Universität Regensburg

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Chair of Cognitive Neuroscience

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# Guest Lecture (via Zoom)
## Friday, 07.05.2021, 15:15

**Title:** Rethinking behavior in the light of evolution

**Speaker:** Paul Cisek

University of Montreal, Department of Neuroscience, Canada

http://www.cisek.org/pavel/

**Zoom-Link:** https://uni-regensburg.zoom.us/j/64510642300
Meeting ID: 645 1064 2300
Passcode: 381898

**Abstract.** In psychology, neuroscience, and AI research, the human brain is usually thought of as an information processing system that encodes and manipulates representations of knowledge to produce plans of action. This view leads to a decomposition of behavior into putative processes such as object recognition, memory, decision-making, action planning, etc., inspiring the search for the neural correlates of these processes and attempts to simulate them in computational models. However, empirical neurophysiological data does not support many of the predictions of these classic subdivisions, consistently showing divergence and broad distribution of functions that should be unified, mixed representations combining functions that should be distinct, and a general incompatibility with the conceptual subdivisions posited by theories of information processing. In this talk, I will explore the possibility of resynthesizing a different set of functional subdivisions, guided by the growing body of data on the evolutionary process that produced the human brain. The main part of my talk will summarize, in chronological order, a proposed sequence of innovations that appeared in nervous systems along the lineage that leads from the earliest multicellular animals to humans. Along the way, functional subdivisions and elaborations will be introduced in parallel with the neural specializations that made them possible, gradually building up an alternative conceptual taxonomy of brain functions. These functions emphasize mechanisms for real-time interaction with the world, rather than for building explicit knowledge of the world, and the relevant representations emphasize pragmatic outcomes rather than decoding accuracy, mixing variables in just the way seen in real neural data. I suggest that this alternative taxonomy better delineates the real functional pieces into which the human brain is organized, offers a more natural mapping to real neural structures, and provides a better set of constraints for constructing artificial systems aimed at replicating advanced brain function.