

**PROJECT TITLE:** Genetic mechanisms of photosynthetic adaptation to a warming and higher CO<sub>2</sub> world

**Project Science Theme:** Climate Change and Risk

**Project keywords:** Photosynthesis, genetics, plant-environment interactions

**Lead Institution:** Bristol

**Lead Supervisor:** Dr. Patrick Dickinson, Bristol, School of Biological Sciences

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### **Project aims and methods:**

Photosynthesis is central to carbon fixation, and long-lived species such as trees are vital as long-term carbon stores. Plants can adjust photosynthesis to best match their current environment through acclimation, maintaining photosynthetic performance in fluctuating conditions. Species vary in their ability to acclimate; those with limited ability are less able to adapt to the effects of climate change. Despite the importance of photosynthetic acclimation its genetic basis is not well understood.

Temperature and CO<sub>2</sub>, both rising due to climate change, are key drivers of photosynthesis. This project will explore the genetic mechanisms underpinning acclimation to high temperature and elevated CO<sub>2</sub>, individually and in combination. The student will integrate physiological, anatomical and gene expression data to understand the evolution of photosynthetic acclimation and improve predictions of how tree species will respond to future environments. Initial research will focus on pedunculate oak (*Quercus robur*) at the BIFoR Free Air Carbon Enrichment (FACE) experiment, with potential to expand to other species and environments. The student will have considerable scope to shape this part of the project, through species and site selection. The student will benefit from an interdisciplinary supervisory team, gaining diverse skills through training in molecular genetics, photosynthetic physiology, and ecological modelling.

### **Useful recruitment links:**

For information relating to the research project please contact the lead Supervisor via:  
[patrick.dickinson@bristol.ac.uk](mailto:patrick.dickinson@bristol.ac.uk)

### **Bristol NERC GW4+ DTP Prospectus:**

<https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-training-partnership-nerc/>

### **How to apply to the University of Bristol:**

<http://www.bristol.ac.uk/study/postgraduate/apply/>

**The application deadline is Thursday 8 January 2026 at 2359 GMT**