**Special Issue Proposal**

# New Innovative Architectures, Tools, and Technology for Self-Powered Sensor Networks in the Context of Future Generation IoT Applications

Sensor networks are crucial components in the Internet of Things (IoT) applications and other major environmental monitoring processes. They can be used in a lot of applications including medicine and healthcare. One such application involves environmental condition monitoring around the human body for measuring and analyzing medical signals. Wearable sensor nodes are being deployed to monitor parameters that are concerned with the physiological functioning of the brain. With the rise in technology and the increasing interest towards autonomous systems, self-powered sensor networks are in great demand. One major challenge that novel system architectures are trying to resolve through self-powered sensor networks is the power supply and battery problems. This is starting to affect the rate at which IoT systems are being used. Because it is a daunting task to change the batteries of each and every sensor since they will be huge in number and widespread across various geographical locations. Hence self-powered sensor networks will create a huge leap in the IoT sector.

Self-powered sensor network architectures work based on energy harvesting technologies. These enable the sensors to harvest energy from the surrounding energy. There are many innovative architectures and tools that help in generating futuristic IoT applications. One such system is used in monitoring and identifying various activity types using sensors. A smart and self-powered wireless sensor network is used in this scenario. It passively monitors and distinguishes various events based on the vibration. The sensing is carried out with the help of energy harvesters that get triggered based on set vibration thresholds. Concerning events are identified if the output power exceeds the set limits. Alarm signals are also possible through these self-powered sensor networks. The power supply for these is provided through electromagnetic energy harvesters. Another approach uses nanogenerators for powering sensor networks in various applications such as human-machine interface, wearable devices, intelligent traffic management, fabricated sensors, monitoring of chemicals and environmental parameters, smart cities, biomedical devices etc. In spite of so many advancements, there is a gap in commercial applications.

- Online monitoring systems using wireless sensor networks that are self-powered.

- Design and development of innovative and minute energy harvesting techniques for self-powered sensor networks.
- Piezoelectric nanogenerators for improving the sustainability of self-powered wireless sensor networks.
- Harvesting thermoelectric energy for self-powered sensor networks in smart traffic management systems.
- Development of a wearable self-powered sensor based on piezoelectricity.
- Super-Hydrophobic nanostructure surfaces for electricity and power generation in wireless sensor networks.
- Design of an efficient and sustainable architecture for a self-powered electronic watch.
- Innovative system architecture for self-powered sensor networks in a smart construction environment.
- Intelligent self-powered sensors for remote healthcare monitoring.
- Self-powered sensor network architecture for real-time vehicular emission testing and reporting.

## Tentative Time Frame for this Special Issue process:

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