

There is a fundamental challenge in realizing intelligent systems in hardware due to their large memory bandwidth requirements, high connectivity, non-linear computation, and adaptive nature. Biological systems exhibit these characteristics very efficiently. However, as circuit designers we barely have a small fraction of the degrees of freedom in our hardware primitives (memristors, transistors, etc.) as are present in biological primitives (proteins, cells, etc.). Indeed the primary challenge is decomposing and abstracting intelligent behavior into basic operations such as neuronal signaling, synaptic plasticity, and designing robust, energy-efficient, and scalable circuits and systems to realize them. In this talk, I will present the design motifs for brain inspired computing systems and how a new class of neuromemristive computing can meet some of the gaps.