



Centre de Neurosciences Psychiatriques

CNP SEMINAR

ANNOUNCEMENT

Friday, May 13, 2022, 11:00 – 12:00

Sensory Inference, Perception and Mental Imagery

Prof Fred Mast

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I will talk about different studies on mental imagery, and I will present conceptual considerations about how mental simulations can be implemented in the brain. A case in point is the vestibular system, which is involved in cognitive processes such as mental rotation, body representation, numerical tasks and affective control. Despite interesting empirical findings, the underlying mechanisms are not well understood. Key to a better understanding of vestibular involvement in cognition is to consider the probabilistic computations performed by the vestibular system. A probabilistic model is a dynamic latent variable model, in which the latent variables represent the dynamics of the head. This helps to distinguish passive and active, self initiated movements. Besides information obtained via efference copy, the model can also incorporate higher-level knowledge. Cognitive tasks such as perceptual decision-making, meta-cognition and mental rotation are using the same probabilistic model in combination with higher-level knowledge. Many cognitive mechanisms can be explained on the basis of sensory inference. This means that mechanisms involved in sensory inference are used in offline operations, and interactions between online sensorimotor processing and offline usage helps to better conceptualize the interplay between the processing of sensory information and cognitive processes.

Invited by Ron.Stoop@unil.ch

Selected recent publications:

Ellis, A.W. & Mast, F.W. (2017) Towards a dynamic probabilistic model of vestibular cognition. *Frontiers in Psychology*, 8 (Cognition). doi:10.3389/fpsyg.2017.00138

Klaus, M.P., Wyssen, G.C., Frank, S.M., Malloni, W.M., Greenlee, M.W. & Mast, F.W. (2020). Vestibular stimulation modulates neural correlates of own-body mental imagery. *Journal of Cognitive Neuroscience*, 32(3), 484-496. doi: [10.1162/jocn_a.01496](https://doi.org/10.1162/jocn_a.01496).

Gurtner, L.M., Hartmann, M. & Mast, F.W. (2021). Eye movements during visual imagery and perception show spatial correspondence but have unique temporal signatures. *Cognition*, 210, p. 104597. doi:10.1016/j.cognition.2021.104597

**Salle de séminaire, 1^{er} étage CNP
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Link for videoconference

<https://chuv.webex.com/chuv/j.php?MTID=m68d7d5a53e61209835f43e4f9e22c48f>