



## MASTER STUDENT INTERNSHIP IN MINIATURE MULTI-DIRECTIONAL AND ULTRA-LOW FREQUENCY MECHANICAL VIBRATION ENERGY HARVESTER FOR MONITORING BY WIRELESS COMMUNICATION (M/F)

Internship | 6 months | Fulltime/40h | Belvaux

### Context

Energy harvesting is the conversion of unused kinetic energy (mechanical, pneumatic, hydraulic, thermic or electromagnetic) in the surrounding environment into small amount of exploitable electrical energy. This technology, as a new power source for small electronic systems, is attracting more attention in the recent years. It is a promising energy source for self-sustained electronic devices with sensors without maintenance with wireless communication capabilities.

### Description

We are currently running projects about the realization of new nanotechnology based generators. The mechanisms by which the energy is collected are based on effects such as electromagnetism, triboelectricity and piezoelectricity. The challenge of the work will be the conversion of external mechanical stresses (rotation, translation) with very low frequency (0.1 to 1Hz) into rotational energy to deliver enough electrical power supplying a wireless Bluetooth communication unit. The internship student will have the opportunity to create a first proof of concept prototype with possibility of field tests. The applications concern the smart conversion of mechanical stimulations as human motion from walking, vibrations from vehicles or building, waves from oceans.

### Profile

#### Education

- Preparing a last year Engineer or Master II degree in Engineering School or University on Mechanics/Physics or a relevant subject area with good marks at merit level

#### Competencies

- Solid culture in mechanics/kinematics
- Very good experience with CAO design and software as SolidWorks or equivalent
- Additional skills on LABVIEW, Arduino, or Raspery Pi interfacing for data acquisition and signal treatment will be determinant assets

#### Language

- Proficiency in French or English

Job reference: MRT-2020-Intern-001

#### Application file:

- A CV
- A motivation letter

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### Your working environment

#### The research department

The Materials Research and Technology department (MRT) focuses on two key enabling technologies: nanotechnologies and advanced materials, and investigates research questions related to transducing materials and actuators, photocatalysis and energy harvesters, transparent electronics and smart nanocomposites, point-of-care and drug delivery, modeling and design of structures and multifunctional composites, bio-based polymers and composites, adhesion and compatibilization of fibres/matrix, process engineering and advanced manufacturing.

> [LIST.lu/MRT](#)