1. **Title:** Development and evaluation of a novel, rapid/portable electrochemical sensing system for measurement of metal ions in water
2. **Academic Lead:** Professor Janice Kiely (supervisors - Alex Yue and Tushar Dhavale). Contact Janice.Kiely@uwe.ac.uk
3. **Description of research topic:**

The supply of safe drinking water is paramount for the health and wellbeing of people across the globe. Water supplies are threatened from the naturally occurring contaminants from the environment such as heavy metals and also from pollutants from activities such as mining, agriculture and oil/chemical refining. Confidence in the water supply and tracing sources of pollution are achieved through water testing. Current measurement techniques, typically Inductively-Coupled-Plasma-Mass-Spectroscopy, involve expensive capital equipment only available in specialised facilities with highly trained personnel. In the modern water industry there is a need for rapid testing and networked stand-alone devices that can be positioned in remote locations.

The challenge of this research work will be to develop a platform technology for detecting metal ions at the required sensitivity/specificity in a portable/hand-held system. The hypothesis is that a new electrochemical sensing approach (developed at UWE) involving the immobilisation of chelating agents on nanostructured surfaces and differential pulse stripping analysis will provide a solution to this challenge. Aspects of the sensor system that must be investigated include the effect of chelating agents on sensitivity, interference from other compounds within a water sample. Signal analysis algorithms will be developed and evaluated to determine the optimum method for establishing a dose dependent relationship. In addition, the technology will be field tested to establish durability, repeatability and the utility of the system.

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