



## Institute of Technology

### Ciência sem Fronteiras / Science Without Borders

#### Postgraduate Project Template

<b>Institution:</b>	Institute of Technology, Sligo
<b>Title of Postgraduate Opportunity:</b> (include level of study)	Investigation of the Occurrence of Pharmaceutical and Personal Care products (PPCP) in Sludge & Wastewater samples using Chromatographic Separation Techniques with Mass Spectrometry Detection (PhD)
<b>PI Name &amp; Contact Details:</b>	Dr. Fiona McArdle +353 71 55254 <a href="mailto:mcardle.fiona@itsligo.ie">mcardle.fiona@itsligo.ie</a>
<b>Department/School:</b>	Life Sciences, School of Science
<b>Research Centre /Group:</b>	This project will be centered in the Analytical Sciences group at IT Sligo.
<b>Research Centre/Group website:</b>	<a href="http://www.itsligo.ie">www.itsligo.ie</a>
<b>Brief Summary of PI research / research group /centre activity</b>	
The PI has previously supervised 4 M.Sc. students in the area of separation science and electroanalysis. The Analytical Sciences group at IT Sligo has supervised a number of PhD students in analysis of essential oils using GCMS and assessment of heavy metals using IPCMS, ICPOES.	
<b>Brief Description of Masters or PhD Project</b>	
The aim of this research is to examine the occurrence of PPCP in sludge and wastewater samples from wastewater treatment plants.	
Objectives:	
<ul style="list-style-type: none"> <li>○ Optimise Chromatographic and Mass Spectrometry conditions for the examination of a range of PPCP. The PPCP products chosen will reflect the most widely used PPCP and those that are most resistant degradation in wastewater treatment plants. The methods used will be based on EPA Method 1694: Pharmaceuticals and Personal Care Products in Water, Soil, Sediment, and Biosolids by HPLC/MS/MS, December 2007.</li> <li>○ Validation of optimised methods using standard reference materials</li> <li>○ Design a sampling regime for wastewater and sludge samples</li> <li>○ Optimise sample preparation and enrichment techniques for a range of PPCP using off-line solid phase extraction (SPE).</li> <li>○ Evaluation of samples using optimised protocols</li> <li>○ Analysis of results</li> </ul>	
<b>Key Attributes of Project for Brazilian Postgraduate Students</b>	
Should outline why projects offer something that is not available in Brazil – specific equipment,	

multi-disciplinarity, aspects of structured programme, links with industry, placements, links with other research groups, etc. Good opportunity for IoTs to emphasise their close working relationships with industry and particularly SMEs and their pivotal role in regional economic development. This project is closely aligned to research being carried out in Teagasc on estrogenic compounds in the environment. The project will use state of the art equipment in the form of GCMS and LCMSMS. These technologies are among the most advanced for trace analysis of organic substances. The project will utilize the vast knowledge base IT, Sligo has in the field of Environmental Science and in Analytical sciences to assess a problem of increasing concern in western societies. The prevalence of PPCP in water systems is a growing problem and there is a real need to establish validated methodologies for measurement of these compounds in water and wastewaters. The staff involved in Environmental science and Analytical science, at IT Sligo, have a long track record of working closely with the EPA, the local authorities and with a wide range of multinational pharmaceutical companies. This project will further enhance these linkages. The PI also has contacts in Teagasc and with other LCMSMS users in Ireland. This project will be of benefit to the pharmaceutical companies who supply the PPCP and to environmental scientists who have to ensure that these products do not find their way into the public water supplies.

**Name and contact details for project queries, if different from PI named above:**

Dr. Fiona McArdle

**Please indicate graduate disciplines which are eligible for application:**

Graduates in Analytical Chemistry, Analytical Science, Chemistry

**Alignment with Science Without Borders Priority Areas:**

Engineering and other technological areas	
Pure and Natural Sciences (e.g. mathematics, physics, chemistry)	
Health and Biomedical Sciences	
Information and Communication Technologies (ICTs)	
Aerospace	
Pharmaceuticals	
Sustainable Agricultural Production	✓
Green Chemistry	
Oil, Gas and Coal	
Renewable Energy	
Minerals	
Biotechnology	
Nanotechnology and New Materials	
Climate Change	
Biodiversity and Bioprospection	
Marine Sciences	
Productive Inclusion and Social Technologies	
Housing and Sanitation	