

Further details: NERC competition studentship

Smart video-capture of diffuse pollution source and mobilisation risks over large-scale agricultural areas

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Why we want to do this science

Despite significant advances in understanding the impact of diffuse pollution, models remain strongly limited by uncertainties in the source dynamics involved. Heterogeneously distributed sources across the whole landscape have variable inputs and are affected by both short-term episodic events (e.g. field ploughing) and long-term processes (e.g. seasonal vegetation changes), which cannot be resolved using current datasets (e.g. landcover maps).

In order to gain a detailed insight into the biogeochemical dynamics of an active agricultural landscape, landscape processes data must be integrated with in-stream monitoring of key water quality determinands (e.g. N, P, DO measurements at 10-minute intervals). At the local scale, this includes the timing, location and magnitude of ephemeral channel flows and livestock access to water courses. At the landscape scale, gradual vegetation changes must be considered.

This project will use a combination of new and innovative high resolution video and time-lapse cameras to provide unprecedented data over these scales, at up to video-rate temporal resolution and over annual durations. Advanced image and video processing techniques will identify events and characterise changes. Topographic data will be used to render the results into 3d, allowing areal extents to be accurately quantified and processes visualised in suitable 3/4d geospatial environments (e.g. Google Earth).

The high resolution process information will then be analysed with rainfall and in-stream data to gain a detailed insight into the biogeochemical dynamics. The results will be assessed in terms of the decision making involved in managing agricultural landscapes.



EdenDTC: Weather station being installed at Dedra Banks (Gareth Owen)

What's in it for you

At the LEC, the student will be part of the Centre for Sustainable Water Management (CSWM) and will interact with a wide range of other research personnel through the interdisciplinary nature of the project. The student will be a member of the EdenDTC team (see <http://www.edendtc.org.uk/>), and benefit from its considerable network of support and infrastructure. There will be additional ties with the Centre for Environmental Informatics and the School of Computing and Communications in Lancaster, and the Institute of Hazard, Risk and Resilience at Durham University.

Who should apply: We seek applications from exceptional graduates or those who expect to graduate in 2011. You should have a strong and numerate science background with a good competence in computing and preferably some experience in geospatial applications. An enthusiasm to learn and a demonstrable potential for creative, high-quality PhD research in an interdisciplinary field is required.

Studentship funding: Eligible applicants will be considered, in competition, for a full NERC studentship (fees and maintenance grant (£13,590 (in 2011/12) Tax Free) per year). Eligible candidates will be from the UK and EU, who have been ordinarily resident in the UK throughout the 3-year period immediately preceding the date of an award. EU candidates who have not been ordinarily resident in the UK for the last 3 years are eligible for "tuition fees-only" awards (no maintenance grant). Unfortunately, this studentship is not available to non-UK/EU applicants.

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

Deadline for applications: Wednesday 9th March 2011.

Interview date: Friday 25th March 2011.

Start date: October 2011

For further information or informal discussion about the position, please contact supervisor Dr Mike James (m.james@lancaster.ac.uk).

Application procedure

Please send a CV and a covering letter outlining your background and suitability for this project, along with two references (download the reference form: http://www.lec.lancs.ac.uk/docs/PG_Reference_Form.docx) to Andy Harrod (LEC postgraduate admissions officer): lec.pg@lancaster.ac.uk