

Hartpury Research and Knowledge Exchange Conference Programme 2023

Hartpury University

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HARTPURY
UNIVERSITY

**HARTPURY RESEARCH AND KNOWLEDGE EXCHANGE
CONFERENCE PROGRAMME
MAKING A DIFFERENCE
FRIDAY 14TH JULY 2023**





Hartpury Research and Knowledge Exchange Conference 2023: *Making a difference*

Welcome from the Academic Dean of Research and Knowledge Exchange

It is my pleasure to welcome staff, students, governors and guests to the annual Hartpury Research and Knowledge Exchange Conference. As ever the Conference comes at the end of a busy academic year and gives us the chance to come together to celebrate achievements in research and knowledge exchange. Recent years when meeting in person has been difficult or impossible have shown us the value of coming together to share ideas and learn about the exciting work happening at Hartpury and beyond.

The Conference theme of 'Making a Difference' speaks to our aims of producing and sharing the highest quality research that has real world relevance and impact. On this theme I am delighted to welcome our two truly outstanding keynote speakers. Prof Greg Whyte (OBE) has reached a level of public communication and engagement never seen before in sport and exercise sciences and Phillipe Wilson is Professor of One Health which will resonate with the real-world challenges facing our industries and indeed our planet. A massive thank you to Phillipe and Greg for giving us their time today.

This will be the first of our conferences that has run in parallel with the Hartpury Sport Business Hub and we are pleased to welcome external guests that have engaged with our students in offering real world knowledge exchange projects. This is an outstanding example of teaching, research, knowledge exchange and industry engagement coming together to make a difference! We also like to wish those students presenting the best of luck with their assessments and thank them for being such outstanding ambassadors for the University. Knowledge exchange is a very important aspect of our work and mission at Hartpury and is particularly complimentary to our applied and industry relevant curriculum. Hartpury punches well above its weight in this area and remains amongst the top UK universities for local growth and regeneration in the Knowledge Exchange Framework (KEF) exercise.

Our post-graduate research students continue to grow and excel. We now have a cohort of around 30 students studying for PhD and DPhil degrees. I am always excited to hear from them and amazed at the spectrum of diverse and brilliant projects happening across the University. We are pleased to welcome guests from the University of the West of England (UWE) Bristol (our research degree provider), and we thank them for their continued support in a relationship that becomes stronger, and we find many areas to work collaboratively. Finally, particular thanks to the Hartpury governors for supporting us in our ongoing research journey.

Prof Steve Draper
Prof Steve Draper
Academic Dean (RKE)

**Hartpury Research and Knowledge Exchange Conference 2023:
*Making a difference***

Programme

09.00 to 09.30	Registration & Coffee	Mark Davidson Centre (MDC) Foyer
09.30 to 09:45	Welcome to the conference	Prof. Stephen Draper MDC1
09:45 to 10:45	Keynote: 'Performing the Impossible in Every Environment Possible'	Prof. Greg Whyte MDC1
10:45 to 11.00	Networking and coffee break	MDC Foyer
11.00 to 12.00	Hartpury Research Grants 1. Dr Gillian Tabor <i>The effect a handheld percussive therapy device on thoracolumbar muscular profile, movement asymmetry, behaviour and mechanical nociceptive thresholds.</i> 2. Dr Kev Harris <i>Fostering a multidisciplinary community for evaluation and learning at Hartpury</i> 3. Christoph Szedlak <i>Developing a workshop to introduce psychosocial coaching competencies within strength and conditioning</i> 4. Greg Henry <i>What makes an effective internship/placement? An investigation into the Strength and Conditioning Industry</i> Launch of Hartpury Internal Research Grants 2023/2024	Chair: Prof. Stephen Draper MDC 1
12:00 to 13:00	Research presentations	MDC 1-5
	Equine 1. Christy Maddock <i>Equine Hock Instability: Relationship with Pelvic Symmetry and Hindlimb Muscle Score</i> 2. Linda Greening <i>Light and equine circadian rhythms: A de-brief exploring the relative advantages of utilizing onsite resources to conduct a multi-institutional collaborative research project</i> 3. Dr Kathryn Nankervis <i>Experiences of interdisciplinary working from the perspective of Society of Master Saddlers Qualified Saddle Fitters</i> 4. Dr Kirsty Lesniak <i>Prevalence of functional trait & distal limb asymmetries & their effects on equine performance: A synopsis of the story so far?</i>	Chair: Dr Kirsty Lesniak MDC 1
	Veterinary Nursing 1. Izzy Riley <i>It's not all about the Vet! How the waiting room environment impacts canine fear-related behavioural expression</i> 2. Hannah Poulton <i>To investigate how veterinary professionals are affected by companion animal euthanasia, in the UK in 2022</i>	Chair: Dr Carol Gray MDC 2



