PhD position:
Reactive transport of micropollutants in surface waters receiving WWTP effluents: insights from multi-element isotopic analysis coupled with passive sensors

Period: Start: October 2022 ; Duration: 36 months
Profile: Organic Chemistry, biogeochemistry, environmental sciences
Topic: Reactive transport of micropollutants in surface waters receiving WWTP effluents: insights from multi-element isotopic analysis coupled with passive sensors
Laboratory: Institut Terre & Environnement de Strasbourg – ITES, France
Contact (send a motivation letter and a CV to): Jérémy Masbou, Assistant Professor ENGEES (Water Management National School) **And** Gwenaël Imfeld, Research scientist at CNRS (National Center for Scientific Research)

We are looking for a creative, qualified and motivated Ph.D. candidate, in the context of ongoing project on "understanding micropollutants fate in surface waters across agricultural/urban contexts" at Earth and Environment Strasbourg (ITES, France, https://ites.unistra.fr/).

Concentrations and transformation of micropollutants, dissolved organic matter (DOM) and particulate matter (POM) in surface waters vary over space and time, depending on diffuse or point sources and biogeochemical reactions. Interactions between micropollutants/DOM/POM with respects to in situ degradation of organic compounds in surface water are largely unknown. This PhD thesis aims to improve the understanding of dissipation of key micropollutants of agricultural and urban relevance in streams receiving WWTP effluents under variable hydro-chemical and hydro-climatic conditions.

The thesis will use analytical chemistry and isotopic biogeochemistry approaches, including multi-element and compound-specific isotopic analysis ($\delta^{2}H$, $\delta^{13}C$, $\delta^{15}N$, $\delta^{37}Cl$, $\delta^{35}S$) and the deployment of passive samplers for an integrative characterization of micropollutant degradation under river conditions. The thesis relies on multi-scale approach based on laboratory experiments and in situ studies of micropollutant degradation in a rural river connected to a WWTP.

The thesis includes:

- Methodological/analytical developments to consolidate and validate the developments of recent years at ITES on the evaluation micropollutant degradation in surface waters;
- Microcosm experiments, river pilot experiments in the laboratory and on-site campaigns to study the interplay between micropollutants/DOM/POM in aquatics ecosystems receiving WWTP effluents;
- Dissemination of the thesis results (publications and an international symposium planned).

Prerequisites and applications

Applications will require:

- A M.Sc. degree in Chemistry or Environmental science, by September 2022
- Experience in hydrochemistry, organic chemistry and/or biogeochemistry: laboratory-based experimental and analytical studies (GC-MS, HPLC-MS, etc.)
- Good command of the English language (written and oral)
- Communication skills and ability to work in an interdisciplinary team with scientists, engineers, and technicians
- A working knowledge on pollutant transformation, stable isotope analysis, and/or CSIA as well as an international research experience, will be additional assets.