

E5 NERC Summer Research Experience Placements 2026

Please return to e5dtp.info@ed.ac.uk

A. Supervisor (s) - Name, email and affiliation
<p>I. Dr Matthew Hartfield</p>
B. Student Mentor (current PhD student) Name, email and affiliation
<p>Freya Way, IEE, U Edinburgh (F.L.Way@sms.ed.ac.uk)</p>
C. Department/School
<p>Institute of Ecology and Evolution, School of Biological Sciences</p>
D. Placement Project Title
<p>How does mating system and local environment affect phenotypes of Mountain Rock cress?</p>
E. Job purpose
<p>How do species adapt to their environment, and how does their reproductive mode affect this process? In this project you will work as part of an ongoing project to investigate this topic, which uses the alpine rock-cress <i>Arabis alpina</i> as a study system. You will characterise phenotypic measurements that were taken during fieldwork, and perform investigations as to how these traits interact with their sampling location and mode of reproduction.</p>
F. Host and project outline
<p>Self-fertilisation is a mating system that occurs in 42% of flowering plants, including rare species and crops. Transitioning from outcrossing to selfing causes inbreeding, and is associated with a range of genetic and morphological consequences. This project will investigate how an individual's mode of reproduction interacts with local environment to shape plant morphology and evolution.</p> <p>You will use a dataset of field measurements and photographs of wild <i>Arabis alpina</i> plants from mountains in France and Italy, in combination with environmental data and mating system information, to determine if traits such as plant size and reproductive output are affected by mating system or by local environment. You will first quantify key ecological parameters from these photographs (with examples including flower number and height), then develop statistical analyses</p>

to relate these traits to geographic location and hence the mating system.

This project will suit a student interested in plant biology and evolution in the wild, who would like to develop their statistics skills, and learn more about adaptation to mountain habitats. You will be able to choose which phenotypic traits and environmental variables to focus on, and there is scope to expand the dataset and goals of the project such as by extracting additional data from plant photographs. There will be an opportunity for you to discuss and present your work to the Hartfield lab as well as be a full member of the lab for the duration of the project. There will also be opportunities for you to network with wider labs and institutes, for example with plant biology, and to visit the *Arabis alpina* specimens at the Royal Botanic Gardens Edinburgh.

Reading:

Wright SI, Kalisz S, Slotte T. Evolutionary consequences of self-fertilization in plants. *Proc Biol Sci.* 2013 Jun 7;280(1760):20130133. doi: 10.1098/rspb.2013.0133. PMID: 23595268; PMCID: PMC3652455.

Wötzel S, Andrello M, Albani MC, Koch MA, Coupland G, Gugerli F. *Arabis alpina*: A perennial model plant for ecological genomics and life-history evolution. *Mol Ecol Resour.* 2022 Feb;22(2):468-486. doi: 10.1111/1755-0998.13490. Epub 2021 Sep 7. PMID: 34415668; PMCID: PMC9293087.

de Villemereuil P, Mouterde M, Gaggiotti OE, Till-Bottraud I. Patterns of phenotypic plasticity and local adaptation in the wide elevation range of the alpine plant *Arabis alpina*. *J Ecol.* 2018; 106: 1952–1971.

G. Main responsibilities

- Characterising phenotypic data from existing field measurements and photographs (40%)
- Performing statistical analyses of measurements with sampling location and mating-system (40%)
- Background reading (10%)
- Weekly reporting to provide project updates (10%)

Key contacts and relationships

- Matthew Hartfield, m.hartfield@ed.ac.uk
- Freya Way, F.L.Way@sms.ed.ac.uk

H. Knowledge, skills and experience required for the role

Attribute	Essential	Desirable
Education, Qualifications & Training	<ul style="list-style-type: none"> • Current study of ecology and/or evolution 	

Knowledge & Experience	<ul style="list-style-type: none"> • Enthusiasm for working with plant data 	<ul style="list-style-type: none"> • Knowledge of extracting data from photos • Knowledge of statistical analysis
I. Planning and organising		
<ul style="list-style-type: none"> • Essential: Ability to plan time and different tasks, and report progress on a weekly basis • Desirable: Knowledge of basis health and safety rules pertaining to computer work 		
J. Problem solving		
<ul style="list-style-type: none"> • Essential: Ability to think of potential solutions to problems and willingness to discuss with supervisory team 		
K. Decision making		
<ul style="list-style-type: none"> • Essential: Ability to work independently 		
L. Length and timing of placement		
8 weeks. Start date to be agreed.		
M. Budget		
N/A		
N. Location and Equipment		
<p>This project will be predominantly computational based. The intern can work with their own laptop if they have one, although one can be provided if required. We can discuss whether the intern would like to work mostly remotely or within Ashworth; if the latter then we will seek appropriate desk space.</p>		
O. Health & Safety requirements		
<p>This role requires a Protection of Vulnerable Groups Scheme (PVG) Registration:</p> <ul style="list-style-type: none"> • Standard Disclosure Check • Basic Disclosure Check • Ongoing Health Surveillance • Home Country Criminal Record Check • Counter Terrorism Check 		

P. Job hazards 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.

Q. Alternative/adjusted placement (remote placement only).

As a computer-based project this project can be performed remotely if requested, although we will encourage candidates to work in-person so they can interact with the host lab and the intellectual life of the institute.