12:00 to 13:00	<p>3. Megan Rice <i>An Investigation into Clinical Coaching from the Student Veterinary Nurses Perspective in the UK</i></p> <p>4. Dr Carol Gray <i>Companion animal neutering: Exploring the purpose, process and power dynamics of consent</i></p>	
	Animal	
	<p>1. Polly Doodson <i>Animal-visitor interactions in semi-contrived tourism settings: a study of 'Meet & Greets' in UK zoos</i></p> <p>2. Carys Player <i>An Investigation into the Public Perception of the Reintroduced Eurasian Beaver (Castor fiber) in Great Britain.</i></p> <p>3. Dr Alison Wills/Megan Bailey <i>Effect of Restraint Type on Intraocular Pressure and Respiration Rate of Brachycephalic and Dolichocephalic Dogs</i></p> <p>4. Prof. Vicky Melfi <i>Furred and feathered friends: how attached are zoo keepers to the animals in their care?</i></p>	Chair: Prof. Vicky Melfi MDC 3
	Sport and Exercise	
	<p>1. Gerard McGinty <i>Is 11v11 the Optimal Match Format to Develop the Technical and Physical Attributes of Young Soccer Players Within the English Professional Academy System?</i></p> <p>2. Andrew Hearn <i>The average and 5-minute high intensity demands of trained female football players and acute fatigue responses from match-play</i></p> <p>3. Hannah Clarke <i>The effects of the menstrual cycle on performance markers in female rugby players</i></p> <p>4. Alexander Wilson <i>The impact of sport scheduling on sleep duration and social jetlag in student-athletes: A pilot study</i></p>	Chair: Dr John Parker MDC 4
	Agriculture	
	<p>1. Wing Ng <i>Achieving Net Zero through farm level carbon assessment</i></p> <p>2. Misbah Ahmad <i>A deep learning based vision model for cows' behaviour classification</i></p> <p>3. Brian Evans and Torin Nicolson <i>Impact of different Nitrogen fertiliser application methods on grass yield and nitrogen use efficiency within a UK dairy grazed trial area</i></p> <p>4. Aisling Carroll <i>Investigating faecal bacterial communities in pre-weaned Holstein dairy calves and the influence of management events</i></p>	Chair: Prof. Matt Bell MDC 5



11:30 to 13:00	<p style="text-align: center;">Hartpury Sport Business Hub</p> <ol style="list-style-type: none"> 1. Jeremy Holt <i>Developing the RISE project: A programme framework aimed at individuals not in education aged 16 - 24 to upskill and boost the employability of young people in Bristol</i> 2. Dan Bugg <i>An evaluation into the TrainAsONE AI powered running App that constantly adjusts your training plan according to you, your data and your goals</i> 3. Arabella White <i>An investigation into Female participation levels within golf at Hilton Puckrup Hall Hotel</i> 4. Henry Phillips <i>A needs analysis of Gloucester City based community sport organisations that can be supported by the services of the HSBH.</i> 5. Giles Winthrop & Reece Swain <i>To develop commercial and financial opportunities in relation to the new golf range facility being constructed at the Hartpury sports Academy</i> 6. Bevan Howells <i>The impact and effectiveness of the Be Active Wales fund on community clubs</i> 7. Tom Handley <i>Cinderford Town AFC – A business plan to support club relocation and its future viability</i> 8. Grace Simpson <i>What is in a ‘Name’: how does Gloucestershire County Cricket Club create more cut-through in the city of Bristol</i> 	<p style="text-align: center;">Chair: Mike Green Alex Kay Kev Harris Hartpury House</p>
13.00 to 14.00	Lunch	Hartpury House
14.00 to 15.00	Keynote: ‘Professor Philippe Wilson his career journey’	Prof. Philippe Wilson MDC1
14.00 to 15.00	Engaging communities through RKE activity	Chair: Mike Green/ Alex Kay/Kev Ball Hartpury House A6
15.00 to 15.15	Networking and coffee break	MDC Foyer
15.15 to 15:45	Postgraduate Research Student Presentations (3 min lightening talks)	Chair: Prof. Stephen Draper MDC1
15:45 to 16.15	Presentation of awards and close of conference	Prof. Andy Collop Prof. Stephen Draper MDC1

