



Master 2 internship opportunity

BioCompUS project: Elaboration of bio-sourced materials by ultrasonic compression

Field/Keywords

Lignocellulosic materials, Multiscale biosourced composites, Adhesive-free composites

Context

Today, the need to find more sustainable solutions for materials used in everyday life is opening up new avenues of research in materials science. In particular, one possible direction is to develop more sustainable processes for producing materials from biomass that could replace certain plastic products. In this context, the BioCompUS project is looking at the shaping of materials by ultrasonic compression (UCM), a process derived from ultrasonic welding (US), which enables materials to be joined together by the application of high-frequency acoustic vibration under stress. US welding is already used on an industrial scale to join metals, polymers and thermoplastic composites, but little work has been done on its use for lignocellulosic materials. The initial results of the project indicate that UCM is indeed a shaping method that can be used to produce 100% biobased materials without the addition of polymeric resins, but the materials obtained remain fairly heterogeneous and the mechanisms involved in their formation are not all fully understood.

To address these issues, the aims of the proposed course will be to:

- Manufacture materials by UCM with control of the process, environmental and material parameters,
- Characterise the structural and mechanical properties of the materials obtained,
- Assess the influence of raw material properties and operating conditions on the structure and physical properties of the materials,
- Implement an iterative approach to improve our understanding of the mechanisms leading to the formation of materials.

Profile and skills required

Engineer or Master's degree in Materials Science and Engineering or Mechanics of Materials. A taste for experimental work is essential. Desired knowledge of polymer and composite materials, lignocellulosic materials and manufacturing processes. Knowledge of ultrasonic welding would be a plus. Autonomy, motivation, initiative and the ability to work as part of a team are the skills required for recruitment. Fluency in French (spoken and written) is also a plus.

The internship will last 5 to 6 months, with a planned start date of February/March 2025. The internship will take place in the MatBio (Multi-scale Bio-sourced Materials) team at LGP2 (Process Engineering Laboratory for Biorefinery, Bio-sourced Materials and Functional Printing) on the Saint-Martin d'Hères university campus.

To apply, please send your CV and covering letter by Monday 18 November to :

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