Post-doctorant (M/F)

The environmental influence of new eco-materials: resistance to microorganisms and emissions in indoor air

Departments: CERI Energie Environnement & CERI Matériaux et Procédés

Line managers: Head of CERI EE: Patrice CODDEVILLE and head of CERI MP: Didier LESUEUR

Type of contract: Fixed term contract of 14 months

Site: Douai

Background:

IMT Lille Douai, an engineering school under administration of the Ministry of Economy and finances, has three main missions: to form responsible engineers capable to tackle the big challenges of the XXI century; to conduct research leading to high added-value innovations; support the development of territories, in particular through the facilitation of innovation and the creation of companies. Its objective is to train the engineers of the tomorrow, competent in both digital technology and industrial knowhow. Situated at the crossroads of Europe, between Paris, London, Brussels and Amsterdam, IMT Lille Douai has the ambition to become a leader in the major transformations of XXIst century by combining teaching and research in engineering sciences and digital technologies.

Based in two sites, in Lille and Douai, IMT Lille Douai disposes of over 2000 m² of laboratory space to develop its excellence in research focused on the following domains:

- Digital Systems
- Energy and Environment
- Materials and Processes

For further details, please consult the school's website: www.imt-lille-douai.fr.

The position will be based in two departments or CERIs (Teaching, Research and Innovation Centres), the CERI Energy and Environment and the CERI Materials and Processes.

The research of the CERI Energy and Environment is focused on environmental and energy issues. In particular, the group is involved in research on air quality and the anthropogenic impact on the composition of the out – and indoor atmosphere. Research projects build on fundamental knowledge applied to Atmospheric Sciences, with the aim to increase our knowledge and understanding of physico-chemical processes underlying the generation, transport and transformation of gas and particulate pollutants in the atmosphere.

The research of the CERI Materials and Processes focuses on three major themes: circular economy and eco-materials, advanced technologies and materials, and digital materials and processes. The first theme aims to study secondary, alternative and bio-based materials, and their use in different sectors, including the building sector through a multi-scale experimental approach.
The emergence of industrial sectors of these eco-materials requires the establishment of a multidisciplinary approach, based on a detailed knowledge of materials and their environmental acceptability, which takes the behaviour of contaminants into account.

Background and description of the project:

Within France's objective to reach carbon neutrality at the horizon of 2050, the building sector is of particular interest. This sector, representing approximately 30% of the national annual GHG emissions, has thus scope and the duty to minimise the carbon footprint of new constructions. The development of new construction materials, sober in carbon during manufacturing and performing better during operation, attempts to take on this challenge. For an intern, collaborative project at IMT Lille Douai, the CERI MP develops new eco-materials using an innovative process using recycled primary materials (such as hemp). However, these new materials need to be characterised for microbiological resistance and emissions before their use. Indeed, the resistance to micro-organisms, particularly microscopic fungi, is an essential parameter for every new material, a fortiori for materials with high organic contents such as certain eco-materials developed. Another essential parameter is the new materials emissive behaviour, in particular with respect to their influence on indoor air quality. Their atmospheric emissions will not only be evaluated with respect to regulated volatile organic compounds but equally with respect to potential odours associated with them. The project proposes, through a collaboration between CERI MP and CERI EE, to evaluate the characterisation of the material in terms of microbiology, emissions and odours from the development stage of the eco-materials, which allows feedback on the formulation and manufacturing process, in order to optimise the characteristics of these new materials.

Keyword: Indoor air quality, fungal development, eco-materials for construction, emissions

Role description:

The candidate should have competences in microbiology and/or in measurement of odours, with a strong interest in eco-materials for construction. The candidate should show a large interest and be willing to learn techniques and methods used in the characterization of building materials. Knowledge and experience in the field of measurement of VOCs or indoor air quality would be a strong plus.

Skills and experience needed:
Essential:
Knowledge and demonstrated experience in the sensorial and analytical evaluation of odours, including the use of an GC-olfactometer
and /or
Knowledge and demonstrated experience in microbiology, particularly in the study of microscopic fungi.

Desirable:
Knowledge in the field of indoor air quality, experience in the sampling and analysis of VOCs, experience in data treatment from GC-FID, GC-MS and/or HPLC analysis.
Knowledge in the field of eco-materials, with organic and inorganic primary materials, experience in the microbial sampling at the surface of materials, experience in the fungal population counts and in the identification of fungal species.

The candidate will have obtained a PhD in the field of indoor air quality or in the microbiology applied to the field of construction materials.
The candidate will demonstrate excellent communication skills, both orally and in writing. He/she is expected to participate in the publication of scientific articles and to present in national and international conferences. A good knowledge of English (written and orally) is essential. The candidate will display a collaborative ethos and demonstrate a sense of pedagogy, which will make his/her work in a multicultural environment successful.

Conditions:

The position is offered on a fixed term basis of 14 months with a starting date on 02 May 2021 (CDD contract).

Information and application procedure:

For any additional information, please contact **Liselotte Tinel**, assistant-professor at CERI EE (email: liselotte.tinel@imt-lille-douai.fr, tel: +33 (0)327 712641) or **Christine Lors**, professor at CERI MP (email: christine.lors@imt-lille-douai.fr, tel : +33 (0)327 712674)

For administrative informations, please contact the Direction of Human Resources:
- jobs@imt-lille-douai.fr
- tel: 03.27.71.25.36 ou 03.27.71.25.20

To apply for this position, please connect to our job application platform via the following link:
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Application deadline: 04/04/2021