Contribution ID : **147** Type : **Invited Oral**

Oxide based electronics for neuromorphic computing

Monday, 13 August 2018 17:40 (20)

In thin film form, transition metal oxides can be subjected to intense electric fields and are known to exhibit characteristic resistance changes that are of increasing interest for a new generation of low power oxide-electronics, including: resistive random access memory (ReRAM) as a replacement for non-volatile flash memory, field-programmable gate arrays (FPGAs) for reconfigurable electronics, and artificial synapses and neurons for neuromorphic computing. The neuromorphic computing application is particularly interesting as it provides the basis for a compact, low-power neural network capable of repetitive learning tasks, such as image recognition, signal processing or autonomous navigation. Like their biological counterparts, these networks are based on the large scale integration of synapses and neurons, where the former control the amplitude of propagating signals and the latter respond to the relative strengths and timing of these signals.

This presentation introduces a new class of solid-state synapses and neurons based on non-volatile resistive-switching and volatile threshold-switching in oxide thin films, respectively. The physical processes underpinning these devices are discussed and examples of device operation are used to highlight their capabilities and limitations.

Primary author(s) : Prof. ROBERT, Elliman (Australian National University)

Presenter(s) : Prof. ROBERT, Elliman (Australian National University)

Session Classification : Speaker Sessions and Seminars

Track Classification : IUVSTA Highlight Seminars