OPEN PH.D POSITION

WoodTreat : fungal bioremediation of highly polluted post-consumer wood waste

Laboratory: LERMAB

Principal Investigators: Dr. Arnaud Besserer, Pr Nicolas Brosse (LERMAB)
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Starting date: January 2026

Duration: 36 Month

Gross salary: 2200 € / month

PROJECT DESCRIPTION

The proposed position is part of the Woodtreat project, funded under the Horizon Europe programme (HORIZON-JU-CBE-2024-R-01). It addresses the pressing challenge of valorizing highly polluted post-consumer wood waste (HPPCW). These waste streams, often contaminated with hazardous preservatives are currently incinerated or landfilled. This poses significant environmental and health risks. Woodtreat proposes a transformative, multi-sectoral approach to recover clean secondary materials from these waste streams and convert them into high-value bio-based products. The project integrates cutting-edge technologies for detection, sorting, and depollution, including a neutron-based online characterization system, hydro-mechanical cleaning, thermo-bio-chemical treatments, and hydrothermal carbonisation (HTC). These innovations are validated through seven industrially relevant pilot validation trials (PVTs), targeting applications in construction, furniture, chemicals, and energy sectors. The open post-doctoral position will take place in the WP2 of the project and will aim to investigate the combination of thermo-chemical and biological processes for the removal of contaminants occurring in the HPPCW. This project includes the study of the physiological and molecular processes underlying the adaptation of fungi to aversive substrates. Characterization of the fungal growth and physiological changes will be performed. The tracking and analysis of contaminant's fate will be of a particular interest. The ultimate goal will be to use the cleaned particles and fiber for the production of innovative building materials in cooperation with the WP3 of the project.

RESEARCH TEAM & EQUIPMENTS

This project brings together expertise from a diverse range of disciplines, including microbiology, biochemistry, analytical chemistry, materials science, process engineering. Each research laboratory involved in the project brings a unique perspective and set of skills, allowing for a truly and quite unique transdisciplinary approach to research.

The main location will be in Epinal, France with strong connections with Labs located in Nancy. The work will be performed in collaboration with other Ph.D students from the research team (https://lermab.univ-lorraine.fr/recherche/procedes-de-valorisation-du-bois-et-des-dechets/) and researchers from INRAe. Strong connections with other students and engineers recruited on this project and working in the international teams will occur.

EXPECTED PROFILE OF THE CANDIDATES

We are looking for a candidate with a master's degree in biotechnology, microbiology, or environmental process engineering. Knowledge of or interest in wood science would be an asset. The successful candidate will work together with a

post-doc student to design, develop, and implementing the process of bioremediation process of HPPCW with fungi and possibly with a microbial consortium in combination with steam explosion process.

Mission and research topics:
Develop and implement innovative process using filamentous fungi and steam explosion to remove contaminants from HPPCW.
More particularly the physico-chemical characterization of the process effect on HPPCW by a multi-modal approach (imaging, spectrometry, biochemistry) will be carried out.
The work with filamentous fungi and the monitoring of the their remediation activity will be performed. A focus will be made on the understanding of the physiological and molecular mechanisms supporting the fungal acclimatation or adaptation to aversive substrate.
The candidate will collaborate with the WoodTreat Consortium team and contribute to the reporting period. International exchange and travel (Sweden, Greece and Germany) will be part of the working plan.

Expected skills:
The candidate will have a solid background and experience in microbiology. Experience in microscopy, analytical chemistry techniques or process engineering will greatly facilitate the progress of the project. Knowledge of wood chemistry/material and particularly in wood-fungi interaction will be appreciated. Skills in statistical analysis and programming (Python /R language) as well as picture analysis (FIJI) would greatly help. Basis in biochemistry (enzymatic reaction monitoring). Skills in solid and liquid fermentation will be a real added value. The candidate must be able to speak English fluently and write reports and publications in English

HOW TO APPLY

Application is open immediately.
Applications are only accepted through email in one pdf file. All documents must be sent to
arnaud.besserer@univ-lorraine.fr & nicolas.brosse@univ-lorraine.fr

REQUIREMENTS

- Curriculum Vitae
- Master diploma copy
- Cover Letter
- Statement of Research
- E-mail of at least 3 references