The Sense of Memory:
Integration and representation of sensory processes

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Tuesday  April 25, 13:40 – 16:20

Session 2  Interaction of cortical, cortico-cortical and subcortical structures

**DORA ANGELAKI**
Department of Neuroscience, Baylor College of Medicine, Houston, USA

**Multisensory Neural Computations for Perceiving Self-Motion and Object Motion**

Navigation and spatial orientation are vital functions in our lives. Sensory information arises from the balance (vestibular) organs in the inner ear, as well as from visual optic flow and other sensory, motor and cognitive cues. As such, a fundamental aspect of our sensory experience is how information from different modalities is often seamlessly integrated into a unified percept. Both theory and behavioral studies have shown that humans and animals combine multiple cues, as well as prior experiences based on the statistics of our environment and our interactions with it, according to a statically optimal scheme derived from Bayesian probability theory. Using navigational heading perception tasks, we show how multisensory interactions improve precision, reaction time and accuracy. The latter is particularly important when navigational environments include independently-moving objects. We study both computational principles and their neural implementations in diverse subcortical and cortical circuits that process visual (optic flow) and vestibular (acceleration) signals.