# ULTRA-LOW POWER DEVICE IN NANO-SCALE FOR BIOMEDICAL APPLICATIONS - SEIZURE DETECTION

Therapeutic and prosthetic devices have emerged as a promising candidate for treatment of patients with neurological disorders ranging from epilepsy, Parkinson's disease, and motor impairments. The ability to acquire targeted neuro-logical information from brain is an essential requirement to the advancement of these systems. Thus, brain monitoring introduces key challenges for electronic systems in terms of both instrumentation and information extraction.

The focus of this project is to design low-power and low-noise mixed-signal IC design in nano-scale technologies such as CMOS, FinFET, and Tunnel-FET (TFET). This design performs brain signal (EEG) acquisition and feature extraction from an analog channel into the digital domain. The main focus of the project is on the designing ultra-low power digital and analog components especially for neurological disorders such as seizure on a system-on-chip.

In this system, an Instrumentation Amplifier is used to acquire the microvolt signals from electrodes in the presence of numerous physiological and environmental interferences. These amplified signals are processed using a DSP or a custom digital/analog circuits in CMOS technology in an extremely low power mode.

**Contact:**
PhD student Mohammad Tohidi,
m.tohidi@eng.au.dk

AARHUS
UNIVERSITY
DEPARTMENT OF ENGINEERING