



SEMINAIRE ISMO

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Nanodevices for Bio-inspired Computing

In the last five years, Artificial Intelligence has made striking progress, and now defeating humans at subtle strategy games, such as Go, and even Poker. However, these algorithms are running on traditional processors which have a radically different architecture than the biological neural networks they are inspired from. This considerably slows them down and requires massive amounts of electrical power, more than ten thousand times what the brain typically need to function. This energy dissipation is not only becoming an environmental issue, but it also sets a limit to the size of neural networks that can be simulated. We are at a point where we need to rethink the way we compute, and build hardware chips directly inspired from the architecture of the brain. This is a challenge. Indeed, contrarily to current electronic systems, the brain is a huge parallel network closely entangling memory and processing.

In this talk, I will show that, for building the neuromorphic chips of the future, we will need to emulate functionalities of synapses and neurons at the nanoscale. I will review the recent developments of memristive nano-synapses and oscillating nano-neurons, the physical mechanisms at stake, and the challenges in terms of materials. Finally, I will present the first achievements of neuromorphic computing with novel nanodevices and the fascinating perspectives of this emerging field.

Mardi 13 février 2018 à 11 h
Amphithéâtre du bât 520 (3^{ème} étage)
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