Ramp project

Real neurons-nanoelectronics Architecture with Memristive Plasticity

http://www.rampproject.eu/
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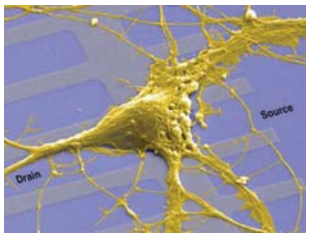
Abstract

Our aim is to create, for the first time, a biohybrid architecture (RAMP) merging natural and artificial neurons endowed with elements of plasticity into a unique entity. Artificial neurons, realized in a silicon microchip by a combination of CMOS and memristor technology, will be physically interfaced to natural neurons through electrical transducers forming a biohybrid network. The new system will self-organize, evolve and adapt to input stimuli owing to intrinsic plasticity of the natural component and to the interplay with the artificial network.

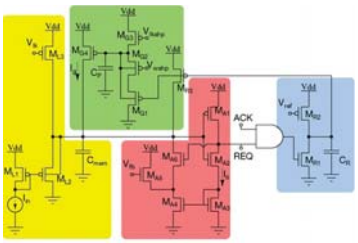
Project: biohybrid adaptive architecture

Biological neurons



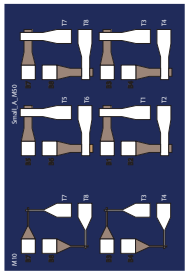
Establishing a reliable communication with real neurons through ad-hoc developed electronic transducers for recording and stimulation of electrical activity.

Artificial neurons



Brain-inspired hardware architectures that emulate the biophysics of neurons and synapses in silicon.

Memristive plasticity



Develop a physical memristive component capable of supporting, at an elementary level, different forms of short- and long-term synaptic plasticity thus reproducing what happens in a real synapse

Information excange between closed loop nodes guaranteed by UDP packets and high-performance on-line data analysis tools

Partners

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