

## Master 2 Internship

### Synthesis, characterization and polymerization of fully renewable UV-filtering monomers from cellulose

URD Agro-Biotechnologies Industrielles (ABI) – AgroParisTech  
CEBB - 3 Rue des Rouges-Terres, 51110 Pomacle

**Host Laboratory:** Located at the heart of the Pomacle-Bazancourt biorefinery, URD ABI AgroParisTech is a research and development unit of AgroParisTech dedicated to valorization of agrosources and biorefinery byproducts. With expertise in white biotechnologies, green chemistry, and process engineering, the team works on multi-disciplinary research projects aiming at the development of new industrial processes allowing integrating the transformation of byproducts of agriculture into high value-added chemicals such as polymers, fine chemicals, functional additives or cosmetics.

**Work context and objectives:** The application of green chemistry principles to polymer synthesis is crucial not only to solve environmental and waste management issues related to production processes, but also to transform biomass wastes into new sustainable high-performance materials. Currently, the vast majority of commodity polymers still rely on cheaper but non-renewable fossil feedstocks. To overcome the limited availability of petrochemicals, biomass feedstocks (e.g., lignin, cellulose, terpenes) can be used as abundant and renewable resources to produce chemical building blocks. In this context, after having studied the use of lignin-derived monomers for the production of fully renewable polyesters, polyamides, (non-isocyanate) polyurethanes, and epoxy-amine resins, we have decided to go extra miles and develop several compounds from the reaction of cellulose-based chemicals with various lignin-derived molecules to be used as monomers to access unprecedented sustainable polymers with UV-filtering activity.

The objectives of the internship are:

- Synthesis of a new family of cellulose-derived monomers on a g scale.
- Polymerization of the targeted monomers to produce 100% renewable polymers
- Characterization of all monomers and polymers by different analytical techniques including NMR, TGA, DSC, SEC and FT-IR
- Assessment of the UV-filtering activity and photostability of the monomers and polymers

**Candidate profile:** The candidate should be a master-level student (university or engineering school) with excellent skills in organic synthesis and/or polymers. She/he should have good analytical skills. High self-motivation and a hard-work attitude are appreciated. The internship will start as early as January/February 2024 for up to 6 months.

**Contact:**

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