OXFORD INTERDISCIPLINARY BIOSCIENCE
Doctoral Training Partnership

Industrial CASE Studentship Advertisement 2022-23

Supervisors names:	Academic supervisors: Prof. John Mackay, Dr Sarah Green Industrial supervisors: Alice Snowden, Chris Hardy
Department/ Organisations:	Oxford University (Plant Sciences); Forest Research (Centre for Ecosystems, Society and Biosecurity); Cheviot Trees; Forestry England
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Project Title:	Assessment of pathogen impacts on novel forestry species and provenances in the UK to aid understanding of future commercial potential

Brief description of project:

Forests in the UK are in a vulnerable position as epidemics of invasive pathogens such as *Phytophthora ramorum* on larches and *Dothistroma septosporum* on pines have narrowed the range of commercially viable timber species. This, added to the predicted direct effects of climate change, has raised serious doubts as to the level of 'future proofing' in UK production forestry. Alternative tree species may be suited to increasing resilience but the lack of information on their likely performance in commercial forestry is a major barrier to inform species selection. Recent evidence shows that the impact of pathogenic agents is a key factor when assessing forest resilience. Initial health assessments of alternative forest species trials across diverse field study sites in Britain indicate that species and provenances differ markedly in their responses to a broad range of endemic and invasive pathogens, some of which are shown to have significant health impacts.

The PhD project will identify the key pathogens affecting the health of alternative forestry species, the main biological factors influencing their impact, and practices that mitigate the risk of importing pathogens on exotic propagation material. The project will use field observations, laboratory identification of pathogens, and molecular methods to investigate tree responses and susceptibility. The research will develop a collection of isolates and associated genetic data as important project outputs. Findings will be used to underpin decisions on future species suitability for commercial forestry and to inform nursery propagation best practice.

The objectives of the PhD project are to:

i) Identify the key pathogens causing damage in alternative forestry species trials planted across Britain, and the host and environment factors influencing pathogen impact.

ii) Further examine priority 'emerging' commercial forestry species/provenances for their phenotypic and genetic responses to the key pathogens identified in the field surveys.

iii) Work with two forest industry partners to determine which pathogens pose greatest risk to key forestry species/seed provenances in the forest and nursery

and identify best nursery practices to avoid these pathogens occurring at seed collection, seedling or planted out stages.

The work with industry partners will be carried out through placements, following two strands: (i) analysis of plant pathogens affecting the survival of Douglas-fir after plantation in forestry sites (with Cheviot Trees); and (ii) analysis of seed-borne pathogens, particularly on seeds that are imported from outside of the UK (with Forestry England). The placement project work will run for a total 24 weeks spread over the entire PhD.

Attributes of suitable applicants:

- A first-class or upper second-class undergraduate degree is required with specialization in biological sciences (biology, plant sciences, genetics, forest science, or other related subjects)
- Demonstrated interest in plant biology and experience in research are preferred
- Desirable areas of experience or interest include plant pathology, tree biology, molecular techniques
- An ability to work independently, to communicate effectively in both verbal and written English, and to carry out or learn proactively molecular experiments and computational analyses
- A desire to work with industry partners to address applied problems and an ability to work on site at Cheviot Trees and Forest England forest tree nurseries.
- Any other entry requirements set out officially: https://www.ox.ac.uk/admissions/graduate/courses/interdisciplinary-bioscience

How to apply:

Applicants should first contact the lead supervisor to discuss whether their research interests are a suitable fit for the project, then apply online via this webpage Interdisciplinary Bioscience (BBSRC Doctoral Training Partnership) | University of Oxford. Please note that we are implementing measures to limit implicit bias in the application process and taking positive action to support students from groups that are under-represented in bioscience. Applicants therefore need to follow the instructions available on the following webpage when preparing an application: Pilot assessment procedure: MPLS doctoral training courses | University of Oxford.

Funding notes:

This project is funded for four years by the Biotechnology and Biological Sciences Research Council UKRI-BBSRC. UKRI-BBSRC eligibility criteria apply (https://www.ukri.org/files/funding/ukri-training-grant-terms-and-conditions-guidance-pdf/). Successful students will receive a stipend of no less than the standard UKRI stipend rate, currently set at £15,609 per year.

The cost of accommodation during placement projects will be covered by industrial partners.

This project is supported through the Oxford Interdisciplinary Bioscience Doctoral Training Partnership (DTP) studentship programme. The student recruited to this project will join a cohort of students enrolled in the DTP's interdisciplinary training programme, and will participate in the

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training and networking opportunities available through the DTP. For further details, please visit www.biodtp.ox.ac.uk. The DTP and its associated partner organisations aim to create a community that is innovative, inclusive and collaborative, in which everyone feels valued, respected, and supported, and we encourage applications from a diverse range of qualified applicants.