

TOPOLOGICAL PROPERTIES OF NEURONAL CIRCUITS EMERGING FROM SPONTANEOUS DYNAMICS: FROM HUB NEURONS TO CEREBELLAR NETWORKS FAILURES

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Starting from evidence of how spontaneous activity is a shared property of multi-scaled neuronal circuitries, I will introduce the framework of complex networks to study the structure-function relationship of brain circuits, distinguishing among structural, functional and effective connectivity. In this framework, I will present multi-scale evidence of how neuronal spontaneous dynamics allows highlighting key features of structural-functional connectivity both in physiological conditions, where the fingerprint of functional modules and neuronal hubs ultimately emerges, and in pathological conditions, such as the ATM-KO cerebellar circuits, where impaired synchronizations emerge. Finally, I will show how astrocytic replacement can impact ATM-KO cerebellar circuits topology and restore neuronal synchronizations.