Introducing our Keynote Speakers

'Performing the Impossible in Every Environment Possible' Professor Greg Whyte OBE

Elite athletes regularly compete in environmental extremes with major championships hosted in some of the most inhospitable places on the planet. Both summer and winter Olympic Games have a reputation for choosing extreme environments, challenging athletes with heat, cold, altitude, and pollution, often in combination. The rise of ultra-endurance events and charity challenges is now exposing non-elite athletes to extreme environments, often in the absence of any targeted acclimation or experience despite a growing body of research evidence to support the health and performance on the athlete. This session will examine the roll of research in the preparation and performance of elite athletes, non-elite athletes, and celebrities at the extremes.



Introducing our Keynote Speakers

'Professor Philippe Wilson his career journey' **Professor Philippe Wilson**

In this Keynote session, Professor Philippe Wilson will describe his career journey and lead into a perspective on interdisciplinarity catalysed by his own research interests in human, animal and plant medicine. Originally from Somerset where he grew up farming cattle, sheep and poultry, Philippe then received his Masters in Chemistry and PhD in Computational Biochemistry from the University of Bath. After moving to De Montfort University's School of Pharmacy in Leicester for 4 years, he took a sabbatical from academia to pursue founding several startups and working as the Scientific Director of the Rare Breeds Survival Trust. In 2020 he was appointed as Professor and Chair in One Health at Nottingham Trent University and in 2023 became a member of the Senior Leadership Team of the Medical Technologies Innovation Facility. He has received >£5m external research and commercial income to date and published more than 100 outputs. He was named in Forbes Magazine's 30under30 listing in 2018 for Science and Healthcare, received the Joseph Black Medal from the Royal Society of Chemistry in 2019 and in 2022 was named by The Analytical Scientist Magazine as one of the top 40 Analytical Chemists globally.



Hartpury Research and Knowledge Exchange Internal Research Grant

The effect a handheld percussive therapy device on thoracolumbar muscular profile, movement asymmetry, behaviour and mechanical nociceptive thresholds.

G. Tabor and C. Maddock

This study was designed to test the effects of a percussive therapy device, commonly used on soft tissues in people and currently unstudied in horses, despite anecdotal reports of benefit. Whilst use of vibration therapy is established in humans, with positive outcomes related to neural and/or muscular (re)conditioning, strength and range of motion, and pain perception and posture, there is a paucity of evidence on responses in horses. Gaining insight into the effects of home-use, therapeutic devices in horses will provide veterinarians, therapists, and owners with objective information on whether such devices will benefit horses, therefore having welfare and economic implications on horse and owner, respectively. The aims of this study were to assess the effects of handheld percussive device effect thoracolumbar muscle profile, movement symmetry, mechanical nociceptive thresholds, and behaviour in horses.

A within-subjects design (randomised, blinded, cross-over study of treatment and sham treatment, with pre- and post-intervention measurements) was used to collect data from twelve polo ponies. Mechanical nociceptive thresholds (MNT) were tested with a pressure algometer, muscle palpation scores collected, thoracic musculature dimensions and symmetry measured with a flexible curve ruler and behavioural responses to the device and sham application gathered via video, with recordings reviewed using the EquiFACS ethogram, by a blinded and trained observer.

Kinematic data was collected with Equigait inertial motion unit (IMU) sensors during a dynamic assessment consisting of four in hand passes at walk and trot on a straight line. The IMUs, sampling at 100Hz, were located at the poll, T6, T13, T18, L3, sacrum and left and right tuber coxae. For each sensor dorsoventral, craniocaudal and mediolateral displacement range of motion, roll, pitch, yaw and stride time (duration) were quantified. Symmetry values were calculated using previously defined methods based on the sensors placed on left and right tuber coxae.

