

## **Multiscale simulation and modeling of memristive devices for neuromorphic computing**

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Since the first experimental demonstration of a memristive device in 2008, numerous materials and structures have been devised to optimize the memristive behavior aiming at emulating the biological synapses. However, although it is possible to find a wide variety of materials and devices that have demonstrated their ability to reproduce the memristive behavior, there is a lack of understanding about the different physical mechanisms underlying the experimental results. Thus, in this talk we will present a multiscale approach, beginning from the atomistic description of the materials to the numerical modeling of a complete device and its I-V characteristics, to finally get to the design and simulation of simple neuromorphic circuits that are expected to become essential components of sophisticated computational systems emulating the brain behavior. These numerical experiments will guide us to control and improve the performance of these devices and therefore, of the systems built on them.

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