Cluster WATER – CIRSEE – SUEZ – Le Pecq (France)

Le Pecq, June 6th, 2019

POST-DOCTORAL POSITION

Subject

Development of non-targeted screening methodology and evaluation of its applications to the monitoring of drinking water treatment facilities.

Context

The development of non-targeted screening approaches has opened new opportunities in environmental analytical chemistry. New high-resolution mass spectrometry techniques allow analytical chemists to tackle new scientific challenges while requiring the development of technique-specific workflows. Application of this tool to water analysis and monitoring will generate highly relevant datasets and provide access to new tracers and indicators of water treatment processes' efficiency.

The application of non-target screening implies a complete change in paradigm regarding usual laboratory practices for method development and optimization (sample preparation, analytical method, quality control and insurance, data analysis and statistical tests…); the challenge being the generation of the most comprehensive and least specific water chemical fingerprints possible.

The use of non-targeted screening approaches could therefore represent a significant revolution for the monitoring of water resources quality and for the management of treatment facilities efficiency.

Objectives of the research project

The main objective of the project is to develop the methodology for non-targeted screening at the main research center of SUEZ and to evaluate its applications for the monitoring of specific drinking water treatment processes. The final goal is its application to SUEZ' treatment plants and its inclusion as an innovative methodology in future bid-for-tenders. The results of the project will be presented to the company's main scientific actors as well as published in scientific journals and/or presented at national and international conferences.

Job description

The postdoctoral researcher will contribute to the development and the validation of analytical methodologies aimed at answering new challenges for SUEZ clients. His/Her main activity will be the development of a non-targeted screening methodology (suspected and non-targeted) and to apply it to the monitoring of drinking water production plants and for water quality control of resources and drinking water. To this end, the postdoctoral researcher will optimize all of the analytical method's parameters : extraction conditions, chromatographic conditions, ionization and detection parameters, data analysis. He/She will evaluate the final methodology on real samples collected at SUEZ facilities: resources, treated waters and various waters produced by several different processes.

The analytical methodology will be developed using a UPLC-HRMS system (Orbitrap, QExactive, ThermoFisher). Sample preparation procedure will be based on solid phase extraction but some innovative techniques could also be tested.

The main tasks and activities of the postdoctoral researcher will be:

- Finding the optimal conditions for every parameter and defining the non-targeted screening methodology (from sampling to data analysis) to be applied in several SUEZ projects.
- Selecting, together with treatment experts from SUEZ, resources, unitary treatment processes and drinking water treatment plants to be used for evaluating the proposed methodology.
- Organizing and coordinating sampling campaigns.
- Performing analysis on real samples.
- Developing and evaluating new data analysis approaches with the support of SUEZ' Digital Hub experts.
- Developing an MS spectra database for SUEZ' laboratory by including relevant compounds for water analysis (suspect screening).
- Presenting the results of the project in national and international conferences and conducting the writing of, at least, 2 scientific articles.

Required profile

Diploma	PhD in environmental analytical chemistry
Level of experience	Three to five years (including PhD work)
Skills	Theoretical and practical skills applied to analytical equipment operation and methods for the analysis of organic micropollutants – Environmental samples preparation – LC-HRMS and LC-MS/MS analysis
Software	Office, knowledge of specific HRMS data analysis software (R or Matlab) would be appreciated
Languages	English: basic knowledge ☐ fluent ☒ bilingual ☐
Other skills: Scientific rigour, critical mind, autonomy, dynamism, perseverance, good scientific writing, teamwork, solution oriented.	

Working place:

Integration to the Water and chemical fingerprint Division at CIRSEE, SUEZ, 38 rue du Président Wilson 78230 Le Pecq, France

Management:

All activities will be under the supervision of Amélie Guillon, project manager, and performed as part of the Water and Chemical Fingerprint Division supervised by Mar Esperanza.

Contact details:

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Mar ESPERANZA, PhD – Manager of Water and Chemical Fingerprint Division
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Contract duration:

18 months
Beginning:, flexible depending on applicant's availability

Contract:

Fixed-term contract

Salary:

To be defined with Human Resources Division