Jack O'Sullivan

7 Coach House Court, Loughborough, LE11 2TJ
Tel: +447399356290 Email: j.w.osullivan93@gmail.com

Research Interests

I am a postdoctoral researcher experienced in the development and application of novel technologies and methodologies to the modelling and monitoring of animal behaviour, welfare, ecology, and cognition. My research interests lie in the interplay between these fields and the diverse ways in which novel methods can be utilised to provide a more nuanced understanding of focal individuals and groups, particularly in how the careful application of novel methods may improve our understanding of how non-human animals perceive and interact with their environments, conspecifics, and us. Most recently my research has focussed on the assessment of the welfare of animals in domestic and agricultural settings by incorporating the approaches and methods established in wild animal behavioural ecology alongside those established in the veterinary and welfare sciences.

Education

Newcastle University, Institute of Neuroscience
2016 - 2021
PhD
Thesis Title: The Automatic Classification of Canine State Using Accelerometers
Supervisor: Professor Lucy Asher
Synopsis: This thesis investigated the use of animal-borne, tri-axial accelerometers to supplement welfare information available to both caregivers and veterinarians. This was achieved through the synthesis of methodologies employed in both wild animal behavioural ecology and domestic veterinary medicine.

Newcastle University, Institute of Neuroscience
2015 – 2016
Master of Research in Animal Behaviour
Dissertation Title: Measuring the Effects of Aging on Behaviour in Dogs Using Accelerometers

Swansea University, College of Sciences
2014 – 2015
Master of Research in Biological Sciences
Dissertation Title: The Applicability of Animal-Attached Tri-Axial Accelerometers and Machine Learning Techniques for Inferring the Behaviour of Wild Social Primates

Aberystwyth University, Institute of Biological, Environmental & Rural Sciences
2011 – 2014
BSC Zoology
Dissertation: The application of GIS tools for the statistical estimation of Anopheline mosquito breeding sites in rural Tanzania

Professional Experiences

10/2023 – 11/2023
Temporary Research Assistant, Newcastle University
A temporary post to leverage my experience in the adaptation and development of machine learning and statistical modelling methods for the creation of a deep learning method of monitoring, predicting and understanding commercially important poultry flock behaviours.

04/2023 – 08/2023
Research Associate, University of Liverpool
A short-term research post joining an established team. My role focussed on the analysis of extant data and compilation of results for inclusion in a report to several external governmental stakeholders. An additional responsibility was the planning and creation of a data-visualisation tool to improve future data accessibility, security, and maintenance by both the public and government employees.

05/2022 – 04/2023
Computational Technician in Behaviour Informatics, Newcastle University
Conducting project funded via grant awarded by Battersea Dogs and Cat Home. I conceived and managed the project from start to finish. The project concerned the development, prototyping, and validation of a novel, open-source technology to supplement current welfare, behaviour and environment monitoring of domestic animals housed in shelters. The toolset was built with the input of current shelter carers and focussed on the integration of a tool within current practice that serves to supplement rather than replace established protocols. Through this I aimed to improve the welfare of both human and animals within the shelters and ensure the inclusion of novel technologies was a net good to all involved. The resulting device is now hosted as an Open Science Framework project.

09/2021 – 05/2022
Research Technician (Maternity Cover), University of Lincoln
Maternity cover for post-doctoral researcher ensuring the collection and analysis of data relating to canine social behaviour continues uninterrupted. Upon joining and integrating with the team I was able to ensure research continued to meet established timelines and identified areas where novel analytical techniques may be introduced. To that end I wrote and implemented a novel video observation tool for the rapid qualitative annotation of dyad-focussed social encounters.

09/2019 – 09/2021
Research Assistant (Behaviour Informatics), Newcastle University
Assist with projects across the lab group and provide support for a diverse group of PhD students, and research technicians whenever required. During this time, I worked with several external industrial partners to ensure the completion of a range of research projects. I produced academic and industry facing reports and rapid analysis pipelines for the assessment of welfare, behaviour and environment of poultry and domestic animals using thermography, acoustic analyses, and computer vision techniques.

