URD ABI by AgroParisTech

CEBB Centre Européen de Biotechnologie et de Bioéconomie

Funded by the European Union
Horizon Europe | Marie Sklodowska-Curie Actions (MSCA)

Internship Offer: Master 2 / Final-Year Engineering Student

Topic: Additive-Guided Recycling of Functional Food-Contact Materials

Project Description. This 5-month internship is embedded within **STUMAT (Development of Smart PHBV films with microencapsulated spirulina as TUnable food contact MATerials)**, a Horizon Europe **Marie Skłodowska-Curie Actions (MSCA)** Postdoctoral Fellowship hosted at **URD ABI - AgroParisTech**. STUMAT aims to develop next-generation bio-based food-contact materials by combining sustainable polymer design, functional bio-derived additives, molecular interactions, transport phenomena and smart/functional food-contact concepts. The project is funded by the European Union under Grant Agreement No. 101203141.

A central challenge in functional polymer design is that additives introduced to improve flexibility, transport, responsiveness or other performance attributes can also alter the way a material behaves at end-of-life. These effects may arise through changes in chain packing, crystallinity, free volume, interfacial accessibility, water uptake or interactions with chemical and biological depolymerizing agents. Understanding these relationships is essential if high-performance food-contact materials are to be designed not only for use, but also for efficient circular recovery.

The internship will extend **STUMAT** toward end-of-life circularity by investigating how selected functional additives influence the depolymerization of polymer materials. A reference polymer will be compared with selected additive-containing formulations. The intern will conduct experimental depolymerization studies and analytical characterization, complemented by molecular modelling performed by the MSCA fellow. Together, these approaches will connect additive chemistry with depolymerization kinetics, conversion, selectivity and the composition and purity of recovered monomers or oligomers. The longer-term objective is to identify design principles for functional food-contact materials compatible with closed-loop recycling.

Internship Objectives and Main Tasks. The student will contribute to the following activities:

- Prepare and characterize a polymer material containing selected additives.
- Carry out experiments to study how these materials break down and can be recycled.
- Characterize materials and recovered products using FTIR, NMR, DSC, TGA, GPC and chromatographic/analytical methods.
- Assess the composition, purity and reuse potential of recovered monomers and oligomers.
- Help identify how additives influence recycling performance.
- Share progress during project meetings and prepare a final internship report and oral presentation.

Candidate Profile. We are looking for a motivated and careful Master 2 student or final-year engineering/chemistry student interested in sustainable polymers and recycling:

- Studying polymer chemistry, organic or green chemistry, chemical engineering, or a related discipline.

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- Previous experience with polymer characterization, polymer processing or food-contact material applications is highly desirable.
- Familiarity with laboratory and analytical techniques; experience with FTIR, NMR, DSC/TGA, GPC or chromatography will be considered an advantage.
- Interest in sustainable material design and circular-economy approaches.
- Ability to work carefully in an interdisciplinary research environment and communicate clearly in English.

Host Laboratory. The internship will take place at **URD ABI - AgroParisTech**, located within the Pomacle-Bazancourt biorefinery. URD ABI works on the use of agricultural resources and biorefinery by-products. Its research activities include industrial biotechnology, green chemistry, and process engineering. The laboratory develops new processes to transform renewable resources into useful products, including polymers, materials, fine chemicals, additives, and cosmetic ingredients.

Dates and Location.

Duration	5 months
Starting date	February 2027
Application deadline	10 November 2026
Location	CEBB, URD ABI, 3 Rue des Rouges-Terres, 51110 Pomacle

How to Apply. Please send the following documents:

- A CV
- A short cover letter explaining your interest in the internship and relevant experience
- Your Master's or engineering-school transcripts

Applications should be sent to:

Dr. Muhammad Rehan Khan (URD ABI - AgroParisTech): muhammadrehan.khan@agroparistech.fr
Dr. Sami Fadlallah (URD ABI - AgroParisTech): sami.fadlallah@agroparistech.fr

Email subject: Application - STUMAT Internship - First name Last name

Applications will be reviewed as they are received, and the position will remain open until it is filled.

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