

## Catchment Scale Modeling Pollution

This PhD project will focus on sources, fate and behaviour of chemicals on a catchment scale within China. There is considerable interest in water quality with respect to chemical contaminants and the factors that influence spatial and temporal concentrations. These controlling factors are many fold and include; emission (both point discharge and diffusive sources), surface water flows, morphology, and ecological state (e.g. eutrophication) as well as the land surface drainage, chemical partitioning/speciation within the rivers as well as sediment processing and chemical/biological mediated degradation. All of these factors influence chemicals fate and ultimately human and environmental exposure to these substances. This PhD project will focus on providing measurement data and modeling approaches to improve our understanding of chemical sources, fate and behaviour and the factors that control them on a catchment basis. It will focus on detailed processes that will affect chemical transport and fate, alongside larger-scale drivers such as land-use and climatic conditions. These data will ultimately be fed into developing an understanding of the pressures on water quality, with respect to chemical contamination, and an integrated catchment scale model and management plan.

### **Preliminary objectives;**

- Review existing catchment scale models
- Develop and test archetype catchment scale multimedia chemical fate model to predict environmental exposure of the selected chemicals in China
- Consider ecological relevance of archetype scenarios and linkages with freshwater ecosystem models (e.g. AQUATOX)
- Assessment of the magnitude and temporal trends of the emissions of selected environmental contaminants to the water ecosystem via point or diffuse pollution sources. These would include intensive agricultural practices as well as industrial production, and changing daily use consumption of chemicals in a developing society
- Potential modification of river models (e.g. GWAVA, RWQM, QUAL2K, WASP7) to provide an assessment of emissions/sources and riverine fate of a range of selected chemicals. These may include; selected pharmaceuticals and personal care products, selected POPs, pesticides and other substances that can be used as 'pollution' tracers
- Assessment of the of the potential effects of regulatory intervention, changes in land use, population density increase, provision of wastewater treatment facilities, ground and surface water quality on environmental distribution contaminants at the catchment scale.

### **Collaborators;**

Unilever (Antonio Franco, Oliver Price), CAS (Gan Zhang, Guang-Guo Ying, Yonglong Lu), CEH (Alan Jenkins, Richard Williams, Andrew Johnson), LEC (Andy Sweetman, Kevin Jones)

### **Who should apply**

First-class or 2.1 (Hons) degree, or Masters degree (or equivalent) in an appropriate subject.

## The small print

### **Studentship funding:**

**UK/EU Nationals:** Full 3 year studentships (UK/EU fees and maintenance grant (£13,590 (2012/13) tax free, per year) are available to UK and EU candidates.

**Non-UK/EU Nationals:** 3 year studentships (UK/EU fees paid, candidate must be able to pay the difference between the UK/EU fee and the International fee, and maintenance grant (£13,590 (2012/13) tax free, per year) are available to non-UK/EU Nationals. Evidence of ability to pay the difference (£11,492 (2012/13)) between the UK/EU fee (£3,828 (2012/13)) and the International fee (£15,320 (2012/13)) for 3 years must be provided with the application. Non-UK/EU applications without this evidence will not be considered.

**Academic Requirements:** First-class or 2.1 (Hons) degree, or Masters degree (or equivalent) in an appropriate subject.

**Deadline for applications:** Midnight Thursday 20 September 2012.

**Interview Date:** Mid/Late October 2012.

**Start Date:** January 2013 or other by negotiation.

**For further information**, or informal discussion about the position, please contact Dr Andy Sweetman ([a.sweetman@lancaster.ac.uk](mailto:a.sweetman@lancaster.ac.uk)) or Prof Kevin Jones ([k.jones@lancaster.ac.uk](mailto:k.jones@lancaster.ac.uk)).

**Application process:** Please send by email a CV and a covering letter outlining your background and suitability for this project, along with two references (download the reference form from: [http://www.lec.lancs.ac.uk/docs/PG\\_Reference\\_Form.docx](http://www.lec.lancs.ac.uk/docs/PG_Reference_Form.docx)) to Andy Harrod, Postgraduate Research (PGR) Co-ordinator, Lancaster Environment Centre, [lec.pg@lancaster.ac.uk](mailto:lec.pg@lancaster.ac.uk).

**Please do not apply via the online application system.**

Due to the limited time between the closing date and the interview date, it is essential that you ensure references are submitted by the closing date.