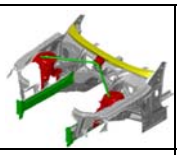
UNIVERSITÉ DE SHERBROOKE

Auto21

GAUS
GROUPE D'ACOUSTIQUE DE L'UNIVERSITÉ DE SHERBROOKE

# PhD research project


## NVH design of magnesium alloys front body structures



**Background:**

Despite recently increased magnesium applications in North America (NA), Europe and China, automotive applications of magnesium remain at single components level and dominated by casting applications. To evaluate the viability of magnesium as a major automotive structural material for vehicle mass production and performance improvement through weight reduction, and to develop enabling technologies for magnesium castings and wrought products, a large scale multi-national US-Canada-China Joint Research & Development Project was launched in 2006. The MAGNESIUM FRONT END RESEARCH AND DEVELOPMENT (MFERD) project is intended to bring magnesium automotive applications from the single component level to a subsystem level. The proposed project is a key part of this effort, representing one of the 10 major tasks within MFERD. Its main objective is to develop noise, vibration and harshness (NVH) enabling knowledge and technologies for magnesium alloys body structures.

**Objectives** :

1) Conduct a numerical study on the airborne and structure-borne acoustic performance of Mg alloys panels.
2) Study numerically the performance of the Mg panels with added Noise Control treatments in both Single Wall (SWL) and Double Wall (DWL) configurations (foam layer + EVA septum). Acoustic and vibration performance will be predicted and compared to existing steel based systems and laminated steel (Metal-Polymer-Metal: MPM) panels.
3) Conduct an experimental study on cast Mg alloys based flat panels and compares their performances with steel and aluminum constructions. The tests will consist of acoustics and vibration tests on flat Mg panels in both SWL and DWL configurations.
4) Design a new Mg alloys Front of Dash panel by investigating both structural, shape and added Noise Control treatments configurations with weight and cost constraints. Current steel design will be based a baseline.
5) Conduct experimental validation tests on the developed design

**Note :**

The proposed work is funded by Auto21 (www.auto21.com). It will be done in collaboration between three universities (U. Sherbrooke, U. Waterloo and U. Windsor), the CANMET-MTL, the MFERD US and Chinese teams, and with the support of several Canadian industries.

**Requirements :**

- Master's degree in mechanical engineering, physics or applied mathematics.
- Training or experience in acoustics and/or vibration is an asset.
- Fluency in either French or English is mandatory. Non French speaking candidates will be expected to learn French during their stay at Université de Sherbrooke.

**Financial Aid :**

Scholarship in accordance with current NSERC standards.

**Information :**

The position is available immediately. Qualified candidates are invited to forward their application (with letter of motivation, CV, 3 recommendation letters and university transcripts) to:

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