

GRADUATION PROJECT CALL 2020-2021

Principal Investigator: Dr. Dina El-Damak

General Call Information

The Emerging Technologies and Ultra-Low Power Systems Group announces graduation project opportunity for final year students at the Nanotechnology and Nanoelectronics Engineering Program at Zewail City.

Student Selection Criteria

1. Students should be interested in power management and analog integrated circuits design.
2. Students should have prior experience using Cadence IC design tools for schematic design, layout, and have completed the NANENG 421 Analog IC Design Course.
3. Students are encouraged to apply as a team.

Project Description

The Internet of Things (IoT) has a wide range of applications such as smart buildings, security, surveillance, personalized healthcare, and smart agriculture. The fundamental building block of the IoT is an intelligent ultra-low power sensor that can be attached to our everyday objects. Since the users are looking for seamless operation of this class of devices, which does not require their intervention to change or charge the battery, energy harvesting has emerged as a key solution for such systems.

Each type of energy harvesting comes with its unique challenges. For example, thermal energy harvesting systems use boost converters for high-efficiency low voltage operation but lack the ability of low voltage startup without off-chip transformers. Thus, the objective of this project is to design a high-efficiency power management IC for thermal energy harvesting with a startup circuit. If time permits, we will also combine the power from other sources such as solar, RF, vibration, and bio-batteries.

Student Responsibilities: Students will participate in literature survey, integrated circuits schematic design and layout, as well as project documentation.

Application Process

Please email the list of your team members to (nanoeng@zewailcity.edu.eg). In the email title, use the graduation project code (GP_2021_DE).

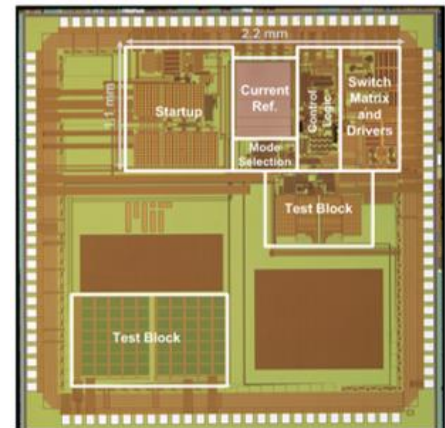


Figure 1 A 10 nW–1 μW power management IC for energy harvesting applications