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Solid State Neuroscience

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In this talk I shall introduce some basic notions of electronic neuromorphic functionalities of materials and devices.
I shall first briefly describe our efforts towards implementing artificial neurons exploiting the electric Mott transition. Then, I shall describe in more detail our recent work implementing a new silicon-based memristive neuron. This artificial spiking neuron is extremely simple as it exploits an overlooked memristive feature of a "forgotten"conventional electronic device, the thyristor. The main features of the memristive silicon neuron circuit are that it provides a simple and physical spiking neuron model that can be associated as LEGO blocks to build spiking neural networks that are relevant to Neuroscience, which we are beginning to explore.

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