IMT Nord Europe
École Mines-Télécom
IMT-Université de Lille

PhD position
Studying natural and polluted air masses in Paris and Sao Paulo

Department: CERI Energy and Environment, Research unit on Atmospheric Sciences

Supervisors: Dr. Joel F. de BRITO, Dr. Sébastien DUSANTER and Prof. Véronique RIFFAULT

Workplace: Campus Bourseul, Douai, France with a field campaign in Brazil

Type of contract: fixed term contract of 36 months

General context

As public establishment belonging to IMT (Institut Mines-Télécom), placed under the supervision of the Ministry of Industry, IMT Nord Europe has three main objectives: providing our students with ethically responsible engineering practices enabling them to solve 21st century issues, carrying out our R&D activities leading to outstanding innovations and supporting territorial development through innovation and entrepreneurship. Ideally positioned at the heart of Europe, an hour away from Paris, 30 min from Brussels and an hour and a half from London, IMT Nord Europe has strong ambitions to become a main actor of the current industrial transitions, digital and environmental, by combining education and research on engineering and digital technologies. Located on two main campuses dedicated to research and education in Douai and Lille, IMT Nord Europe offers research facilities of almost 20,000m² in the following areas: Digital science | Processes for industry and services | Energy and Environment | Materials and Processes.

For more details, please visit the School's website: www.imt-nord-europe.fr

This position is based in the Centre for Education, Research and Innovation in Energy and Environment (CERI EE), in the group of Atmospheric Sciences. The CERI EE's research focus is on the physicochemistry of trace species in the air and its fields of application. The aim is to achieve a better understanding of the processes of formation and transformation of air pollutants and to propose solutions adapted to the needs of society and economic operators. The CERI EE offers an international working environment in a Shanghai ranked research group, with labs based in Douai, a middle-sized town close to Lille, a cosmopolitan metropolis with a thriving cultural scene and lively atmosphere.

Background of the project

The World Health Organization has classified particulate matter as carcinogenic to humans, associating outdoor pollution as responsible for a total of 3.7 million premature deaths in 2012. The complexity of sources in urban environments is further complicated through non-linear interactions with vegetation emission, typically strong emitters of compounds that are transformed in the atmosphere to increase aerosol particles number and mass. The exact process behind it depends on a number of parameters such as fast-evolving anthropogenic source profiles, and highly diverse vegetation responding to a changing climate, more and more often subject to hydric and temperature stresses. Those interactions need to be accurately characterized for improving air quality mitigation strategies in urban environments. Within the scope of anthropogenic-biogenic interactions, state-of-the-art instrumentation will be deployed in the environs of Paris, the Rambouillet forest, during the ACROSS (Atmospheric chemistry of the suburban forest) campaign in summer 2022, and at the University of Sao Paulo campus within the BIOMASP+ (BIOgenic emissions, evolution and impacts in the Metropolitan Area of São Paulo) campaign in spring 2023. Those projects are part of multidisciplinary, international collaborations into which IMT Nord Europe will focus on studying the formation of particulate matter from gaseous sources in real-time deploying high-resolution mass spectrometers.

Brief role description

The PhD position under the direction of Prof. Véronique Riffault, and supervised by Dr. Joel F. de Brito and Dr. Sébastien Dusanter will be focusing on the study of atmospheric chemistry close to the contrasting cities of Paris and Sao Paulo, particularly on Volatile Organic Compounds sources and transformations, toward Secondary Organic Aerosols, in link with aerosol composition. The PhD student is expected to:

- participate in the BIOMASP+ field campaign in Sao Paulo in March 2023 for the collection and validation of data, using state-of-the-art mass spectrometry techniques (PTR-ToF-MS coupled with aerosol inlet, CHARON), with support of senior researchers and technical staff;
- analyse the data of the ACROSS campaign near Paris, comprising of CHARON-PTR-ToF-MS and HR-ToF-AMS for the semi-volatile and non-volatile organic compounds, and BIOMASP+ campaign to investigate links between VOCs, IVOCs and Particulate Matter, and to quantitively inform on the main contributors in each phase. Source apportionment techniques (Positive Matrix Factorisation type) will be applied on different phases and ionization methods for a comprehensive overview of the gas-to-particle transformations under different pollution levels;
- write up research results and participate in the dissemination through publications, conferences and seminar presentations, as well as outreach activities, including towards stakeholders;
- provide guidance to undergrad and MSc students, as required;
- undertake appropriate organisational and administrative activities connected to the research project, such as organising meetings or seminars internally, within the project consortium or with stakeholders.

Profile of the candidate:

The candidate must have a Master degree in atmospheric sciences, or related field.

Skills	Knowledge
Essential: • Competency to conduct individual and collaborative research projects • Ability to plan and prioritise own work in order to meet deadlines • Interest in data analysis, creativity, motivation • Good proficiency in English ***Desirable:*** • Experience in working with and analysing data from online mass spectrometry (PM and/or VOCs) • Willingness and enthusiasm to carry out field campaigns • Scientific programming (MatLab, IgorPro …) • Experience with effective communication for a wide range of audiences, both orally and in writing	***Essential:*** Knowledge of atmospheric sciences ***Desirable:*** Knowledge of urban air pollution, biogenic emissions and/or their interaction

CONDITIONS

The job is offered on a full-time, fixed term basis for a period of 36 months with a starting date aimed on 1 October 2022.

INFORMATION AND APPLICATION METHODS

For any additional information on the missions, please contact

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For any administrative information, please contact the Human Resources Department:

jobs@imt-nord-europe.fr

To apply, please connect to our recruitment platform via the following link:

Le lien recruitee sera inséré par la DRH

DEADLINE DATE FOR SUBMISSIONS: 02/05/2022