The data analysis is ongoing and partial results will be presented from this study examining the immediate effects of the percussive therapy, with a controlled method which assesses for effects from the device and limits confounding variables. If effective (increasing MNTs, muscle profile and movement quality) with no negative behavioural signs observed, this device may be beneficial both pre-competition and for recovery and rehabilitation.



Fostering a multidisciplinary community for evaluation and learning at Hartpury

Dr Kev Harris and Dr Alex Kay

The Hartpury Sports Business Hub has seen considerable success in attracting RKE income boosting the reputation at Hartpury. This income has been wide ranging supporting key organisations such as Active Essex and Sport England. However, it is recognised that in order to deliver on these projects there needs to be a readily primed workforce to support evaluation and learning activity. In February 2022 the Hartpury Sports Business Hub were awarded funding within the 'emerging research' theme to deliver a series of evaluation and learning workshops which focused on a wide range of different approaches that are at the heart of our approach. These workshops (delivered by external partners) sought to increase capacity and grow the culture in Evaluation and Learning RKE activity. In this paper we reflect on the impact of this work drawing upon collective feedback received over the last six months alongside focus groups to inform the direction of travel moving forward. In sum, this work has led to the formation of an evaluation and learning group committed to securing RKE income generation in the near future.

Developing a workshop to introduce psychosocial coaching competencies within strength and conditioning

Christoph Szedlak, Bettina Callary, Kimberley Eagles and Brian Gearity

Strength and condition (S&C) coach educators, such as the United Kingdom Strength and Conditioning Association (UKSCA), promote athlete-centered coaching practice, which includes psychosocial competencies. However, the UKSCA has so far neglected to develop learning opportunities that focus on psychosocial coaching competencies, which include philosophical, pedagogical, psychological, and sociocultural aspects (Callary et al., 2022). As part of an ongoing participatory action research project, our aim was to develop a workshop that introduces psychosocial coaching competencies within the UKSCA's curriculum.

We used a learner-centred, constructivist approach to underpin the development of our workshop. This included the use of stories and communities of practice to promote learning, when reflecting on coaching practice (Szedlak et al., 2019). The workshop comprised of five main elements: (1) psychosocial, included reflecting on the ability to manage their own/their athletes' mental skills, health, emotions, and cognitions, (2) pedagogical, focused on creating an effective learning environment, including effective communication and feedback, (3) philosophical, examined the underlying values and beliefs that guide coach's behaviour, and (4) sociocultural, introduced issues of power, control, discrimination, diversity, and social justice. We finish with a reflective task using Moon's model for critical reflection (Moon, 2004), which allowed the participants to identify the most pertinent psychosocial area for future development.

The UKSCA is the first S&C coach educator to develop a workshop focusing on psychosocial coaching practice to be included in the curriculum. As a result, the UKSCA is now in a position to provide a learning tool that introduces the S&C coach to examine their coaching practice regarding psychosocial coaching competencies. Furthermore, this workshop provides a stepping stone for the development of more comprehensive workshops focusing on each individual psychosocial competency.

What makes an effective internship/placement? An investigation into the Strength and Conditioning Industry

Greg Henry, Dr Christoph Szedlak, Dr Benjamin Drury, Matthew Weber, Henry Davies and Andrew Hearn, Hannah Clarke

Introduction: With a growing number of UK universities offering both undergraduate and master's degrees within strength and conditioning (S&C), the field has become more competitive as the amount of jobs available does not match the volume of graduates entering the field (Read et al. 2016). As a consequence, students enrolled on these degrees are undertaking formal placements/internships so that they can accumulate coaching experience to stand out in the competitive job market (Stewart et al. 2016). The UK Strength and Conditioning Association (UKSCA) released an "Internship Pack" (2018) outlining the definitions of a placement/internship and when individuals should be paid; expectations and legalities. However, there is little guidance as to what should be included in a S&C internship/placement therefore resulting in individuals having vastly different experiences and development. Therefore, the aim of this study was to investigate what makes an effective internship/placement within S&C to provide guidance to intern providers, as well as higher education facilitators in order to facilitate an effective learning experience for the intern.

