural ensembles in reward-conditioned mice. *J Neurophysiol*, 115(3): 1521-1532.

Srinivasan R, Huang B, Venugopal S, Johnston AD, Chai H, Zeng H, **Golshani P**, Khakh BS (2015) Physiological Ca^{2+} signaling in astrocytes from $Ip3r2^{-/-}$ mice in brain slices and during startle responses in vivo. *Nature Neuroscience*, 18: 708-717.

Cowansage K; Shuman T, Chang A, **Golshani P**, Mayford M. (2014) Top-down manipulation of a natural memory by optogenetic control of cortical circuits. *Neuron*, 84: 432-441.

Polack PO, Friedman J, **Golshani P**. (2013) Cellular mechanisms of brain-state-dependent gain modulation in visual cortex. *Nature Neuroscience*, 6: 1331-1339.

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