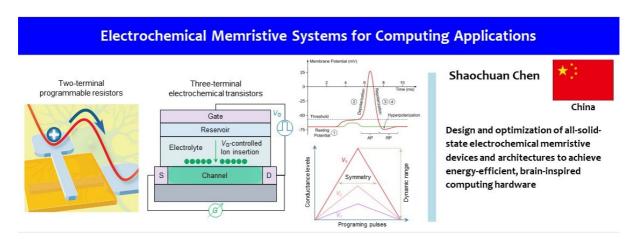<Research Topics>

Electrochemical Memristive Systems for Computing Applications

ICYS Research Fellow Dr. Shaochuan Chen

■Research

The rapid development of machine learning and artificial intelligence technologies require continual development of energy-efficient computing hardware. In-memory computing using analogue memristive devices has shown to be a promising approach to improve computation and energy efficiency for AI applications. The aim of my research is to design and develop nanoionics-based electrochemical memristive devices that can be used for both memory and information processing. Such devices can be employed as basic units to construct neural networks for building in-memory computing hardware. Nanoionic effect has shown to be an effective method to tune materials properties and device functionalities, enabling precise control of resistive switching, phase transition, magnetic switching, etc. Moreover, the ionic nature of electrochemical memristive devices allows it to mimic a variety of biological synaptic/neural behaviors, enabling energy-efficient, parallel information processing and adaptive learning capabilities that can be used for neuromorphic computation.

■Comments

It is my great honor to join ICYS as an ICYS research fellow. ICYS provides numerous benefits to young researchers in conducting independent and cutting-edge research. My research is focused on micro/nano electron and ion devices, as a member of ICYS I can access the state-of-the-art nanofabrication and materials characterization facilities of National Institute of Materials Science. ICYS brings together talented researchers with diverse backgrounds and expertise, the interdisciplinary research and work environment enables us to exchange ideas, share experiences, and develop collaboration. The mentors also provide ICYS research fellows with valuable insights and advice on achieving our research goals.

■Link

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