

# Research mimics brain cells to boost memory power

September 29 2014

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Dr Sharath Sriram, RMIT University

RMIT University researchers have brought ultra-fast, nano-scale data storage within striking reach, using technology that mimics the human

brain.

The researchers have built a novel nano-structure that offers a new platform for the development of highly stable and reliable nanoscale [memory devices](#).

The pioneering work will feature on a forthcoming cover of materials science journal *Advanced Functional Materials* (11 November).

Project leader Dr Sharath Sriram, co-leader of the RMIT Functional Materials and Microsystems Research Group, said the nanometer-thin stacked structure was created using thin film, a functional oxide material more than 10,000 times thinner than a human hair.

"The thin film is specifically designed to have defects in its chemistry to demonstrate a 'memristive' effect – where the [memory](#) element's behaviour is dependent on its past experiences," Dr Sriram said.

"With flash memory rapidly approaching fundamental scaling limits, we need novel [materials](#) and architectures for creating the next generation of non-volatile memory.

"The structure we developed could be used for a range of electronic applications – from ultrafast memory devices that can be shrunk down to a few nanometers, to computer logic architectures that replicate the versatility and response time of a biological neural network.

"While more investigation needs to be done, our work advances the search for next generation memory technology can replicate the complex functions of human neural system – bringing us one step closer to the bionic brain."

The research relies on memristors, touted as a transformational

replacement for current hard drive technologies such as Flash, SSD and DRAM. Memristors have potential to be fashioned into non-volatile solid-state memory and offer building blocks for computing that could be trained to mimic synaptic interfaces in the [human brain](#).

**More information:** Nili, H., Walia, S., Balendhran, S., Strukov, D. B., Bhaskaran, M. and Sriram, S. (2014), "Nanoscale Resistive Switching in Amorphous Perovskite Oxide (a-SrTiO<sub>3</sub>) Memristors." *Adv. Funct. Mater.*.. [DOI: 10.1002/adfm.201401278](https://doi.org/10.1002/adfm.201401278)

Provided by RMIT University

Citation: Research mimics brain cells to boost memory power (2014, September 29) retrieved 2 May 2024 from <https://phys.org/news/2014-09-mimics-brain-cells-boost-memory.html>

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