A 3-year PhD scholarship for a project on untargeted screening of substances related to potential persistent organic pollutants is available at Ifremer (Nantes, France) in close collaboration with LABERCA (Oniris, Nantes). The project will be starting in fall 2016.

Proposal title: ***Towards an untargeted screening of organohalogenated contaminants in environmental matrices by high resolution mass spectrometry and automatic data processing.***

Abstract

A 3-year PhD scholarship is available at the Laboratory of Biogeochemistry of Organic Contaminants within the Unit of Biogeochemistry and Ecotoxicology of the Department of Biological Resources and Environment of the French Research Institute for Exploitation of the Sea (Ifremer, Nantes, France). This PhD will be carried out in cotutelle with the Department of "Laboratoire d'Etude des Résidus et Contaminants dans les Aliments" (LABERCA) belonging to the Nantes-Atlantic National College of Veterinary Medicine, Food Science and Engineering (Oniris, Nantes, France), starting in fall 2016. We offer an interesting and challenging position in an international environment which will contribute to enhancing risk analysis related to persistent organic pollutants and to improving chemical environmental and food safety. The student undertaking the project will receive extensive training in a range of modern analytical techniques including cutting-edge state-of-the-art chromatography coupled with tandem/high resolution mass spectrometry techniques. The position will be based in Nantes (Loire-Atlantique, France) in the two academic laboratories.

Due to the multiplicity of chemical substances placed on the market and potentially in the environment, including food matrices, it is now accepted that the number of molecules monitored by standard targeted chemical analyzes is not enough for a comprehensive picture of the real state of contamination. Potential sources of contamination may therefore remain unknown. The main objective of this PhD thesis is to develop an untargeted and comprehensive analytical strategy for the identification of halogenated contaminants in various matrices. The strategy will include coupling the acquisition of global chemical footprint by ultra-high resolution mass spectrometry to automated bioinformatics tools for filtering and data analysis purposes, taking advantage of the mass defect as discriminating criteria. This "fishing" strategy will allow detecting and identifying new and/or emerging organohalogenated compounds of anthropogenic origin in environmental and food matrices related to the aquatic environment. The untargeted analysis will be implemented through several chromatographic separation techniques (gas phase - GC, liquid - LC or supercritical - SFC) with appropriate ionisation modes (*e.g.* electrospray ionization - ESI, atmospheric pressure chemical ionization - APCI), in order to investigate various accessible fractions and thus to extend the coverage of chemicals of interest to maximize the discovery of halogenated signals of interest. The PhD student will aim at applying this analytical approach to various sample preparation and analytical strategies and possibly optimizing the screening of halogenated signals according to computer scripts. The selected signals of interest will be subjected to a structural identification work. This work requires an in-depth bibliographic review, an extended analytical work and a database construction.

Coordination /Supervision
Ronan CARIOU, Dr. (LABERCA)
Céline TIXIER, Dr. (Ifremer, RBE/BE/LBCO)
Gaud DERVILLY-PINEL, Dr., HDR (LABERCA)
Catherine MUNSCHY, Dr. (Ifremer, RBE/BE/LBCO)

Qualifications

- Strong chemical background with a M.Sc. in Chemistry, Chemical Engineering, Analytical Chemistry or equivalent
- Hands on experience with method development and advanced data analysis within chromatography and mass spectrometry (tandem and/or high resolution MS)
- Experience or knowledge about one or more of the following areas will be an advantage:
  - Metabolomics
  - Persistent Organic Pollutants (POPs)
  - Multivariate data analysis
  - Programming
  - Organic chemistry
- Good laboratory skills
- Good collaboration and communication skills (written and spoken English)
- Structured and analytical working approach

Salary and appointment terms

The salary and appointment terms are consistent with the current rules for PhD degree students. The period of employment is 3 years and contracted directly with Ifremer.

Further information

For further information please contact the project coordinator, Dr. Ronan Cariou (ronan.cariou@oniris-nantes.fr).

Application

Please submit your application no later than **1st April 2016**. Applications must be submitted as **one pdf file** containing all materials to be given consideration. The file must include:

- A letter motivating the application (cover letter)
- Curriculum vitae
- Details of Master's results (and MSc diploma if available)

Candidates may apply prior to obtaining their master's degree, but cannot begin before having received it.

Ifremer, French Research Institute for Exploitation of the Sea is the principal research and advisory body for fisheries, marine environment and aquaculture in France. The Laboratory of Biogeochemistry of Organic Contaminants (LBCO) of the Unit of Biogeochemistry and Ecotoxicology conducts research and monitoring activities on the chemical contamination of the marine environment. His research activities focus on the biogeochemistry of hydrophobic organic contaminants: levels, trends, flux, speciation, partitioning between geochemical and biological reservoirs in coastal environment. Over the last 10 years, LBCO has also worked on the development of research and monitoring tools such as passive samplers exposed to water and sediment. The LBCO has modern analytical facilities (clean laboratory and high performance analytical instruments) and is specialized in trace (ultra-trace) analysis of various hydrophobic organic contaminants in marine matrices (water, suspended matter, sediments, biota).

LABERCA's general domain of activity is the chemical food safety, in a global risk assessment perspective: generation and interpretation of exposure and body burden data, study of the transfer and metabolism of investigated chemicals from their sources to the consumers through the food chain. From an analytical point of view, the two main areas of competence of the laboratory are the treatment of complex biological samples for isolating the studied substances present at (ultra-trace)- level, and the hyphenated measurement of these compounds by various mass spectrometric coupling techniques. Besides these targeted approaches, the laboratory has been developing over the last 10 years an expertise in untargeted approaches (metabolomics) to reveal biomarkers of chemical exposure. The analytical platform is considered as one of the most complete at the national and European level (> 15 last generation MS instruments). All these activities (assays and research) are conducted under management quality system combining accreditation (ISO17025) and certification (ISO9001:2008).

You can read more about IFREMER and LABERCA on wwz.ifremer.fr/institut_eng/ and www.laberca.org