

PhD studentship Project information

Funding Source: CENTA DTP

Proposed start date: 23rd September 2024

Closing date for applications: See our web page

Eligibility: UK/International

Department/School: Genetics

Supervisors: PI: Dr Moya Burns, University of Leicester, mlb40@leicester.ac.uk

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Project Title: Urban forests of the future.

Project Description:

Project Highlights:

- Work with citizen scientists on a project leading the creation of biodiverse urban forests of the future
- Combine on-site ecological monitoring with remotely sensed data to quantify and model ecosystem services of these forests into the future.
- Investigate if the creation of “old wood” features in young forest plantations can help increase biodiversity

Overview

The UK government has announced targets to plant 30,000 hectares of trees per year by 2024 as part of its strategy to reach net carbon zero by 2050. Creating a sound evidence base of how to create and manage these plantations is essential. This project will work with citizen scientists, industry and non-governmental organisations to provide data to maximise the ecosystem benefits of these forests of the future.

Increasing forest cover in urban areas is notoriously difficult due to limited space and competing interests in space usage. However, the potential benefits of high-quality green infrastructure for people and the environment are well documented. Tiny Forest has addressed many of these issues by planting tennis-court-sized forests across the urban landscape, and today a network of over 200 Tiny Forests have been planted across the UK, 94 of which are in the West Midlands. The forests follow the Miyawaki method of afforestation where all four forest layers planted simultaneously and at high density, and so is purported to accelerate the time to mature forest and ecosystem service provision. To test these assumptions Tiny Forest engages local communities in collecting data on 4 ecosystem services provided by the forests: carbon storage, biodiversity support, flood mitigation and thermal comfort; concurrently connecting people with nature and raising environmental awareness.

This project will combine on-site monitoring of the impacts of Tiny Forest creation on measures of biodiversity and ecosystem functioning with using satellite Earth observation data to estimate and model ecosystem service provision of these forests under future climate scenarios.

In addition to understanding how Tiny Forests are currently contributing to urban ecosystem service provision this project will also set out to investigate whether accelerating the ageing processes within these forests can increase their biodiversity. Up to 50 % of woodland biodiversity is associated with deadwood, a sparse feature in young urban forests. Using a paired site design, the second component of this project will investigate how methods of deadwood enrichment can increase biodiversity in young plantations.

Methodology:

Ninety-four Tiny Forests have been planted across the West Midlands with almost identical size and tree composition. As such, factors affecting Tiny Forest ecosystem service provision primarily include shape, management, and surrounding area.

1. Citizen science monitoring of the forests focuses on four ecosystem services (methods can be found at www.tinyforest.org.uk/resources): Biodiversity –invertebrates
2. Carbon capture - mortality, height and DBH of 100 trees representative of forest composition.
3. Flood mitigation - soil colour, texture, compaction, infiltration rate.
4. Thermal comfort – weather station

Remotely sensed data will be used to estimate and model ecosystem service provision of the forests under future climate scenarios by creating very-high resolution land cover maps from Sentinel-2 and Planet imagery, coupling this data stream to the InVEST ecosystem services models. The experimental results from the impact of deadwood enrichment on ecosystem services will be used in models of future regional woodland management scenarios using InVEST

References:

Earthwatch Tiny Forests information, available at: <https://earthwatch.org.uk/get-involved/tiny-forest>

Guo, X.F., 2018. Effects of different forest reconstruction methods on characteristics of understory vegetation and soil quality. *Applied Ecology and Environmental Research*, 16(6), pp.7501-7517.

Rayner, M., Balzter, H., Jones, L., Whelan, M. and Stodate, C., 2021. Effects of improved land-cover mapping on predicted ecosystem service outcomes in a lowland river catchment. *Ecological Indicators*, 133, p.108463.

Sasaki, T., Ishii, H. and Morimoto, Y., 2018. Evaluating restoration success of a 40-year-old urban forest in reference to mature natural forest. *Urban Forestry & Urban Greening*, 32, pp.123-132.

Schirone, B., Salis, A. and Vessella, F., 2011. Effectiveness of the Miyawaki method in Mediterranean forest restoration programs. *Landscape and Ecological Engineering*, 7, pp.81-92.

Funding details:

NERC CENTA studentships are for 3.5 years and are funded by NERC. In addition to the full payment of your tuition fees, you will receive the following financial support:

- Annual stipend, currently set at £18,622 (2023/4 – new figures to be confirmed spring 2024)
- Research training support grant £8,000 (RTSG)

If you are not eligible for UK Fees the University of Leicester will fund the difference between UK and International fees for the duration of your studies

For more details of the CENTA consortium please see the CENTA website: www.centa.org.uk.

Entry requirements:

Applicants are required to hold/or expect to obtain a UK Bachelor Degree 2:1 or better in a relevant subject.

The University of Leicester English language requirements apply where applicable.

Application advice:

To apply please refer to our web page for further information and read carefully the How to Apply section before submitting your application

<https://le.ac.uk/study/research-degrees/funded-opportunities/centa-phd-studentships>

In the funding section please specify that you wish to be considered for **Ref CENTA2-GENE4-BURN**

In the proposal section please provide the name of the supervisors and project title (a proposal is not required)

Project / Funding Enquiries to: CENTA@le.ac.uk or mlb40@leicester.ac.uk

Application enquiries to pgradmissions@le.ac.uk