PhD position (36 months): Sources and exposure risks of urban aerosols – real-time chemical characterization in Lille (RESILIENCE)

Laboratory: Centre of Education, Research and Innovation on Energy and Environment (CERI EE)

Supervisors: Dr. Hui CHEN, Dr. Laurent ALLEMAN, Prof. Véronique RIFFAULT

Type of contract and duration: Full-time PhD (doctoral contract) – 36 months

Workplace: Bourseul Campus, Douai, France

Context:

IMT Nord Europe is a public higher-education and research institution belonging to the Institut Mines-Télécom (IMT) group, under the supervision of the French Ministry of Industry. Its missions include engineering education, scientific research, and innovation in support of sustainable territorial development. For more details, please visit: www.imt-nord-europe.fr/en

This PhD position will be hosted within CERI EE at IMT Nord Europe, in the research axis *"Observations, Sources and Processes in the Atmosphere" (OSPA)*. The host team develops advanced experimental and data analysis approaches to characterize atmospheric aerosols, their sources, and their impacts on air quality and health.

This PhD research is part of the PEPR VDBI RESILIENCE project (https://pepr-vdbi.fr/projets-laureats/projets-resilience). It aims to develop transdisciplinary approaches to evaluate how urban planning and mobility-transition policies can improve living conditions and generate co-benefits for air quality and health. The PhD research will focus on high-time-resolution measurements of aerosol chemical composition and size distributions, source apportionment, and exposure indicators in contrasting urban environments, including:

- Long-term observations at the ATOLL platform (Atmospheric Observatory of LiLle), integrated into the European ACTRIS research infrastructure.
- Enhanced field campaign datasets collected in 2026 within the RESILIENCE campaigns in Lille city center.

Together, these datasets provide a unique framework to identify and quantify the contributions of traffic, industry, residential heating, secondary formation, and regional transport, and to relate these contributions to advanced exposure-risk indicators.

Brief role description:

Main tasks

Under the supervision of the research team, the doctoral candidate will:

- Contribute to the operation, maintenance, and quality assurance of ATOLL real-time instruments (e.g., ACSM for chemical speciation, Aethalometer AE33 for black carbon, Particle counter FIDAS for size distributions, and Xact 625i for hourly trace-metal measurements).
- Perform QA/QC, harmonization, and management of multi-instrument datasets (ATOLL long-term observations + RESILIENCE campaign datasets), including meteorological and ancillary data.
- Develop and apply advanced source-apportionment methods (e.g., PMF, NMF, and emerging machine-learning approaches) to integrate chemical composition, black carbon, trace metals, and particle-size information.

- Construct inhalation-based exposure indicators (e.g., size-dependent deposition modelling and metal-associated inhalation-risk metrics) and quantify the source-specific drivers of exposure in Lille.
- Prepare scientific figures, technical reports, peer-reviewed publications, and thesis chapters (expected 2–3 journal papers).
- Participate in RESILIENCE scientific meetings, ACTRIS-related training activities, workshops, and international conferences.

Profile of the candidate:

The candidate should hold a Master's degree in one of the following fields:

- Environmental science or Environmental engineering.
- Atmospheric sciences.
- Physics, chemistry, or applied data science with a strong interest in air quality.

Skills and qualifications

Required:

- Strong motivation for research on air pollution and health, aerosols and source apportionment.
- Ability to work with large observational datasets and apply quantitative/statistical methods.
- Experience in scientific programming (Python, R, Matlab, or equivalent) for data analysis.
- Excellent scientific writing and communication skills (e.g., evidenced by a Master's thesis or reports); the potential to publish in peer-reviewed journals.
- Autonomy, rigor, and the ability to collaborate effectively within an international and multidisciplinary research team.

Assets:

- Familiarity with aerosol and air-quality instrumentation (e.g., AMS/ACSM, SMPS/OPC, black carbon, or trace-metal measurements).
- Previous involvement in field measurement campaigns.
- Knowledge of source-apportionment methods (e.g., PMF, NMF) and/or related data-processing software (e.g., Igor Pro, Python, R).
- Basic command of French is a plus but not mandatory.

The working language is English. Candidates are expected to demonstrate strong proficiency in English. Knowledge of French is appreciated but not required.

CONDITIONS:

This is a full-time PhD position based at IMT Nord Europe (Douai, France), with regular activities at the ATOLL platform in Lille and possible field activities linked to RESILIENCE campaigns (including Lille and Marseille).

The expected start date is September 2026 (adjustable by mutual agreement).

The PhD grant is **already fully funded**. Salary and benefits will be in accordance with French regulations for doctoral contracts.

INFORMATION AND APPLICATION:

For any information on the duties, please contact Dr. Hui CHEN (hui.chen@imt-nord-europe.fr), Dr. Laurent ALLEMAN (laurent.alleman@imt-nord-europe.fr) and Prof. Véronique RIFFAULT (veronique.riffault@imt-nord-europe.fr)

For any administrative information, please contact the Human Resources Department: jobs@imt-nord-europe.fr

Applicants should submit:

- CV
- Motivation letter describing research interests relevant to the position
- Academic transcripts and contact details of at least two referees

Shortlisted candidates will be invited to an interview (video) and asked to briefly present their academic background and research interests.
To apply, please connect to our recruitment platform via the following link:

https://institutminestelecom.recruitee.com/o/phd-position-sources-and-exposure-risks-of-urban-aerosols-real-time-chemical-characterization-in-lille-resilience

DEADLINE DATE FOR SUBMISSIONS: April 30th, 2026. The position is open until filled. We will begin reviewing applications as they are received.