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Talk Title: The role of autonomic activities in human motor learning and control

Abstract:

Facing the ever-changing world, animals must learn to adjust their movement to many different situations. Experience of an environmental change leads to changes in various internal states, such as novelty, surprise, or uncertainty about a given sensory event. Changes in these subjective states are often accompanied by changes in autonomic arousal, which could be partially read out from, for example, heart rate, electrodermal activities, and pupil diameter. As highlighted in recent studies, such autonomic arousal plays a significant role in forming episodic memory (Clewett et al., Nat Comm, 2020). Here, one unexplored question is whether/how such autonomic arousal contributes to the formation and expression of motor memory.

In the talk, I will introduce a series of behavioral studies in which we simultaneously measured a single or a combination of these peripheral autonomic measures during human motor learning experiments. Based on the results and some simulations using a recently proposed model for contextual inference (Healds et al., Nature, 2021), I will further discuss the potential link between autonomic responses and the contextual inference process. I will also introduce an ongoing challenge of in vivo imaging of human locus coeruleus using ultra-high field (7T) MRI.

Biographical information:

Dr. Atsushi Yokoi is the Researcher at the CiNet, NICT, Japan. His research interest includes movement representation and computational mechanisms in human motor control and learning. He graduated from Kyoto Univ. for his undergraduate and master's degrees. He then completed his Ph.D. with Dr. Daichi Nozaki at the Univ. of Tokyo, followed by postdoctoral training at the UCL Institute of Cognitive Neuroscience and later at the Univ. of Western Ontario with Dr. Jörn Diedrichsen. After another postdoctoral position at the

Osaka Univ. with Dr. Shigeru Kitazawa, he has been in the current position since 2017. He is also in the Visiting Researcher position at the Osaka Univ., Grad. School of Frontier Biosciences since 2017.