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## **RHYTHM 'N' MOVES - A WINDOW INTO BRAIN AND BEHAVIOR**

Rhythmic movements are ubiquitous and regarded as an archetypal expression of human and animal behavior. My research has employed behavioral, modeling, robotic, and brain imaging methods to examine human rhythmic performance in single-, multi-joint, and interactive perceptual-motor tasks. Starting with the longstanding question of what kind of timing mechanism or “clock” is in the central nervous system, one line of experiments showed how rhythmic performance arises from an adaptive internal timing mechanism coupled to external stimuli and biomechanical properties of the movement system. Research on multi-joint drawing movements addressed the issue of how rhythmic movements may form the “primitives” for complex actions. Brain imaging work demonstrated that rhythmic movements are associated with different brain areas compared to discrete actions, suggesting different control mechanisms. At the example of an interactive perceptual-motor task, rhythmically bouncing a ball, we show that control principles are not confined to the actor’s control alone but are defined over the actor and the physical environment. Finally, ongoing research on learning and long-term retention of rhythmic bimanual movements raises the question of specificity of neural plasticity in motor memory.



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