Undergraduate and Postgraduate Student Research Priorities: Titles and Descriptions

Please read the following project titles and descriptions carefully. When you are ready to submit your interest, please complete the form, 'Student Research Priorities Submission' that can be found on our website https://www.marwell.org.uk/contact-us/. Please choose more than one title, as allocating your first choice may not always be feasible.

1. Project Title: Identification of a practical approach to behavioural data extraction and analysis from video recordings in a zoo

Description: The pace of technological advancement is remarkable, and tools for collecting animal behaviour data have undergone significant development in recent years. However, the accessibility of this technology is often hindered by its high installation costs and the need for specialized interfaces, rendering it impractical for many zoos and aquariums. This poses a challenge, especially in the context of monitoring wild animal welfare in captivity, where close proximity to or handling of animals may be challenging. Understanding animal behaviour is crucial for effective welfare monitoring, and while video recording devices are commonly used, the subsequent analysis can be time-consuming. This project aims to identify a practical and cost-effective method for extracting behavioural data from videos that is accessible to zoo staff with minimal training. The overarching goal is to bridge the gap between advanced technology and on-the-ground application, ensuring a more inclusive and efficient approach to animal welfare monitoring in diverse zoo settings. Experience with computer software, such as R or Python, is required.

2. Project Title: Non-invasive indicators of pain in zoo species

Description: The ability to identify and quantify pain experienced by captive animals is vital for optimising animal welfare. However, prey species are adept at hiding pain from predators thus making it difficult for animal caregivers to monitor and treat. Non-invasive indicators of pain, such as facial expressions and infrared thermography, have been established for domestic species, and this project will advance these methods further for application with captive wild animals. Specifically, this project will develop a preliminary facial expression scale for the Scimitar-horned oryx and Grevy's zebra, as well as adapt the Animal Welfare Assessment Grid to highlight changes indicative of pain.

3. Project Title: What is the effect of cooperative care training for husbandry and veterinary procedures on physiological parameters in captive wildlife?

Description: The welfare benefits of training captive animals in zoos and aquariums to assist in their husbandry and veterinary care is widely assumed but there remains little empirical evidence to support this belief, especially for particular taxa. This project will focus on gathering physiological evidence from understudied species, before and after completing a

training programme or comparing individuals of the same species that are and are not part of a training programme. A key element of this project will be identifying suitable non-invasive methods for assessing physiological parameters. Taxa of interest include: birds (particularly penguins) and reptiles but will be dependent on when the project takes place (e.g. which training programmes are in place or due to start, biosecurity, etc.).

4. Project Title: Trialling non-invasive sensing techniques for monitoring physiological parameters for captive wild animals

Description: Various methods are employed for assessing animal welfare in zoos, ranging from physiological indicators to behavioural observations. However, these approaches have limitations, such as labour-intensive data collection, potential bias, and the need for specialised observers, and it is essential to combine a range of indicators to achieve a comprehensive understanding of animal welfare. Unfortunately, the use of physiological indicators can often require close contact with an animal, which can cause stress or risk of injury, invasive and labour-intensive procedures and costly equipment or tests. In addition, individual and species-specific differences make it challenging to establish universal indicators. This project will focus on identifying and trialling non-invasive sensing techniques for monitoring physiological parameters in understudied taxa (e.g. reptiles, fish or invertebrates) which can be used holistically alongside other welfare measures. Methods may include monitoring of heart or breathing rate, thermal imaging, video, and data analysis software.

5. Project Title: Development of a body condition scoring system for reptiles

Description: Incorporating body condition scoring as part of animal welfare assessments provides an objective, standardised, non-invasive and effective means of monitoring and managing the health and well-being of captive wild animals. Body condition scoring systems were initially developed for domestic species, particularly farm animals, and have been adapted for numerous other species since, however, due to species similarities, these tend to be mammal-focussed. With the growing number of reptiles in captivity, both in private collections and zoos, there is a need to develop an easy to use, objective, visual body condition scoring system that can be used by animal care staff in the assessment of captive, and potentially wild, reptile welfare.

6. Project Title: Enclosure evaluation and utilisation by feeder invertebrates

Description: The majority of zoos house and breed some, if not all, of the invertebrates e.g. crickets, locusts, beetles, cockroaches, that they require to feed the insectivorous species in their care. With the concern for invertebrate welfare growing in response to a greater awareness of invertebrate sentience, invertebrates must be included in zoo welfare assessments. One method which can be used to contribute to our understanding of welfare is evaluating the suitability and environmental complexity of enclosures. Therefore, this project aims to evaluate the extent to which invertebrates utilise the space available to them, identifying key resources (structural, social, and environmental) and unused areas.

Behavioural observations and the use of a modified spread of participation index are suggested as a means to tackle this evaluation.

7. Project Title: Evaluating the suitability and environmental complexity of vivaria for captive herptiles.

Description: Herptiles are an understudied group of species in zoological collections, particularly when considering animal welfare. With the increasing necessity to assess the welfare of all taxa in zoos on a regular basis, there is a need to better understand herptile behaviour and how it relates to welfare. Captive herptiles often don't appear to utilise all of the enclosure available to them, which raises the question why not and can the unused space be developed to improve enclosure use. This project aims to evaluate the extent to which herptiles utilise the space available to them, identifying key resources (structural, social, and environmental) and unused areas. Behavioural observations and the use of a modified spread of participation index are suggested as methods.

N.B. The successful applicant should have a full driving license and access to their own vehicle, or be able to organise alternate transport arrangements, to carry out fieldwork in Hampshire at Marwell Wildlife (please note, there is minimal/no public transport to Marwell). They should have good communication skills and be prepared to work alongside staff without interfering with the day-to-day running of the zoo. Students must be prepared to support their own travel and accommodation expenses if required.