

CHAIR/READER IN PHYSICAL GEOGRAPHY

FURTHER DETAILS

You will be responsible to the Head of the Department of Geography and will undertake research, teaching, administration and other activities supporting the work of the Department and developing and enhancing its reputation, both internal and external to the University. You will be a scholar with an established international reputation for research. Your specialisation should complement or extend the Department's current existing interests in Physical Geography. Key qualities include a highly developed understanding of the field and the research opportunities that it presents, a strong developmental commitment to mentoring and nurturing the research aspirations of staff as well as a commitment to excellent teaching.

The department would particularly welcome applications from Geomorphologists/Quaternary Scientists with a strong background in low latitude landscape dynamics and Hydrologists with research interests in the spatial-temporal dynamics of water in ecosystems and/or ecosystem services.

As a Geomorphologist/Quaternary Scientist, you will complement and extend the department's research into patterns and processes of landscape change. Reconciling a kinematic understanding of landscape evolution with a dynamic understanding of process mechanics is a key area of physical geography research and is undertaken at a variety of spatial and temporal scales. There is currently a particular research emphasis on low latitude (dryland and tropical) environments.

Over relatively short time scales, field based research concerns the morphodynamics of alluvial rivers with a special emphasis on semi-arid fluvial systems and sediment transport mechanics. Research is conducted to improve our knowledge of the linkages between dryland river form and process in order to facilitate understanding of these dynamic landforms and to help in the interpretation of the deposits of ancient fluvial systems preserved in the stratigraphic record. Complimentary flume-based research seeks to improve our understanding of the fundamental physics governing bed material movement in alluvial rivers. Specifically, techniques of laser scanning and particle image velocimetry are being used to better understand the development of bed-surface structuring in coarse-grained channels and the implications for near-bed flow hydraulics and bedload flux.

At a similar scale, eddy covariance and ecosystem modelling is being used to investigate ecosystem carbon cycling and carbon trace gas exchange within lowland fens. At regional to global scales, mathematical modelling and remote sensing techniques are being used to quantify the responses of ecosystem biogeochemical cycling and plant growth to climate variability.

Longer-term geomorphic research considers the aeolian landscape dynamics of Saudi Arabia, southern Africa and South America over Quaternary timescales, as well as long-term coastal landscape and sea-level dynamics in southern Africa. Such work is under-pinned by the development of geochronological frameworks primarily based on the application of optical luminescence dating.

Another research theme focuses on the application of geochemical techniques to both reconstruct palaeoenvironments and understand the fundamental processes of soil

development and sediment diagenesis. Such studies are supported by our state of the art environmental stable isotope facility and expertise in micromorphology. Current research is focused on the palaeoenvironments and palaeoclimates of the Libyan Sahara, precipitation-vegetation-soil dynamics in Mexico and the mechanisms of organic matter degradation and preservation in dryland environments.

Allied to this work is a research cluster concerned with long-term palaeoecological change. This involves the application of palynological and micro-fossil analysis and the development of novel ecological proxies using plant biomarkers and the molecular analysis of organic matter.

As a Hydrologist, you will have an opportunity to contribute to the newly established Centre for Landscape and Climate Research at the University of Leicester. The research centre, led by Prof. Heiko Balzter, is developing the emerging field of Spatial Ecohydrology. This new research field draws together Geography, Ecology, Hydrology, Physics and Chemistry with Social Sciences to understand changing landscapes and the ecosystem services they provide. It analyses the effects of spatial patterns and processes upon biological populations in the bio-hydro-geochemical systems of evolving three-dimensional landscapes. Professor Balzter is also Principal Investigator of the European Centre of Excellence in Earth Observation Research Training GIONET (EC Marie Curie funded).

The Centre's research methods involve geographical information systems, remote sensing, field ecology, hydrology and mathematical modelling. This narrowing of the gap between observational and modelled data provides an opportunity to exploit their synergies. The Centre is establishing a novel and innovative intellectual framework to understand interactions of the water cycle with ecosystems across multiple spatial and temporal scales. It undertakes fundamental research that helps solve the problems of global biodiversity loss, water scarcity and flooding, and threats to food security, which are arising from complex interactions between anthropogenic climate change and land use change.

The rationale of the research centre is to analyse the significance of spatial location, scale, patchiness and structure for coupled ecological/hydrological systems. By making use of advances in space technology and satellite remote sensing, the Centre accesses a wealth of spatial and temporal observations relevant to the understanding of interactions between biological populations and their habitats at a range of spatial scales. The development of methodological concepts for explicitly analysing spatio-temporal heterogeneity in the changing water cycle in the context of land use change and climate change will improve the assessment of ecohydrological processes.

Through its work, the Centre advances our understanding of the world we live in through a range of ecosystem services, a concept adopted by the Millennium Ecosystem Assessment.