universität wien

Faculty of Psychology

Colloquium lecture of Dr. Matthias Stangl

Spatial representations for self and others during naturalistic movement and behavior

Some of the most fundamental abilities in humans, such as navigating an environment without getting lost, or the formation of episodic memories, depend on our ability to process spatial information about where we are, and about the environment we are in. Our brain supports these functions by encoding neural representations of spatial information, for example by functionally classified neurons that show spatially-modulated firing properties. To date, the vast majority of what is known about the brain's spatial representation system stems from research in non-human animals, or humans tested under non-naturalistic conditions (e.g., stationary participants performing tasks on a computer screen). Most recently, however, we have developed a technical platform to investigate human deep brain activity with high ecological validity in a rare group of clinical patients, during naturalistic real-world experiences and largely unrestricted ambulatory movement. With this setup, we have discovered that human deep brain oscillations encode several types of spatial representations, such as information about one's own location and self-motion properties, during navigation in real-world environments. Moreover, we found evidence for neural mechanisms in the human brain to encode spatial information not only for the self, but also for other individuals in a shared environment. Together, these findings shed new light on the neural substrate underlying spatial navigation functions and awareness of others in real-world scenarios.

Matthias Stangl, PhD
University of California, Los Angeles (UCLA)
Semel Institute for Neuroscience and Human Behavior
Laboratory of Neuromodulation & Neuroimaging

The colloquium lectures of this semester take place online!
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