

IGSN - SYMPOSIUM

Monday, June 20th 2022 • 15.00 (3 pm)

Cerebellar learning beyond circuits, networks and oscillations

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The complex behaviors of the 'simple' cerebellar circuit (or how we chew gum and walk at the same time)

Even the seemingly simplest actions require precise coordination of multiple body parts. The cerebellum is essential for coordinating movement, but we still don't understand how cerebellar circuit computations contribute to whole-body behaviors like locomotion. We have taken a behavior-centric approach to this problem, establishing a quantitative framework (LocoMouse) that reveals specific, cerebellum-dependent features of locomotor coordination (e.g. Machado et al., eLife 2015, 2020). This work suggests that cerebellar ataxia stems from an inability to predict the consequences of movements across the body. We are further investigating this idea by studying neural circuit mechanisms of a form of locomotor learning in which mice adapt their locomotor patterns to achieve a more symmetrical gait while walking on a split-belt treadmill (Darmohray et al., Neuron 2019). Our most recent work demonstrates that individual Purkinje cells encode the movements of multiple body parts, providing precise representations of temporal coordination across diverse combinations of behavioral events. These findings resolve long-standing controversies surrounding the role of Purkinje cells in locomotor control and could allow for efficient readouts of whole-body coordination for flexible behavior.

Host:

VIOLETA CARAGEA

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Guests are welcome!

