THE UNIVERSITY of EDINBURGH

Job Description

Internship Title: NERC Research Experience Placement - Employ.ed on Campus - Modelling of cricket breeding programmes to increase cricket production

Department / School	The Roslin Institute, Royal (Dick) School of Veterinary Studies, University of Edinburgh
Reports To	Dr. Gregor Gorjanc, The Roslin Institute, Royal (Dick) School of Veterinary Studies, University of Edinburgh, gregor.gorjanc@roslin.ed.ac.uk

Job Purpose

This project aims to contribute to developing sustainable breeding systems to increase the production of crickets as a novel and sustainable source of protein by collecting information about cricket reproduction and growth, analysing the information and scope breeding programmes to improve production characteristics, simulating alternative breeding programmes in a computer and disseminating knowledge to stakeholders.

Main responsibilities

- Participate in managing the project, which will be led by the post-doctoral researcher Leticia Lara, in collaboration with partners in Kenya: an online kick-start meeting at the beginning of the project, intermediate interaction with partners in Kenya as needed, and a final online report meeting at the end of the project.
- Gather information about cricket reproduction and growth to assess breeding and production characteristics.
- Design and compare alternative breeding programmes for crickets based on the cricket specific biology and the gathered information.
- Participate in weekly HighlanderLab meetings and present progress every second week.
- Give a seminar at the Computational Genetics Discussion Group (CGDG).

Knowledge Skills and Experience

Person specification

Essential:

- Ability and enthusiasm to work with stochastic simulations as well as a high level of commitment and independent, pro-active.

- Keen to work with insect breeding programmes.
- Very good English skills, both written and spoken.

Desirable:

- Experience with R.
- Be able to interact and work with a multidisciplinary group.

Key contacts

- Dr Gregor Gorjanc, Chancellor's Fellow in Data-Driven Innovation for AgriTech at The Roslin Institute
- Dr Leticia Lara, post-doctoral researcher at The Roslin Institute

Dimensions

This is a 7-week placement with preferred starting date on 14 June 2021 (but flexible).

Closing date: 19 May 2021
Interview date: to be determined by the supervisor
Start date: flexible start date between 14 June (preferred) and 19 July 2021
Hours per week and preferred pattern/restrictions (if applicable): 35 hours per week (part-time option available)
Length of internship: 7 weeks

Additional Information

Host and Project outline

This project aims to contribute to **d**eveloping sustainable breeding systems to increase the production of crickets as a novel and sustainable source of protein. To do that, we need to understand cricket reproductive biology and variation in production characteristics and based on these develop a computer simulation model of a breeding programme that will improve the production characteristics. To this end we will: i) collect information about cricket reproduction and growth; ii) analyse the information and scope breeding programmes to improve production characteristics; iii) simulate alternative breeding programmes in a computer; and iv) disseminate knowledge to stakeholders.

Crickets are considered a speciality in Kenya and elsewhere in Africa. Crickets are one of the most popular edible insects, source of feed and food, rich in proteins, lipids and fibre. While crickets are part of standard diet in many African countries, cricket breeding programmes are in its infancy and lack state-of-the-art knowledge in modern data-driven selective breeding. The currently used strains are essentially wild strains and have not yet been breed for improved performance. The recent domestication combined with high genetic diversity, short generation intervals, high fecundity, and prolificacy highlight a huge potential to improve cricket production through selective breeding.

Improving insect production in Africa has a significant potential for a social impact associated with food security. Rapid population growth in Africa is exacerbating the challenge to meet the demand for protein. The production and use of insects can strengthen value chains for human food as well as livestock feed.

This project will align the Roslin (UK) skills in animal and plant breeding with the ICIPE (www.icipe.org, International Centre of Insects and Ecology, Kenya) skills in cricket biology and the InsectiPro (www.insectipro.com, Kenya) skills in cricket production. ICIPE is an academic partner and a well-respected pan-African institute. InsectiPro is a business partner

and a leader in cricket production in Kenya. This project will scope an opportunity to initiate a breeding programme by ICIPE and InsectiPro. The long-term plan is that ICIPE and InsectiPro will be disseminating improved crickets to other producers, who improve their production potential by using better genetics.

The project is composed of four work-packages. The project will be led by the post-doctoral researcher Leticia Lara and the student will have the opportunity to work alongside and lead activities in the work-package 3.

- **Work-package 1: Participate in project management –** The Roslin team will manage the project in collaboration with the partners in Kenya**.** An online kick-start meeting will introduce the intern to cricket production and characteristics. Weekly meetings with the whole HighlanderLab and the project lead (Leticia Lara) will ensure continuous overview of the meeting.

- **Work-package 2: Gathering cricket information** – The ICIPE and InsectiPro are already collecting information about cricket reproduction and growth to assess production and breeding characteristics in research and commercial conditions. ICIPE and InsectiPro will share their experiences with breeding and production and share the collected data in the first online meeting.

