

Selected Publications

Amygdala ensembles encode behavioral states.

Gründemann* J, Bitterman* Y, Lu T, Krabbe S, Grewe BF, Schnitzer MJ, Lüthi A. *Science*. 2019 Apr 19;364(6437).

Neural ensemble dynamics underlying a long-term associative memory. Grewe BF, **Gründemann J**, Kitch LJ, Lecoq JA, Parker JG, Marshall JD, Larkin MC, Jercog PE, Grenier F, Li JZ, Lüthi A, Schnitzer MJ. *Nature*. 2017 Mar 30;543(7647):670-675.

Distinct Hippocampal Pathways Mediate Dissociable Roles of Context in Memory Retrieval. Xu C, Krabbe S, **Gründemann J**, Botta P, Fadok JP, Osakada F, Saur D, Grewe BF, Schnitzer MJ, Callaway EM, Lüthi A. *Cell*. 2016 Nov 3;167(4):961-972.e16.

Ensemble coding in amygdala circuits for associative learning. **Gründemann J**, Lüthi A. *Curr Opin Neurobiol*. 2015 Dec;35:200-6.

Calcium-Activated Potassium Channels at Nodes of Ranvier Secure Axonal Spike Propagation. **Gründemann J**, Clark BA. *Cell Rep*. 2015 Sep 22;12(11):1715-22.

Amygdala interneuron subtypes control fear learning through disinhibition. Wolff* SB, **Gründemann* J**, Tovote P, Krabbe S, Jacobson GA, Müller C, Herry C, Ehrlich I, Friedrich RW, Letzkus JJ, Lüthi A. *Nature*. 2014 May 22;509(7501):453-8.

Bonn Lecture Series in Neuroscience



Imaging deep: State and sensory coding in subcortical circuits

Prof. Dr. Jan Gründemann

University of Basel, Department of Biomedicine, Pharmazentrum, Basel, Switzerland

Thursday, July 4th, 2019, 4.00 pm
Life & Brain, Seminar Room, Ground Floor

Internal states, including affective or homeostatic states, are important behavioral motivators. The amygdala is a key regulator of motivated behaviors, yet how distinct internal states are represented in amygdala circuits is unknown. Here, by longitudinally imaging neural calcium dynamics across different environments in freely moving mice, we identify changes in the activity levels of two major, non-overlapping populations of principal neurons in the basal amygdala (BA) that predict switches between exploratory and non-exploratory (defensive, anxiety-like) states. Moreover, the amygdala broadcasts state information via several output pathways to larger brain networks, and sensory responses in BA occur independently of behavioral state encoding. Thus, the brain processes external stimuli and internal states orthogonally, which may facilitate rapid and flexible selection of appropriate, state-dependent behavioral responses.