Development of a passive sampler for monitoring sources and fluxes of metaldehyde in natural waters and response to stochastic storm events

University of Portsmouth
In partnership with South West Water

NERC Industrial CASE PhD studentship – 4 years full-time (1st October 2014)
Closing Date – 28th February 2014 (Interviews scheduled for 11th March 2014)
National Minimum Doctoral Stipend for 2014/15 is £13,863
http://www.rcuk.ac.uk/ResearchCareers/postgrad/Pages/home.aspx
Student will also receive additional £1000 p/a from CASE partner

Supervisory team
• Dr Gary Fones, University of Portsmouth
  http://www.port.ac.uk/school-of-earth-and-environmental-sciences/staff/gary-fones.html
• Professor Graham Mills, University of Portsmouth
  http://www.port.ac.uk/school-of-pharmacy-and-biomedical-sciences/staff/prof-graham-mills.html
• Mr Lewis Jones, South-West Water Ltd.

Project overview
Metaldehyde is the active ingredient in 80% of slug pellets products, with 6,000-10,000 t/yr applied to protect crops in the UK. Riverine contamination by metaldehyde can result in UK water companies breaching the Drinking Water Directive standard currently set at 0.1 µg L⁻¹. Concentrations in lowland rivers routinely range from 0.2-2.0 µg L⁻¹. There is a relationship between agricultural use of metaldehyde and peak concentrations (autumn through to winter) in river water. Water companies and Environment agencies are under pressure to routinely monitor for metaldehyde as part of their legal obligation. Sampling of water by grab/spot methods can miss fluctuations in concentration. This hampers the prediction of potential biological effects and exposure to the molluscicide. Some of these difficulties can be overcome by the use of passive samplers. Several designs of passive sampler have been developed to monitor a range of pollutants in the aquatic environment. The mass of a pollutant accumulated by a device can reflect either the equilibrium concentration or the time-weighted average concentration of the pollutant in the water column. They can also pre-concentrate pollutants, thereby lowering analytical detection limits. This project will further develop the University of Portsmouth’s Chemcatcher® passive sampler (alongside any other potential devices) for measuring metaldehyde. The sampler will then be used to produce more robust and reliable monitoring data for end-users such as water companies and environment agencies. Devices will be calibrated in the laboratory and then validated in extensive field trials involving South-West Water (CASE partner) and project partners Natural Resources Wales and the Centre for Ecology & Hydrology. Information from the project will be disseminated by our other partner, the
Metaldehyde stewardship group, and the field data will help end users in developing management plans for situations where the concentration of metaldehyde exceeds the regulatory limits. In addition, the project will initially involve developing and optimising instrumental analytical chemistry techniques (such as GC-MS and LC-MS/MS) for measuring metaldehyde at environmental concentrations.

**Training and other skills**
The studentship will provide a number of unique learning and work experiences both at the University and with the CASE partner. The doctoral student will be part of a high quality research environment and be a member of the University’s Graduate School (http://www.port.ac.uk/graduateschool/).

The School of Earth and Environmental Sciences has excellent laboratory facilities and analytical instrumentation and an expanding cohort of doctoral and post-doctoral researchers. There are opportunities for the student to interact across the Faculty via regular scientific workshops and external research seminars. Regular attendance at Graduate School activities will be a requirement and there will be opportunities to attend external events organised by the funding body. Further specific training on instrumental laboratory (e.g. GC-MS and LC-MS/MS) and field techniques will be given during the placements at South-West Water and there will be additional opportunities to interact with the other project partners and bodies such as the Westcountry Rivers Trust and Cornwall Wildlife Trust.

**Requirements**

This NERC funded PhD programme is only available to UK citizens or those who have been resident in the UK for a period of 3 years or more.

**Essential** - Good BSc (Hons) degree in Chemistry, Environmental Chemistry, Environmental Science or equivalent. Current UK driving licence and willingness to undertake field work within the UK outside of normal working hours. The applicant must have the ability to work at the CASE partner laboratory for a minimum of three months over the duration of the project.

**Desirable** - MSc/MRes degree in a chemical science discipline and also have recent experience of modern analytical chemistry and fieldwork techniques.

**References and further reading**
1. [http://www.getpelletwise.co.uk/](http://www.getpelletwise.co.uk/)

**Applications & further information**
Email a cover letter and CV to Dr Gary Fones by 28th February 2014
Tel: 023 92 84 2252
E-mail: gary.fones@port.ac.uk

Please note that this PhD studentship is a CASE award with South West Water.