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## Vortragseinladung

**Montag, den 24.07.2017, 14 ct**

**Thema: Roles of attention and reward in perceptual learning**

**Ort: Universität Regensburg, H24 (Vielberth-Gebäude)**

**Referent: Takeo Watanabe, The Fred M Seed Chair, Distinguished Professor**  
**Yuka Sasaki, Associate Professor,**  
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Perceptual learning (PL) is defined as long-term performance improvement on a perceptual task as a result of perceptual experience (Beer & Watanabe, *Exp Brain Res*, 2009; Watanabe & Sasaki, 2015, *Ann Rev Psychol*; Shibata et al 2017, *Nat Neurosci*). We first found that PL occurs for task-irrelevant and subthreshold features and that pairing task-irrelevant features with rewards is the key to form task-irrelevant PL (TIPL) (Watanabe, Nanez & Sasaki, *Nature*, 2001; Watanabe et al, 2002, *Nature Neuroscience*; Seitz & Watanabe, *Nature*, 2003; Seitz, Kim & Watanabe, 2009, *Neuron*; Shibata et al, 2011, *Science*). These results suggest that PL occurs as a result of interactions between reinforcement and bottom-up stimulus signals (Seitz & Watanabe, 2005, *TICS*). On the other hand, fMRI study results indicate that lateral prefrontal cortex fails to detect and thus to suppress subthreshold task-irrelevant signals. This leads to the paradoxical effect that a signal that is below, but close to, one's discrimination threshold ends up being stronger than suprathreshold signals (Tsushima, Sasaki & Watanabe, 2006, *Science*). We confirmed this mechanism with the following results: Task-irrelevant learning occurs only when a presented feature is under and close to the threshold with younger individuals (Tsushima et al, 2009, *Current Biol*), whereas with older individuals who tend to have less inhibitory control task-irrelevant learning occurs with a feature whose signal is much greater than the threshold (Chang et al, 2014, *Current Biol*). From all of these results, we conclude that attention and reward play important but different roles in PL (Watanabe & Sasaki, *Ann Rev Psychol*, 2015).