

Protecting biodiversity through the development of non-lethal research methods for wildlife

This project presents an exciting opportunity to undertake world-leading research to support the protection and maintenance of biodiversity. You will become part of an international network of academics who are working to revolutionise pollution ecology through the development of 'non-lethal methods' and will have the opportunity to work closely with colleagues around the world throughout the course of the project. Developing your expertise in biology, ecology and environmental science, the interdisciplinary research you undertake, coupled with the international reputation you will establish through research publications and conference presentations, will provide you with highly marketable skills to support you in your future career.

Project background: Biodiversity loss is one of the most significant threats to the future sustainability of humans and the environment. The resultant reduction in ecosystem resilience leads to destabilised ecosystems that may be highly susceptible to ecological stressors. Therefore, there is an international focus on scientific research to support the development of management strategies for the protection and maintenance of biodiversity. One major area of research is Ecological Risk Assessment (ERA), which seeks to evaluate the impacts of pollutants and other stressors on wildlife. ERA requires quantification of contaminant concentrations in wildlife, but models that can be used to predict these concentrations often produce highly variable results (e.g. Wood et al., 2009). Therefore, there is an ongoing need for direct measurement (Wood et al., 2010), the conventional techniques for which are destructive (lethal). Given that the aim is to protect biodiversity, lethal methods seem both ethically and morally questionable, especially when considering rare and endangered species. There is growing international interest in the development of non-lethal methods for quantifying whole-body contaminant burdens (Wood et al., 2011). Methods range from whole organism analysis, known as live monitoring, to the non-lethal harvesting of tissue samples (e.g. blood, hair, feathers). Such methods have been used for viral and DNA studies in wildlife, but using these methods to determine contaminant burdens has received minimal attention to date.

Project outline: This PhD project contributes to the protection of biodiversity through the development of non-lethal methods to support ERA. The aim is to develop methods to quantify contaminant burdens in representatives of one or more vertebrate groups (mammals, birds, reptiles, fish and amphibians). Focussing on radionuclides and their stable element equivalents, you will use a combination of desk-based analysis, laboratory and field studies, to undertake this research. Full training will be given and this may include both training at Salford and at other participating institutions within the international network. The expected outputs from this PhD research include: (i) a critical review of the current literature on the use of non-lethal methods for measuring contaminant burdens in wildlife; (ii) an international database of parameters to convert contaminant concentrations in tissues to contaminant concentrations in whole organisms; and (iii) new laboratory- and field-based non-lethal methods for representatives of at least one vertebrate group.

The project will make use of recent extensive investment by the University in laboratory space and new equipment, including fpXRF, ICPOES and the gamma spectrometry system. The project outputs will be of significant international interest, publishable in high impact journals (e.g. *Environment International*, *Environmental Pollution*) and suitable for presentation at various international conferences. The project will also make a direct contribution to the International Task Group on Non-lethal Methods, which is chaired by Dr Wood (<http://www.iur-uir.org/en/task-groups/id-19-non-lethal-methods-in-radioecology>).

For further details/informal discussion please contact Dr Mike Wood (m.d.wood@salford.ac.uk; +44 161 295 2143)

References

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