

**Project title:** Reducing the impact of climate change and other environmental stresses on oak tree health.

**(Ref: OP2161)**

**Keywords:** *Treescapes, plant health, population modelling, spatial analysis*

**One Planet Research Theme:**

Climate & Climate Change  | Earth System Processes  | Anthropocene  | Environmental Informatics

**Lead Supervisor: Dr Rachel Gaulton (Newcastle University)**

**Key Research Gaps and Questions:**

- 1) How will the health of the UK's oak trees fair in a changing climate and with other escalating environmental stresses?
- 2) What interventions can be used to safeguard the health of oaks, and protect the valuable ecosystem services they provide?



**Project Description:** Oak trees are a hugely valuable component of the UK's treescape, providing a wealth of ecosystem services in addition to their cultural importance. Despite this, there is little understanding of the distribution, demography or genetic characteristics of the UK's population of oaks. This exciting project will use large scale data sets and modelling to identify areas of the country where oaks are either particularly vulnerable or doing relatively well, in response to current and future predictions of environmental conditions and stresses. This information will inform a set of recommendations to enhance the health of UK oaks, protecting the benefits they provide. Key objectives include:

- 1) Characterising the oak population using existing sources (NFI, Countryside Survey, Ancient Tree Inventory etc.) with the possibility of developing new mapping and surveying techniques.
- 2) Analysing the main drivers affecting the health of trees in different contexts. This could include environmental factors such as climate change predictions, management, situation, pest / disease presence etc.
- 3) Identifying key issues affecting oak health, together with recommendations for further research and/or practical management action.

In characterising the oak population, the student has the opportunity to investigate the link between pressures on oak trees and the predicted level of carbon capture in the future. From this analysis, interventions could be suggested to alleviate pressures which are shown to have negative impacts on oak health, facilitated by the development of models to predict oak populations and carbon sequestration under alternate future greenhouse gas emission and climate scenarios. The genetics of oak trees in different situations could also be investigated. **The project, developed through the Action Oak initiative and supported by additional funding from HSBC**, would involve working closely with the Defra's Tree Health Policy team and stakeholders and researchers within Action Oak, to ensure opportunities for impact and dissemination are fully realised and key evidence gaps identified through the initiative's Knowledge Review are addressed.

**Prerequisites:** The project is suitable for a student with a background in ecology, biology, GIS or geography / environmental science and strong interest in UK trees and woodland. Experience of GIS or statistical / spatial modelling is desirable. For more information, please contact Dr Rachel Gaulton ([rachel.gaulton@ncl.ac.uk](mailto:rachel.gaulton@ncl.ac.uk)).