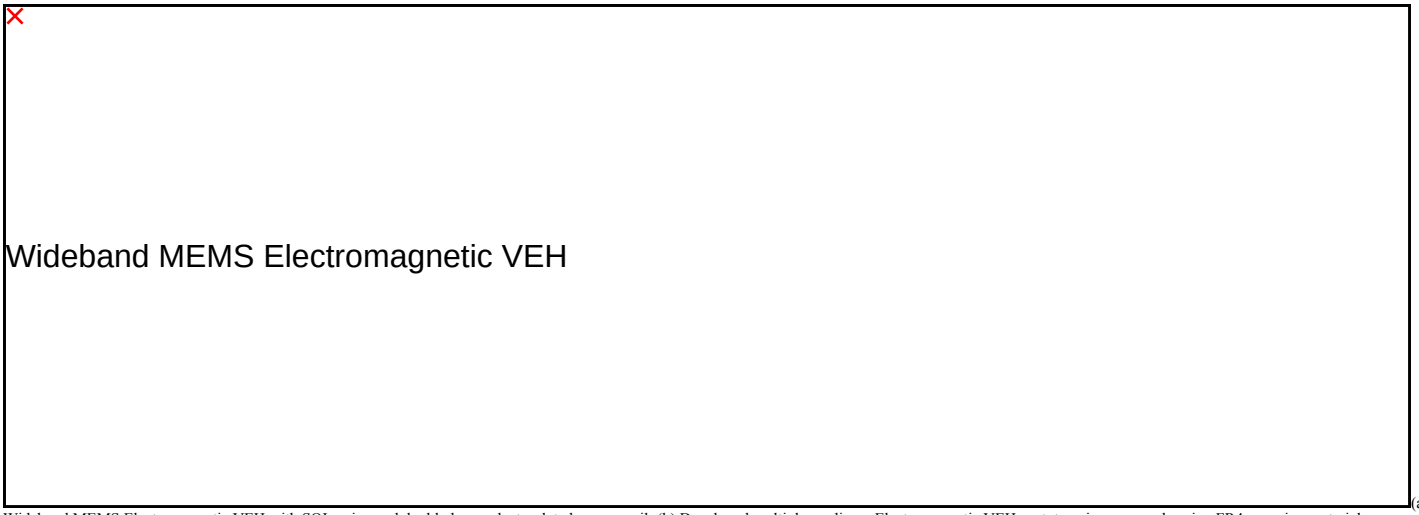
Electromechanical – MEMS Vibrational Energy Harvesting

Wideband Electromagnetic Vibration Energy Harvesters for Powering 'Internet of Things'

The potential of the so called 'Internet of Things (IoT)' has opened up a window to visualize a connected world of tiny, autonomous, self-powered Wireless Sensor Nodes (WSNs), which would transform our surrounding into an intelligent and responsive environment. This is speculated based on the recent developments in low power electronics and sensors which have led to the possibility of deployment of WSNs. However, widespread deployment of WSNs is restrained by lack of reliable and robust power sources capable of providing energy to the sensors perpetually.

This issue has surged the research to study the prospect of harvesting the energy of ambient mechanical vibrations. Thus addressing the pertinent issues of miniaturized Vibrational Energy Harvesters (VEHs) is of paramount importance both scientifically and commercially. The focus of our group is harvesting of electrical energy from mechanical vibration using Electromagnetic (EM) or Hybrid transduction over a wide band width with a miniaturized/microfabricated devices and addressing the corresponding issues associated.



(a)

Wideband MEMS Electromagnetic VEH with SOI spring and double layer, electroplated copper coil; (b) Developed multiple nonlinear Electromagnetic VEH prototype in meso-scale using FR4 as spring material.

This ranges from development of next generation, nano-structured hard and soft magnetic materials, integrated micro-magnetics, development of novel VEH topologies and their efficient power management. Our group has expertized in design, simulation, modelling, fabrication and characterization of linear/nonlinear EM VEH devices both in meso- and MEMS-scale. Our area of expertize also includes development and characterization (structural, magnetic and electrical) of different nano-structured magnetic materials for Magnetic MEMS applications such as Energy Harvesting.

Contact enquiry (at) tyndall (dot) ie for all Business Development enquiries

Contact

- Saibal Roy
  MNS (Circuits and Systems) - Micro-Power and Nano-Magnetics
  +353 21 2346331
  saibal.roy (at) tyndall (dot) ie