Master project from Chair Cellulose Valley

« Barrier and stretchable fiber-based materials for replacing single use plastics. » (industrial project)

Main tasks

In recent years, legislation has been introduced at various levels with the goal of improving the circularity of materials and the supply of non-petroleum-based materials. In this context, cellulose is an excellent candidate due to its recyclability, origin, and properties. It offers advantages in terms of strength, lightness, and barrier properties. Manufacturers are looking at cellulose-based materials as alternatives to petroleum-based plastic single-use packaging.
The proposal below concerns the development of new, innovative cellulose materials, in collaboration with one of our industrial partners in the packaging sector.
The challenges of this internship will be:

1- The understanding of the key factors of molded cellulose and stretchable papers.
2- The processes to bring barrier properties to stretchable papers.
3- The characterization of the properties of the solutions
4- The recyclability and impact on product life-cycle analysis of the solutions.

The development of a demonstrator is one of the tasks to be carried out during the internship. Meetings will be scheduled with the industrial research department of the partner concerned, as well as occasional site visits. The Master's project will last 5 to 7 months at the LGP2 laboratory. The project will be overseen by a PhD student and will be closely aligned with their research objectives.

Description and expertise of the organization

The "Cellulose Valley" Chair is a special ecosystem that aims to provide alternatives with new cellulose materials for packaging applications. It is a consortium of several industrial partners: Marie, Ahlstrom, Decathlon, Chanel, DS Smith, Guillin Emballage, CITEO and Aptar. Each year, 8 students are hired to work on one or more specific problems encountered by our partners. Cellulose Valley is located in the LGP2 - Laboratory of process engineering for biorefinery, bio-based materials and functional printing. LGP2 is a joint research unit (UMR 5518) of the French National Center for Scientific Research (CNRS). Its activities range from wood science to packaging converting and printing. The laboratory's distinctive feature is its multi-disciplinary approach to processes, chemistry and materials. Furthermore, its close affiliation with the paper and packaging industry facilitates numerous research projects and the utilization of specialized equipment, spanning from laboratory to pilot scale.

Candidate requirements

The candidate must be at engineering school or master's level, with expertise in materials, chemistry or processes. A good level of written and spoken English is required. Work on cellulose or packaging barriers would be a plus. Knowledge of biopolymers and life cycle assessment will be considered. The ability to work in a team, autonomy and motivation are important selection parameters.

Contact persons involved in the project

- Mathilde BERNARD-CATINAT, PhD student,

E-mail: mathilde.bernard-catinat@grenoble-inp.fr

- Dr Julien BRAS, Associate Professor,

Tel: 33 (0)4 76 82 69 15 / E-mail: Julien.Bras@grenoble-inp.fr

Send CV and Motivation letter.

Deadline to apply: 20th October 2024.