THE UNIVERSITY of EDINBURGH

Job Description

Internship Title: Understanding the role of plant traits in the recovery and restoration of disturbed Southeast Asian forests

Department/ School	UK Centre for Ecology & Hydrology (UKCEH), Edinburgh
Reports To	Dr Lindsay F Banin, libanin@ceh.ac.uk, UK Centre for Ecology & Hydrology Edinburgh (UKCEH) Jeffrey Mancera (PhD Mentor), Royal Botanic Gardens, Edinburgh

Job Purpose

The purpose of this research position is to explore how tree functional traits, and particularly reproductive traits affect how tropical forest tree communities recover following disturbance. The candidate will work within the context of existing research projects in Southeast Asia and collate data from online resources, and will have the opportunity to develop hypotheses and conduct analyses. The candidate will gain additional hands-on experience of fertile herbarium specimens and their digitisation, to consolidate the theoretical knowledge from trait-based literature and databases.

Main Responsibilities

- Using tree taxa lists, collate data from open plant trait databases (e.g. Seed Information Database; BIEN; TRY), herbarium records, scientific literature and flora books (50%)
- Design and conduct analyses relevant to research questions (25%)
- Create trait database structure (5%)
- Visit herbarium and familiarise with specimens and digitisation processes (10%)
- Participate in team meetings and discussions to expose broader context of the work (5%)
- Highlight key gaps in trait data for SE Asian taxa (3%)
- Reporting on outcomes of the placement (2%)

Knowledge Skills and Experience (required for the role)

Attribute	Essential	Desirable
Education, Qualifications & Training	- Secondary education and University modules in environmental science, biology, ecology or quantitative science discipline	- University modules covering forest ecology - University modules covering literature review

		- University modules covering data management and statistical analysis
Knowledge & - Experience	- IT & MS Office competency (especially Excel) - Some prior experience using R software - Experience accessing, reading and recording information from scientific publications	- Statistical competency (using R software for databasing and/or statistical analysis) - Familiarity with plant functional trait literature - Familiarity with accessing and using plant functional trait data - Experience developing study hypotheses - Experience managing time and project work

Person Specification

Planning and Organising

- The role will involve accessing a range of data sources in a systematic way, and with support, prioritising the most relevant sources and tree taxa to focus on. Data need to be curated in an organised and accurate way to avoid introducing errors.
- The successful candidate will demonstrate previous experience in applying a systematic approach with an aptitude for attention to detail.

Problem Solving

- During the data collation and analysis process, many challenges may arise which require critical thinking. These may include data quality issues, standardisation, handling data gaps and so on. Key to the project success will be identifying and discussing these challenges and potentially iterating the data recording process.
- The successful candidate will confidently identify challenges when they arise and suggest solutions for how they might be best overcome.

Decision Making

- The research placement will provide a supportive environment for the candidate to develop hypotheses and consider an analytical pathway for how these could be tested, and depending on progress, continue on to conduct these analyses and report on findings. Each of these steps require decision making.
- The successful candidate will have experience of thinking through a project from beginning to end and hold an awareness of how earlier decisions may impact latter steps in that pathway.

Key Contacts:

In addition to the supervisors mentioned above, the student will have the opportunity to join project team discussions with internal (UKCEH) and external collaborators, including but not limited to:

- Dr Beth Raine and Dr Fiona Seaton (UKCEH team members on the Danum Valley Phenology Project)
- Prof David Burslem (PI of the ForestGEO 50-hectare research plot at Danum Valley and FOR-RESTOR collaborator)
- Dr Mark Hughes (RBGE Asia Team lead; PI of the GCBC BREL-Borneo project)

Dimensions

Closing date for applications: Wednesday 14th May 2025 (Midnight)
Start date: From: Commencing 16th June 2025 – 15th August 2025
Hours per week and preferred pattern/ restrictions (if applicable): **35 hours per week for 8 to 8 weeks**

Additional Information

Project Outline

Background

Recovery and restoration of tropical forest ecosystems is recognised as a critical component of mitigating the climate and biodiversity crises (Banin et al. 2023). Natural regeneration or colonisation is one low-intervention approach to re-establishing forest cover, and due to relatively low costs, may offer an opportunity for upscaling restoration efforts (Chazdon et al. 2021). However, there may be constraints around reproduction and dispersal that limit the colonisation of the full community assemblage found in intact forests. This may mean tree species with certain reproductive traits or dispersal modes are excluded from the recovering tree flora. Similarly, restored forests where a small selection of species are planted within disturbed areas may function differently to a natural system.
In a landscape in northeast Sabah, Malaysian Borneo, we have been monitoring tree and seedling dynamics in intact, logged and restored areas of forest to better understand processes of recovery (Hayward et al. 2021; Bartholomew et al. 2024). We have also recently established phenological monitoring using seed traps to understand how flower and fruit production varies across the landscape. During this placement, we aim to collate tree trait information, informed by the tree information available from permanent forest inventory plots. This will help us better understand how the tree communities differ in their functioning and will also provide useful background information for studying the seed trap samples.

