

Proposal Outline

Topic	Identification, Screening and Surveillance for Contaminants of Emerging Concern in Coastal and Transitional Waters
Research Theme	Pollution and Litter
Background and Rationale	<p>National water quality monitoring classifies the “chemical status” of Irish Transitional and Coastal waters to be good, though not all our waters can be deemed pristine. New pharmaceuticals, personal care products, pesticides and industrial chemicals are introduced to the global market on an almost daily basis. The wide-ranging use of these chemicals and chemical mixtures in our daily lives, allied with their incomplete treatment through existing wastewater technologies, through non-point source conveyances (e.g. stormwater, overland flow) and directly from sea-based activities results in their release to the broader environment. Some of these products have been found to cause toxicological effects in a range of systemic endpoints (e.g., endocrine disruption, immunotoxicity, etc.) and some may be persistent and liable to accumulate in organisms and food webs; however, their potential distribution and fate within the environment and potential of these real-world mixtures of contaminants to cause acute or chronic effects to sensitive environmental receptors or the broader ecosystem remains largely underexplored and unresolved. Routine monitoring programmes such as required under the Water Framework Directive focuses on compliance with Environmental Quality Standards for a specific list of individual priority substances but does not capture all of the substances that may be present in the environment. For this reason, many of these chemicals and chemical mixtures have been characterised as ‘contaminants of emerging concern’ (CECs).</p> <p>The identification of new substances of concern, their measurement in the marine environment and investigation of their environmental fate of CECs requires new technologies and approaches that can help develop risk-based assessments of chemical pollution of coastal and marine waters.</p>
Scope of Research (Scientific/ Technical Challenge)	<p>This fellowship would provide knowledge on the application of new technologies (e.g., high-resolution mass spectrometry, passive sampling, passive dosing and informatics) to enable the detection and quantification in the environmental reservoirs where they could accumulate (e.g., water, sediment, biota).</p> <p>The fellowship should provide information on the occurrence and fate of CECs in transitional and coastal waters using both novel technologies and field studies for risk- selected coastal and transitional locations. Screening for emerging substances may employ strategic targeting or non-target techniques.</p>

	<p>The information generated should be used to identify and rank emerging substances or substance groups that may pose a risk to the estuarine and coastal environmental and ecosystems.</p> <p>Using such technologies, it is envisioned that this work would also endeavour to identify estuarine and coastal areas of concern such that further investigations or management actions could be subsequently explored.</p> <p>This work should take account of current monitoring and research and previous work undertaken in Ireland on CECs such as dangerous substance screening programmes (2008) and internationally (e.g. NORMAN Network).</p>
<p>Expected Impact</p>	<p>The fellow will engage with relevant national and international networks, and explore opportunities for collaboration and securing further research funding under Horizon Europe.</p> <p>This fellowship will help to build national expertise in this research area.</p> <p>The fellow will produce policy briefs, in collaboration with relevant state agencies, for stakeholders, and publish their research findings as widely as possible through peer-reviewed papers, conference presentations, articles, etc.</p> <p>Analytical data should be available to the Marine Institute in line with international reporting formats and best practice data archiving practices (e.g. ICES/NORMAN), and include appropriate metadata, method and QA/QC information.</p> <p>The project should provide a review and evaluation of the potential application of novel approaches in future risk- based water quality assessment for CECs.</p>
<p>Specific Collaboration</p>	<p>Marine Environment & Food Safety Services, Marine Institute and Environmental Protection Agency.</p> <p>The fellow will provide policy briefs for relevant Government Departments including DHPLG and DCCA.</p>
<p>Location of Fellow</p>	<p>Higher Education Institute or Public Research Body (Republic of Ireland)</p>
<p>Duration and Funding Available</p>	<p>3-5 years</p> <p>€100,000 per annum maximum (e.g. €400,000 for 4 years duration)</p>

References and information	<p>Nilsen, E., Smalling, K. L., Ahrens, L., Gros, M., Miglioranza, K. S. B., Picó, Y., and Schoenfuss, H. L. 2019. Critical review: Grand challenges in assessing the adverse effects of contaminants of emerging concern on aquatic food webs. Environmental Toxicology and Chemistry, 38: 46–60.</p> <p>OSPAR request on information for use in selecting and deselecting hazardous substances of concern ICES Special Request Advice sr.2017.21 DOI: 10.17895/ices.pub.3693 2017</p> <p>Contaminants of emerging concern in a large temperate estuary 2016 James P. Meador et al Environmental Pollution, 213: 254-267.</p> <p>Tornero, V., and Hanke, G. 2016. Chemical contaminants entering the marine environment from sea-based sources: A review with a focus on European seas. Marine Pollution Bulletin, 112: 17–38.</p> <p>Vandermeersch, G., Lourenço, H. M., Alvarez-Muñoz, D., Cunha, S., Diogène, J., Cano-Sancho, G., Sloth, J. J., et al. 2015. Environmental contaminants of emerging concern in seafood – European database on contaminant levels. Environmental Research, 143: 29–45.</p> <p>An Assessment of Dangerous Substances in Water Framework Directive Transitional and Coastal Waters 2007-2009 McGovern et al. 2011</p> <p>Roose P., Albaigés J., Bebianno M.J., Camphuysen C., Cronin M., de Leeuw J., Gabrielsen G., Hutchinson T., Hylland K., Jansson B., Jessen B.M., Schulz-Bull D., Szefer P., Webster L., Bakke T., Janssen C. 2011. Chemical Pollution in Europe's Seas: Programmes, Practices and Priorities for Research, Marine Board Position Paper 16. Calewaert, J.B. and McDonough N. (Eds.). Marine Board-ESF, Ostend, Belgium.</p> <p>SUMMARY DOCUMENT - DANGEROUS SUBSTANCES SCREENING SUMMARY REPORT National Dangerous Substances Expert Group 2008</p> <p>NORMAN Network of reference laboratories, research centres and related organisations for monitoring of emerging environmental substances.</p>
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