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NEUROMORPHIC COMPUTING WITH SPINTRONIC NANODEVICES

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Computing systems inspired by biological neural networks can perform complex tasks for which they were not explicitly programmed, by learning from examples. They demonstrate amazing performances in machine learning tasks such as image or speech recognition, or natural language processing. However, they are executed on traditional von Neuman architecture computers, resulting in huge energy consumption.

Building hardware inspired by brain enables analog neuromorphic computing and machine learning with low energy consumption. Due to their nanometric size and nonlinear properties, magnetic tunnel junctions are great candidates for artificial neurons. I will present few experiments that we have realized where spintronic circuits based on these artificial neurons were used to successfully classify different forms such as spoken digits or vowels, or distinguishing sines from squares.

Dr Danijela Markovic has obtained her PhD at Ecole Normale Supérieure in Paris, on quantum information with superconducting circuits.. She currently works at the CNRS/Thales Laboratory at Palaiseau, France on neuromorphic computing with spin torque nano-oscillators.

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