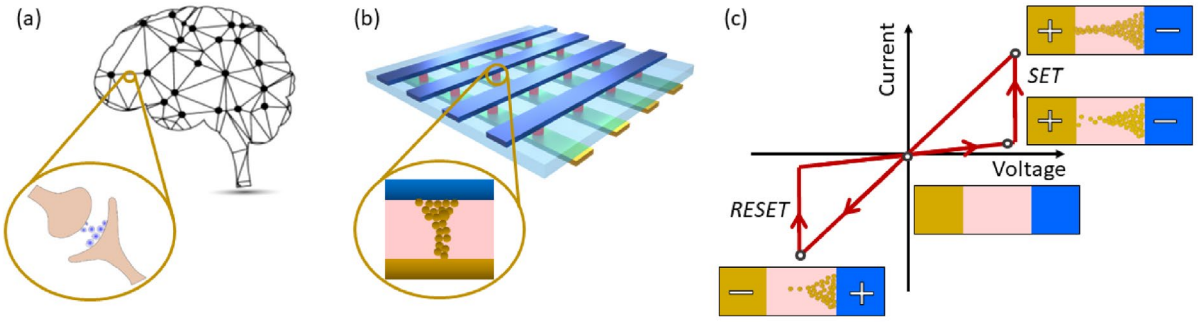
Master Thesis

Oxide based resistive switching memories for neuromorphic computing

The laboratory "Transport at Nanoscale Interfaces" at Empa Dübendorf is looking for strong candidates with a background in nanoscience, physics, or electrical engineering for a master thesis research project.

While current CMOS technology is reaching the sub-10 nm regime, a broad consensus arises that a further boosting in computational power will primarily rely on novel circuit elements exhibiting an increased functional complexity [1]. Networks of two-terminal resistance change random access memory devices (ReRAMs) are outstanding candidates as such elements are scalable below 10 nm due to the filamentary nature of their resistive switching. Moreover, they also offer multi-bit operations via the analogue tuneability of their resistance states [2].



In the current research project we investigate the resistive switching properties of transition metal oxides which we aim to utilize in nanometer-scale memory devices. This will provide the master student with the opportunity to gain hands-on experience in a broad range of measurement techniques including electron-beam and scanning probe microscopy as well as low-noise electronic transport experiments.

For applications (with motivation and CV) and more information please contact Dr. Miklos Csontos (miklos.csontos@empa.ch).

References

[1] M. A. Zidan, J. P. Strachan and W. D. Lu. The future of electronics based on memristive sytems. Nature Electronics **1**, 22-29 (2018).

[2] Q. Xia and J. J. Yang. Memristive crossbar arrays for brain-inspired computing. Nature Materials **18**, 309-323 (2019).