Linking dairy cows' day-to-day behaviours with affective states and welfare.

Supervisory team:
Main supervisor: Dr Benjamin Lecorps (University of Bristol)
Second supervisor: Prof Andrew Dowsey (University of Bristol)
Prof Mike Mendl (University of Bristol)

Host institution: University of Bristol

Project description:
The welfare of animals used in the food system is attracting growing attention, but our ability to assess animal welfare is still limited. It is increasingly recognized that animal welfare goes beyond assuring that animals are physically healthy and productive, and now strongly focuses on animals' affective experiences (emotions and moods). The subjective nature of these states and the lack of verbal report makes assessing animal emotion scientifically challenging. However, new methods in behavioural and cognitive science now allow better insight into what animals may feel. For instance, conditioned place preference tests can reveal whether a past experience was associated with a more positive or negative affective state and hence help, for example, to determine which pain-control drugs are most effective (https://doi.org/10.1098/rsbl.2019.0642). Judgment bias tests can be used to assess animals' mood states and thus help making inferences about the effect of a given practice on the welfare of the animals.

Although these tests provide very useful information, they are too complex to be carried out routinely on farms and hence their potential remains unrealized in 'real-life' contexts. A possible solution is offered by new computer vision technologies that use deep learning AI to track free-living individuals (https://doi.org/10.1016/j.compag.2021.106133) and assess their behaviours (https://arxiv.org/abs/2011.10759). The aim of this PhD project is to combine both approaches to determine whether spontaneous behaviours of dairy cattle (quantifiable via computer vision) reflect animal affective states (assessed using behavioural assays), and hence can be used as proxy markers of affect and welfare. Behaviours to be measured include resting and sleeping, positive and negative social interactions, and feeding behaviours. This data will then be matched with recurrent behavioural/cognitive tests of animal affect (e.g., judgment bias) and productivity metrics.

The student will receive training in experimental design, behavioural testing, machine vision, and data science, and should have a degree in biology, agriculture or psychology and ideally some experience with dairy cows and/or animal welfare. The successful applicant will be based at Bristol Vet School and join the Animal Welfare and Behaviour Research Community, led by co-supervisor Prof Mike Mendl and including main-supervisor Dr Benjamin Lecorps who is an expert on dairy cow welfare and the School's Data Science Research Community led by co-supervisor Professor Andrew Dowsey. The work will take place at the newly instrumented John Oldacre Centre (JOC) for Dairy Welfare and Sustainability Research (https://bristol.ac.uk/vet-school/research/john-oldacre-centre/).

Our aim as the SWBio DTP is to support students from a range of backgrounds and circumstances. Where needed, we will work with you to take into consideration reasonable project adaptations (for example to support caring responsibilities, disabilities, other significant personal circumstances) as well as flexible working and part-time study requests, to enable greater access to a PhD. All our supervisors support us with this aim, so please feel comfortable in discussing further with the listed PhD project supervisor to see what is feasible.