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INTERNSHIP OFFER

Sensor data analysis for Air Quality estimation at the urban scale

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Location: Verneuil-en-Halatte (60) - accessible by public transport, 40 minutes north of Paris

Contract type: Internship

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Internship theme: *air quality - sensor system - open access dataset*

Context and scientific content:

Ineris, Institut National de l'Environnement Industriel et des Risques, is a public industrial and commercial establishment under the supervision of the Ministry of Ecological Transition and is the public expert in technological risk management.

The proposed internship will be carried out within the MOCA (Modélisation Atmosphérique et Cartographie Environnementale) and ASUR (Accompagnement à la SURveillance de la qualité de l'air et des eaux de surface) units of the MIV (Milieux et Impact sur le Vivant) Directorate. This internship is part of the work of the French central laboratory for air quality monitoring (LCSQA, Laboratoire Central de Surveillance de la Qualité de l'Air, https://www.lcsqa.org/fr), of which Ineris is a member. During the internship, regular exchanges will take place with international laboratories such as VITO (Belgium) and the Joint Research Center of the European Commission (JRC).

The LCSQA's work focuses in particular on performance evaluation and integration of measurements from low-cost sensor systems into the various decision-making tools used to support air quality improvement policies. In this field, the pollutant maps produced by numerical modelling combined with measurements from reference stations are an essential tool. However, they are subject to uncertainties due to the lack of information available to validate them. Sensor systems dedicated to monitoring air quality provide a perfect opportunity to improve these maps. At significantly lower cost and with fewer constraints, they can be deployed to provide denser spatial and temporal coverage than reference measurement stations. However, these devices are subject to major measurement uncertainties, requiring the application of methods for categorising, filtering, correcting and even calibrating the data collected to improve the way in which these observations are taken into account in air quality mapping tools.

The proposed internship will involve transposing a sensor system data processing methodology (Wesseling et al., 2024, https://link.springer.com/article/10.1007/s11869-023-01493-z) developed by Ineris as part of the work of the European FAIRMODE group (https://fairmode.jrc.ec.europa.eu/activity/ct6) to a dataset from a project based on open access air quality measurement sensor systems (SensEURCity: a multi-city air quality dataset collected for 2020/2021 using open low-cost sensor systems, https://doi.org/10.1038/s41597-023-02135-w). This application will make it possible to

test the methodology for processing sensor system data under real conditions and will offer the possibility of using this data for high-resolution mapping of pollutants on an urban scale. The digital tools and interface developed will be open source, in line with FAIR principles.

PROFILE

Bac+4 or Bac+5 (Engineer / Master 1 or 2). This internship is aimed at a student who has studied statistics/geostatistics applied to environmental issues. Skills in R and/or Python programming are required.

Fluent in English (reading, writing, speaking), level B1/B2 (CEFR classification, https://www.service-public.fr/particuliers/vosdroits/F34739).

OTHER

4-month internship possible, ideally 6 months.
Paid internship with a contract. Reimbursement of SNCF pass (up to 50%) subject to conditions.

This position is open to people with disabilities.