

**PROJECT TITLE: Drivers of variation in social interactions**

**DTP Research Theme(s): Living World, Changing Planet**

**Lead Institution: University of Bristol**

**Lead Supervisor: Prof. Andy Radford, School of Biological Sciences, University of Bristol**

**Co-Supervisor: Prof. Lauren Brent, Psychology, University of Exeter**

**Co-Supervisor: Stephen Dunleavy, Humble Bee Films (CASE partner)**

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**Project keywords: ageing, cooperation, conflict, climatic conditions, early-life experience, field experiments, group-living, long-term data, social interactions, social networks**



*The study population at the long-term Dwarf Mongoose Research Project is habituated to close human presence. Photo: Shannon Wild.*



*The rich social lives of the rhesus macaques living on Cayo Santiago Island in Puerto Rico are documented by daily observation. Photo: Lauren Brent.*

## Project Background

In social species across the animal kingdom, interactions between group members and with conspecific outsiders are a constant aspect of life. A wide array of cooperative and antagonistic acts occurs daily, but there is considerable unexplained variation in the extent to which different individuals are involved. This PhD will investigate life-history, social and climatic drivers of this variation, using long-term and experimental data from two complementary study populations of dwarf mongooses (*Helogale parvula*) and rhesus macaques (*Macaca mulatta*). There is the possibility to consider, for example, how early-life experiences, age, social-network position, group instability, threats from outsiders, extreme temperatures and droughts affect social interactions. The project also includes time with CASE partner Humble Bee Films, learning about how academic research is translated into natural-history films and the value of archive footage for research.

## Project Aims and Methods

The overall aim of this project is to uncover explanations for individual variation in engagement in social interactions. We encourage our students to take ownership over the specific research direction and to pursue areas of particular interest. General approaches and methods that are available include:

**Use of long-term life-history and behavioural data:** We have 13 years of data from the wild dwarf mongoose population and 14 years from the rhesus macaque population. These data include full life-histories of known individuals, detailed behavioural observations throughout the year, body-mass measurements, GPS tracking, group compositions, complete pedigrees and climatic variables.

**Social network analyses:** We regularly use social network analysis and work to develop its application to animal data. This includes a new framework released by Prof. Brent's group that allows researchers to account for variable sampling effort and network sizes and thus more accurately estimate social phenotypes.

**Spatial and movement modelling:** We use state-of-the-art analytical methods (developed by Prof. Radford's collaborators) that take account of the heterogeneity of landscapes and effects over different timeframes.

**Field experiments:** We use a range of approaches including call playbacks, faecal and visual presentations and supplementary feeding to investigate short and longer-term social responses.

## Candidate requirements

We welcome and encourage student applications from under-represented groups; we value a diverse research environment. We are looking for a highly motivated student with a passion for biology. The two most important requirements are that you have a strong interest in animal social behaviour and that you are excited by the prospect of conducting fieldwork-based studies at overseas locations. Prior fieldwork experience would be helpful but is not required.

## Project partners

**University of Bristol:** You will be based in the School of Biological Sciences in the vibrant research group of Prof. Andy Radford ([https://www.bio.bris.ac.uk/research/behavior/Vocal\\_Communication/home.html](https://www.bio.bris.ac.uk/research/behavior/Vocal_Communication/home.html)), working as part of the Dwarf Mongoose Research Project (<https://dwarfmongooseresearch.weebly.com/>).

**University of Exeter:** You will spend time with co-supervisor Prof. Lauren Brent (<http://www.laurenbrent.com/>) and her active research group in the Psychology Department's Center for Research in Animal Behaviour, working on the long-term rhesus macaque population on Cayo Santiago ([https://en.wikipedia.org/wiki/Cayo\\_Santiago](https://en.wikipedia.org/wiki/Cayo_Santiago)).

**Humble Bee Films (CASE partner):** You will spend time with this successful natural-history film-making company (<https://www.humblebeefilms.com/>) learning about the dynamic interaction between academic research and the media.

## Training

You will learn how to use long-term databases and sophisticated statistical analysis methods. You will have the opportunity to conduct overseas fieldwork at the Dwarf Mongoose Research Project in South Africa and/or the Cayo Santiago Field Station in Puerto Rico, learning how to work with habituated free-roaming animals, to collect life-history and behavioural data, and how to design and implement field experiments. You will also develop links with international collaborators at universities in Africa and the Caribbean. You will learn how academic research can be translated into natural history films and how documentary footage can be used as a research tool.

## Background reading and references

Ellis S., et al. (2019) Deconstructing sociality: the types of social connections that predict longevity in a group-living primate. *Proc. R. Soc. B* 286: 20191991.

Kern, J.M., et al. (2023) Behavioural, demographic and fitness consequences of social instability in cooperatively breeding dwarf mongoose groups. *Proc. R. Soc. B* 290: 20230901.

Morris-Drake, A., et al. (2021) Experimental evidence for delayed post-conflict management behaviour in wild dwarf mongooses. *eLife* 10: e69196.

Testard C., et al. (2021) Rhesus macaques build new social connections after a natural disaster. *Curr. Biol.* 31: 2299–2309.

## Useful links

<http://www.bristol.ac.uk/biology/courses/postgraduate/>

### Bristol NERC GW4+ DTP Prospectus:

<https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-training-partnership-nerc/>

### How to apply to the University of Bristol:

<http://www.bristol.ac.uk/study/postgraduate/apply/>

**Please note:** If you wish to apply for more than one project please contact the Bristol NERC GW4+ DTP Administrator to find out the process for doing this.

**The application deadline is Tuesday 9 January 2024 at 2359 GMT. Interviews will take place from 26 February to 8 March 2024.**

**For more information about the NERC GW4+ Doctoral Training Partnership please visit**

<https://www.nercgw4plus.ac.uk>.

**General Enquiries:** Bristol NERC GW4+ DTP Administrator

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