ARIES DLA CASE-FUNDED COMPETITIVE PHD STUDENTSHIP WITH THE NATIONAL TRUST

Climate resilience and sustainable development of cultural heritage parks & gardens (Sheffield Park, National Trust): Integrated water resource management, environmental & ecological monitoring

Supervisors: *Prof. Jürgen Adam, Dr Jonathan Paul, Dr Adrian Palmer, Pippa Reece (National Trust)*

Scientific background

Climate change causes increasing challenges and pressures on natural ecosystems and cultural landscapes including heritage parks and gardens of national importance. Such landscapes like Sheffield Parks and Gardens, a top-ranked UK National Trust site, with their complex mosaic of designed and natural elements are under pressure to mitigate against the manifold effects of climate change while safeguarding and fostering their historic and social identity. A holistic approach for climate resilience and (environmentally) sustainable development must develop and integrate innovative multi-scale remote and field data acquisition methods to develop sensitive water management, environmental and land use strategies. This project will develop and apply this integrative methodology with the aim of future-proofing Sheffield Park against specific climatic changes such as rising groundwater levels and diminishing surface water quality. The candidate will work closely with our partners, the National Trust, to characterise the surface and sub-surface hydrological regime, predict potential changes in the short- and long-term under specific scenarios, and develop environmentally and economically sustainable mitigatory strategies.

Research methodology

You will deploy multi-sensor drone surveys, aquatic surveys using ROV's, field surveys using GPR and shallow seismic reflection profile, water quality sampling (aquifer and river), hydrological tracer tests (using fluorescein dye) and analytical + numerical modelling. These methods will be used to characterise the structural controls on the hydrology of Sheffield Park in order to predict how the landscape will evolve under future climate change scenarios.

Training

You will receive training in drone and ROV piloting at the unique RHUL Omnidrome facility, in addition to survey planning, multi-sensor data acquisition and data analysis and near-surface geophysical and hydrological survey setup and execution. You will also be trained in laboratory analyses of water samples, hydrogeological modelling (e.g. using Modflow) and water quality analysis.

Person specification

We seek an enthusiastic individual who is committed to addressing issues of climate change mitigation at a local scale. Fieldwork experience, particularly involving liaising with different stakeholders, is beneficial but not essential. Similarly, prior experience with any form of remote sensing using UAV's, geophysical or hydrological surveying is desirable.