

Neuromorphic systems based on memristive devices and ioelectronics

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Organic based Biosensing and memristive devices are more and more paving the way to novel perspectives both in mimicking and interfacing natural systems while representing an ideally suitable platform for applications in bio-electronics and bio-medicine. Furthermore they represent a very promising playground for neuromorphic devices and systems. Our contribution to the field including applications to drug delivery studies and bioelectronics will be introduced and discussed together with the recent achievements in developing memristive devices based both on PANI/PEO and PEDOT::PSS polymers. The evolution from simple logic elements up to the first organic based Perceptron will be discussed envisaging the perspectives. The results and potential of the approach based on organic electrochemical devices will be discussed together with the great potential of these devices in the framework of other methods and technologies already established in the field,. The novel approach based on interfacing memristive devices with biological cells and systems will be discussed together with the demonstration of a memristive organic-bio-hybrids that will be proposed and discussed as a potential for novel very promising applications. The first demonstration of an artificial synapsis interfacing, stimulating and reacting to a living brain will be reported