

Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : MAHDJOUR

Given names : Morad

Status (prof., assistant prof., ...): Assistant Professor (provided with the habilitation to supervise research. HDR)

Laboratory : ELLIADD (UR. 4661)

Website address :

<https://ercos.utbm.fr>

Institution : UTBM

Website address :

<https://www.utbm.fr/>

Scientific competence of the supervisor:

- Design science,
- Design for X,
- Collaborative design,
- Design methods and process.

Two major publications in the field proposed for the PhD :

1. F. Duc, P.E. Bourban, C.J.G. Plummer, J.-A.E. Manson, Damping of thermoset and thermoplastic flax fibre composites, Composites: Part A 64 (2014) 115–123
2. E. Padayodi et al., Improvement of bio-sourced materials properties, 2nd Int. Conf. on Sustainable Materials Science and Technology, Las Palmas, Spain, 19-21 july, 2017.

Website address of the personal page :

Supervisor's email : morad.mahdioub@utbm.fr

Description of the research work proposed for a PhD

Topic # (see list) : IV-6

Title : Investigation of advanced hybrid composites with improved vibration and shocks damping capacity

Subject :

Thermoplastics matrices (polypropylene, LDPE, ...) are replacing thermosets (epoxy) and move composites into the automotive thanks to their processing short cycle time that allows new high-speed manufacturing technology in vehicle parts production. Similarly, bio-sourced reinforcement such as flax fibers are being developed for lightweight requirements in automotive. Some research papers showed that flax fibers present excellent damping capacity better than traditional reinforcement but their low stiffness still limiting the use of composites reinforced flax fibers on components requiring low stiffness such as vehicle interior cover parts.

This thesis proposal aims to investigate the stiffness and the dynamic properties of hybrid composites reinforced carbon and flax fibers allowing human centred design of equipment that present high performance of vibration and shocks damping, thanks to the high stiffness of carbon fibres as well as the full vibration damping potential of flax fibers. Especially, the study is related to vibrations and shocks damping and lightweighting of equipments so to reduce fatigue of muscles and to allow athletic performances. The experimental and numerical simulation approaches are applied to the case study of sport equipments.

Keywords :

vibration damping, composites, materials characterizations, finite elements simulation

Expected collaborations :

Essolé PADAYODI, assistant prof. ELLIADD laboratory (UR 4661), assistant supervisor of the PhD

Scientific competence : composites, materials characterization, FE simulation, optimisation of flax reinforcement properties.

Background required from the applicant :

Master's degree in Mechanics, composites

Existence of a PDF file detailing the proposal ("yes" or "no") :

YES

(see guidelines on the website www-csc.utt.fr)