Relevant Skills

- Experienced in the assessment, observation, annotation and analysis of animal behaviour and welfare. This includes the design and carrying out of experimental procedures to address cognitive and behavioural research questions.
- Robust practical and theoretical knowledge of animal cognition, ecology and behaviour across diverse organisms.
- Diverse experience of novel technologies utilised for the supplementation of the above (e.g. infrared thermography, inertial measurements, GPS and GIS measurements, acoustic monitoring, etc.) and the common challenges in their use, adoption, and development.
- Extensive experience in statistical modelling, analysis, and the use of diverse machine learning, deep learning, and computer vision techniques.
- Experienced in the use of R, Python, and other computing and statistical languages for the processing, analysis, and presentation of diverse quantitative and qualitative data.
- The ability to communicate the use of the above methods, statistical analyses, and results effectively and efficiently to diverse audiences from wide-ranging backgrounds.
- Ability to design, construct, deploy, and validate custom sensors and monitoring devices tailored to novel environments and an understanding of the process of achieving this.

Awards

Battersea Dogs & Cats Home Research Grant (£60,000) 2021

Open Science Projects

O'Sullivan, J., 2023, 'PawPrint: An Open Source Inertial and Magnetic Measurement Unit.' *OSF,* https://doi.org/10.17605/OSF.IO/KZ6NW

Publications

O'Sullivan J., Asher L*., In prep.* 'The Impact of Welfare on the Circadian Rhythms of Activity in Domestic Dogs.'

O'Sullivan J., Asher L*., In prep.* 'Dynamic Body Acceleration as a Measure of Welfare Impact in Domestic Dogs.'

Ladha C., Belshaw Z., **O'Sullivan J.**, Asher L*.,* 2018, 'A step in the right direction: an open-design pedometer algorithm for dogs.' *BMC Vet Res* 14, 107. https://doi.org/10.1186/s12917-018-1422-3

Ladha C., **O'Sullivan J.**, Belshaw Z., Asher L., 2017, 'GaitKeeper: A System for Measuring Canine Gait.' *Sensors*., 17(2):309., https://doi.org/10.3390/s17020309

Fehlmann G., O'Riain M.J., Hopkins P.W., **O'Sullivan J.**, Holton M.D., Shepard E.L.C., King A.J., 2017, 'Identification of behaviours from accelerometer data in a wild social primate.' *Anim Biotelemetry* **5,** 6. https://doi.org/10.1186/s40317-017-0121-3

Conferences

O'Sullivan J., Asher L., 2021, 'Translating behavioural ecology acceleration measures to a welfare context.' *Proceedings of the 6th Annual Meeting of the Animal Welfare Research Network.* July 15 – July 16 2021.

O'Sullivan J., Smith C., Asher L., 2020, 'Identifying Canine Posture from a Wearable Sensor: Application of Cross-Disciplinary Methods to Companion Animal Monitoring.' Spink, A., Barski, J., Brouwer, A., Riedel, G., Sil, A., *Volume 1 of the Proceedings of the joint 12th International Conference on Methods and Techniques in Behavioral Research and 6th Seminar on Behavioral Methods*, Krakow, Poland, October 15 - 18, 2021., https://doi.org/10.6084/m9.figshare.13013717.v5

O'Sullivan J., Ladha C., Belshaw Z., Asher L., 2018, 'Circadian rhythms in activity in healthy and arthritic dogs.' Cockram M., Tennessen T., Bate L., Bergeron R., Cloutier S., Fisher A., Hötzel M., *Proceedings of the 52nd Congress of the International Society for Applied Ethology, Ethology for health and welfare*, Prince Edward Island, Canada, July 30 - August 3, 2018., https://doi.org/10.3920/978-90-8686-870-4

Posters

O'Sullivan J., Ladha C., Belshaw Z., Asher L., 2018 'Rhythm of the night: Circadian rhythms in activity as a potential welfare indicator in dogs' Recent advances in animal welfare science VI, UFAW Animal Welfare Conference, Newcastle-Upon-Tyne, U.K., June 28 2018

Membership of Professional Societies

- Association for the Study of Animal Behaviour 2015 – Present
- Animal Welfare Research Network 2020 – Present

References

Professor Lucy Asher
School of Natural and Environmental Sciences
Agriculture Building
Newcastle University
NE1 7RU
Email: Lucy.Asher@newcastle.ac.uk

Professor Daniel Mills
Department of Life Sciences
College of Science
University of Lincoln
Brayford Pool Campus
LN6 7TS
Email: dmills@lincoln.ac.uk