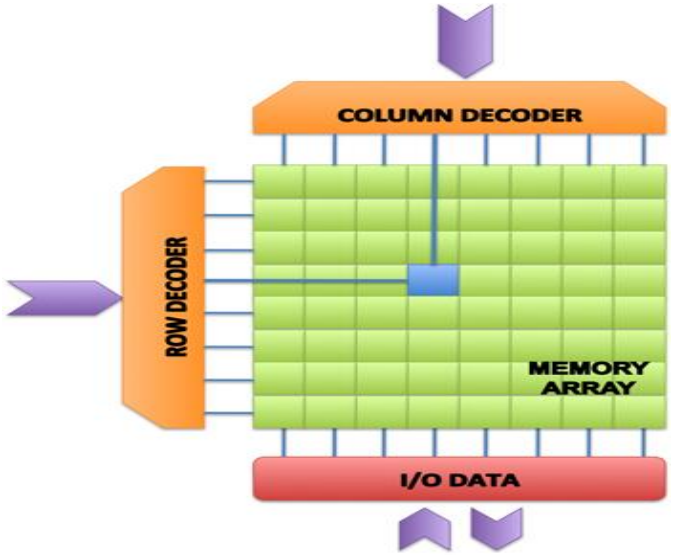
ASIC² Project: High Precision Differential Sense Amplifier for Resistive Memories

***Background**: Resistive memory is a new technology based on a passive circuit element called Memristor, which changes its resistance value based on the current flowing through it. Memristors are nanoscale elements that can be easily integrated in a typical VLSI manufacturing process. Therefore, memristors can be combined with existing structures to create new circuits. Memristors have a list of unique properties, such as non-volatility, non-linearity and sensitivity to process that make them particularly attractive for security applications. One such application is a memristive hardware secure hash function, based on a memristor crossbar structure. This application uses differential read and requires high accuracy in the read path. In this project, the students will design a high precision differential sense amplifier required for an accurate read from the array based on the state-of-the-art technology.*

Project Description:

At the first stage, the students will study the literature related to high precision differential current sense amplifiers. Then, they will choose a specific architecture and design the circuit. In the following stage, the students will simulate the circuit both as a stand-alone and when connected to a memristor crossbar array. The simulations will include noise and parameter variations. The main tool for design and simulation is Cadence Virtuoso.

In this project the students will acquire experience in advanced analog design and in using the Cadence Analog Design Environment.



Prerequisites: Linear circuits, analog design is an advantage

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ASIC² ARCHITECTURES SYSTEMS INTELLIGENT COMPUTING INTEGRATED CIRCUITS