

Acoustic Sensors for Electric Vehicle Drivetrain Diagnosis

Record number : OPR-1068

Overview

RESEARCH DIRECTION

Julien Sylvestre, Professeur - Department
of Mechanical Engineering

INFORMATION

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ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie électrique et de
génie informatique
Département de génie mécanique
Institut interdisciplinaire d'innovation
technologique (3IT)

LEVEL(S)

Stage postdoctoral

LOCATION(S)

3IT - Institut interdisciplinaire d'innovation
technologique

Project Description

The automotive industry faces great changes in the upcoming years, notably in Canada where the sale of gas-powered cars will be prohibited by the year 2035. Most consumers will then have to rely on electrical vehicles (EV). However, these vehicles are still subject to challenges in terms of range, reliability and safety of their power units. In this regard, there is an ever growing need to develop diagnosis tools such as sensors, actuators and their associated monitoring systems.

Our research group is teaming up with a major partner from the automotive industry in order to launch a project dedicated to the design of such systems. In particular, our project aims to develop devices that use acoustic energy to detect and relay diagnosis information in EV drivetrain components.

We are looking for postdoctoral fellows to build on prior exploratory work made by the research team. Given the multi-disciplinary nature of the project, we are open to candidates in from any related fields, such as mechanical engineering, electrical engineering, physics and material science. Broadly speaking, the candidate will be responsible for :

- Modelling and experimental measurements of acoustic wave propagation in complex structures
- Mechanical integration : CAD and fabrication of prototypes (3D printing, machining, etc.)
- Advanced circuit design, assembly and testing of PCB
- System integration to actual EV drivetrain components (provided by the industrial partner), Motor test bench development

Candidates will also participate in the close supervision of undergraduate and graduate students in their work, as well as the production of quality research publications. The collaborative nature of the project will also bring the candidate to work on technical and strategic topics directly with our industrial partner. These varied responsibilities make this a highly valuable experience to postdoc researchers who are looking for opportunities on either an academic or industrial career path.

The work will be conducted under the supervision of Professor Julien Sylvestre at the Interdisciplinary Institute for Technological Innovation (3iT) in Sherbrooke, QC. This institute is host to a 1600 m² nanofabrication and characterization research facility (including 430 m² of class 100 clean room spaces), extensive FabLab-style manufacturing capabilities and a complete microelectronics packaging production line. The Institute is also part of the Integrated Innovation Chain, a driving force in Quebec and Canada that support organizations in the fields of artificial intelligence, quantum technologies, digital and innovative manufacturing. (details at <https://www.usherbrooke.ca/partenariats/en/innovation-initiatives/integrated-innovation-chain>).

Candidates must hold a Ph.D degree awarded in the previous 5 years or less. More details on eligibility can be found at <https://www.usherbrooke.ca/recherche/en/studying/why/complementary-skills/postdoctoral-fellowships/admission>

Discipline(s) by sector	Funding offered
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Yes

Sciences naturelles et génie	
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Génie électrique et génie électronique,
Génie mécanique

The last update was on 20 June 2024. The University reserves the right to modify its projects without notice.