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Selective attention in silicon: From the design of an analog VLSI synapse to the implementation of a multi--chip system.

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ABSTRACT OF THE TALK

The basic elements of the cortical neural substrate and of current silicon technology obey similar physical principles; the implementation of systems based on each of these two "technologies" also faces similar constraints. The foundation of neuromorphic engineering is to recognize and exploit such similarities, and map the properties of neural computation on to silicon to implement new types of computing devices. This approach leads to the implementation of efficient devices which can interact with the real world in real time. The neuromorphic strategy has particular relevance for applications where biological systems outperform classical digital computers, such as the task of perception, where the system must process noisy and ambiguous stimuli to produce appropriate behavioral responses. The efficient and compact devices developed through this approach are especially suited for integration into autonomous artificial systems.
The work I'll present is an example of application of the neuromorphic approach. It ranges from "morphing" properties of synaptic transmission on to silicon, to the realization of a Selective--Attention Chip (SAC), integrated in a multi--chip system which implements a model of visual selective attention, capable of operating in the real world, in real time.