We are working in collaboration with herbaria where some of this trait information may be held. As part of the placement, the candidate will therefore have the opportunity to spend some time at RBGE to view specimens and participate in the current process of digitising specimens so that this information will be more readily accessible in the future.

Research Questions

1. How complete is trait information, and particularly reproductive traits, for trees present in the study landscape?
2. How does the trait composition and diversity vary amongst intact, logged and restored forests in the study landscape?
3. Are taxa with certain trait characteristics more likely to be absent in disturbed or restored forests than in intact forest?

Activities

The key activities will be to co-develop research questions, build tree trait databases for relevant tree lists and design and conduct statistical analyses to address these questions.

Proposed timeline:

Week 1 – Site induction; familiarisation with forest inventory data and species lists; familiarisation with theoretical background and hypothesis development
Week 2 – Collate list of target resources and traits; build database structure for inputting data; familiarise with relevant code for accessing data through R for some resources
Week 3 – Experience of extracting trait data from herbarium specimens and digitising herbarium specimens (based at Botanics)
Week 4 – Extracting trait data and building database
Week 5 - Extracting trait data and building database; access species distribution simulations
Week 6 - Extracting trait data and building database; revisiting hypotheses and designing statistical analyses
Week 7 – Conduct statistical analyses
Week 8 – Conduct statistical analyses; report writing

References:

- Banin LF, Raine EH et al. (2023) The road to recovery: a synthesis of outcomes from ecosystem restoration in tropical and sub-tropical Asian forests. Philosophical Transactions of the Royal Society B 378 (1867) 20210090.
- Bartholomew DC, Hayward R, … & Banin LF (2024) Bornean tropical forests recovering from logging at risk of regeneration failure. Global Change Biology 30(3): e17209.
- Chazdon RL, Falk DA, Banin LF et al. (2022) The intervention continuum in restoration ecology: rethinking the active–passive dichotomy. Restoration Ecology e13535.
- Hayward RM, Banin LF et al. (2021) Three decades of post-logging tree community recovery in naturally regenerating and actively restored dipterocarp forest in Borneo. Forest Ecology & Management, 488,119036.

Budget

A maximum of £500 towards project costs is available.

Location

Primarily UKCEH Edinburgh with visits to Royal Botanic Gardens Edinburgh. The UKCEH office is on the Easter Bush Estate (close to the University of Edinburgh Vet School) near Penicuik.
At UKCEH, the candidate will have access to a desk in a shared office space. They may wish to use their own laptop but they will have access to a desktop PC if required.

Health & Safety Requirements for the role

This job requires a Protection of Vulnerable Groups Scheme (PVG) Registration

Key Job hazard information specific to the role

This role may result in potential exposure to certain hazards as listed below. These will be risk assessed by the school or department, which may require you to participate in, for example, health surveillance or follow other health and safety requirements.

The research experience placement may involve handling herbarium specimens according to RBGE protocols.

Programme Information

The Research Experience Programme (REPs), funded by NERC, offers paid research opportunities for undergraduate students. The programme is designed to address both demographic and diversity challenges in the environmental sciences, as well as thematic skills gaps, such as quantitative skills.
This is a valuable opportunity to gain hands on research experience, boost your employability, and explore potential pathways into further study or careers in environmental science.

For full details on how to apply and the selection process, please visit our REP webpage

Application Support

The University's Careers service provides a wide range of resources to support your application, including guidance on CVs, cover letters, and interview preparation.
Students undertaking a REP placement will also have the opportunity participate in the Edinburgh Award - a structured programme that helps you reflect on and gain recognition from the University for the skills and attributes developed during your internship.
For more information, you can book an appointment with a Careers Consultant via MyCareerHub.

Eligibility Criteria

To be eligible for a REP placement, applicants must meet **all** of the following criteria:

• Be currently studying towards their first undergraduate degree studies (including integrated Master's degrees) in a UK Higher Education institution, in any science discipline
Note: *Final year students are eligible if they still hold student status at the* ***start of the placement,*** *even if the student graduates during the course of the placement.*

- Be eligible for subsequent NERC PhD funding as defined here:
- A UK citizen who has been living in the UK for at least the past 3 years OR
- An EU citizen with pre-settled or settled status under the EU Settlement Scheme OR
- A non-EU citizen who has obtained the right to remain in the UK - known as 'indefinite leave to remain' (ILR) OR
- An International/EU student currently studying in the UK under a Tier 4 or Student Route Visa with validity until at least September 2025.

REPs **do not** meet the requirements for visa sponsorship. As such, students who are not currently residing in the UK or who do not hold a valid UK visa are not eligible to apply.

You cannot take part if you are a visiting student, or have previously taken part in REP programme.

Privacy Statement

In addition to the University's HR Privacy Information Notice, please read the Student and Graduate Privacy Statement: Internships and work experience programmes to understand how your personal information will be collected, used, and stored as part of the application process.

If you require this document in an alternative format, please email us at: e5dtp.info@ed.ac.uk