- **Work-package 3: Designing and evaluating breeding programmes** – The Roslin team will design and compare alternative breeding programmes for crickets based on the cricket specific biology and the collected information. This work-package involves two stages: i) breeding programme design based on deterministic predictions using the breeder's equation and cricket characteristics; and ii) breeding programme comparison based on stochastic computer simulations in R using AlphaSimR package.

- **Work-package 4: Dissemination.** The intern will give a seminar at the Computational Genetics Discussion Group (CGDG), which involves students and staffs of The Roslin Institute. The intern will also present the same work to stakeholders in Kenya - the wider ICIPE staff working on a range of insects, the InsectiPro staff, other interested cricket producers and students from a range of African universities that collaborate with ICIPE.

As the main take-away, this project will train the intern to work in a collaborative and multidisciplinary environment with a great need for independence. The intern will be embedded in a research group and interact with researchers and industry professionals to broaden her/his skills and network. Importantly, this project has the ability to transfer the state-of-the-art genetics and breeding from the UK to Africa, impact Kenyan agriculture and food systems by contributing to efficiency of production, trade and to human nutrition and resulting livelihood improvements.

Training

The intern will be supported by the line manager with a fortnightly meeting and by Dr. Leticia Lara (researcher fellow at HighlanderLab) twice every week.

The HighlanderLab has access to DataCamp courses for students to learn the required computer and modelling skills.

Further, we also have a set of pedagogical exercises (for a developing Massive On-line On-demand Course - MOOC) to train newcomers into the field of modelling breeding programmes using stochastic simulation.

Finally, interaction with partners in Kenya will give the intern opportunity to gain experience in collaborations. Also, regular presentations at the HighlanderLab meeting will give the intern opportunity to hone presentation skills.

Location

If Covid-19 restrictions will be lifted by the start of this project, the intern will be given a desk at The Roslin Institute, next to HighlanderLab members. The intern can receive a laptop.

If Covid-19 restrictions will remain in place, the intern will need to work remotely from home and will need a laptop or standalone computer and a good internet connection.

All other computational programs (R, RStudio and AlphaSimR) can be freely installed on any computer.

Covid-19 contingency plan

The HighlanderLab team is operating fully online since the start of the pandemic and therefore there will be no impact if Covid-19 restrictions continue during the time of the project. The interaction between the intern and other members will not be affected and we have weekly fun activities (coffee/tea time and game time) to encourage team building.

Programme Information

Research Experience Placement is a summer placement scheme funded by NERC, aimed at undergraduate students to address demographic and diversity-related challenges in the environmental sciences as well as thematic skills gaps (e.g. quantitative skills).

Please see the application instructions and selection process on the REP webpage: Research Experience Placements (REPs) | The University of Edinburgh

Employ.ed on Campus is run by the Careers Service in collaboration with University departments and Schools. It offers exclusive summer internships at the University over the summer for 2nd year to penultimate year undergraduate students studying in an UK Higher Education institution.

As well as great work experience, the Careers Service provides supporting resources, this is combined with a framework to support the development of participants' employability and self-reflection with an Edinburgh Award as part of the internship.

Application Support

For guidance on writing an effective application see our website: CV, Applications and Interview Advice
You can also make an appointment with a Careers Consultant using MyCareerHub.

Eligibility

Students are subject to eligibility criteria to be able to apply for NERC REPs and must:

- Be undertaking their first undergraduate degree studies (or integrated Masters)
- Be applying for a placement in a different department to their undergraduate degree
- Be eligible for subsequent NERC PhD funding, i.e. be either:
    - an UK citizen OR
    - an EU citizen with pre- or settled status under the EU Settlement Scheme OR
    - a non-EU citizen who have obtained the right to remain in the UK - known as 'indefinite leave to remain' (ILR) O
    - an International/EU student already studying in the UK and currently under a Tier 4 or Student Route Visa with validity until at least September 2021

REPs do not meet the requirements for a visa request therefore non-UK students who are not currently living in the UK or who are without a suitable UK visa are not eligible to apply.

Internships are ONLY open to 2nd year to penultimate year undergraduate students studying in an UK Higher Education institution and based in the UK. You cannot take part if you are a visiting student, or you have already taken part in the programme before.

Privacy Statement

In addition to the University's HR data privacy statement, please read the Student and Graduate Privacy Statement: Internships and work experience programmes to understand how and why we will use the information you submit for the Employ.ed Programmes

Health & Safety Requirements for the role

None required

Key Job hazard information specific to the role

The work is exclusively computational with on-line meetings with the UK host and Kenyan contacts so there are no hazards.

If you require this document in an alternative format please contact Internships and Work Experience Team by email at employ.ed@ed.ac.uk