Enabling Logic-Memory Synergy using Integrated Non-Volatile Transistor Technologies for Energy-Efficient Computing

Sandeep Krishna Thirumala
School of Electrical and Computer Engineering, Purdue University, USA.

Proposal of novel integrated non-volatile transistor technologies with built-in logic-memory coupling

- Ferroelectric Transistor (FETF)
- Reconfigurable FETF
- Valley-Spin-Hall (VSH) Effect based Devices

Circuits

- FETF Non-volatile (NV) Memory Cells
- R-FETF NV-Memory Cells
- R-FETF Flip-flops; NV-logic

Arrays

- Intelligent Memory Arrays
- In-Memory Boolean/non-Boolean Computations
- Ultra-High Density NVM Arrays for General Purpose and Targeted Computing

System

- General-purpose multi-core processor
- Energy Harvesting Systems
- Boolean Computing
- Non-Boolean Computing
- Deep Neural Networks

- Utilizing the proposed devices, circuits and arrays to build several energy efficient Boolean and non-Boolean systems