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Title: Modeling Challenges in Motor Control.

Abstract: Motor control is a field of Neuroscience that is characterized by major modeling challenges. Motor control relies heavily on the integration of sensory inputs (tactile, visual, …) with predictive mechanisms based on internal models of the controlled plants (eye, limb, …) and their interaction with the environment (gravity, perturbations, …). This talk will review some of the major challenges in modeling motor control: the importance of sensory and motor noise, the weighting between sensory and predictive signals, the hierarchical control of multiple platforms (eye, head, and trunk), the reference frame transformations performed by population of neurons in the brain and finally the important learning mechanisms involved. The mathematical models that will be presented are based on experimental results from both normal and pathological subjects (clinical studies).