Methods: Online focus groups were held for the following three stake holders involved in the creation and running of internships/placements: programme managers/directors of HE S&C UK degrees, practitioners who run internships and students. We recruited eight programme manager/director or a representative of a UK HE S&C degree, eight practitioners who has led an internship in the past year and a student who has completed an internship/placement in the past 18 months, and four students who recently finished an internship. We analysed the data using a reflexive thematic analysis (Braun & Clarke., 2016).

Results: We identified five key themes: (1) Remuneration for the interns, (2) A set structure and layout, (3) Effective mentoring of the intern progress, (4) Soft skill development and (5) Opportunity for practical application of knowledge.

Discussion: The findings of this study confirm that there are still challenges to individuals both running and participating in internships/placements. The results further highlight some of the skillsets that are key to succeeding within the industry but also further guidance as to how internships/guidance should be structured and tasks that can be utilised to promote learning.

Conclusion: Our findings call for clarity from internship/placement provider on how internship/placement should be structured and how the learning experiences should include essential aspects of developing novice S&C coaches. Furthermore, our findings promote a call for action for internship/placement provider, as well as S&C accreditation bodies to work more closely together in developing expected standards of effective S&C internship programmes.

Hartpury Research and Knowledge Exchange Internal Research Grant

Prof Steve Draper Academic Dean (RKE)

Following Hartpury University's successful REF, we received additional Research England QR funding. To support and develop research and knowledge exchange (RKE) at Hartpury University the funds have been used to offer staff members the opportunity to bid for project funding. This process is designed to both support the excellent work of our staff and to develop experience in bid writing for early career researchers.

The first round of funding took place in the 2022-2023 academic year. All projects for the 2022-2023 academic year identified tangible outputs and it was a requirement of funding that the PI produce a summary report evaluating the success of the projects at the end of the funding period alongside a financial breakdown of how the funds have been spent. We will evaluate the success of these projects in the coming months.

We are in the position to offer the same funding opportunity to staff for the 2023-2024 academic year. We will require a short summary report on the project at the end of the funding period.

We would welcome applications to the following three funds:

1. Emerging areas of RKE:

This fund is designed to seed fund new and emerging research and knowledge exchange ideas from all subjects and areas. Whilst the nature of such a fund is to support potentially as yet unproven projects and concepts, the application must clearly articulate the intended outputs and impacts from the projects.

Maximum £2000

2. Research to Support REF

This fund is designed to support established research that clearly aligns to one of the two REF units of assessment that Hartpury intends to submit to. Projects may be aligned to outputs or impacts but this must be clear in the application.

Maximum £3000

3. Participatory Research

Participatory research (PR) encompasses research designs, methods, and frameworks that use systematic inquiry in direct collaboration with those affected by an issue being studied for the purpose of action or change. This fund is to support any research projects in this area.

Maximum £5000

To apply:

Complete application form [RKE Internal Research Grant Process](#)

Return the completed application form to research@hartpury.ac.uk by **15th September 2023**. A panel of senior RKE staff will evaluate the bids. Decisions will be communicated by **2nd October 2023**.

Research Presentations: Equine

Hock instability in the horse: relationship with pelvic symmetry and hindlimb muscle development.

Maddock, C, Tabor, G, Deckers, I, Murray, R, and Walker, V

Introduction: Excessive mediolateral (ML) hock oscillation or ‘wobble’ during locomotion is commonly associated with clinical issues. However, its presence has been reported within populations that are deemed clinically sound, with a suggestion it may be associated with hindlimb (HL) muscle weakness (Dyson et al., 2018). Yet, there is little investigation into factors affecting hock instability in sound horses. Objectives: To quantify the range of ML hock motion in walk and trot. To identify associations between ML hock motion, pelvic symmetry and HL muscle development (MD) in walk and trot.

Material and methods: 12 horses (age: 13±4 years) of mixed breeds with no history of hock pathology were recruited. All horses were described as clinically sound by an ACPAT physiotherapist. Seven optical motion capture cameras (240Hz) captured data from horses walking and trotting on a high-speed treadmill (1.5±0.1m/s at walk and 3.2±0.1m/s at trot). Seven 19mm retroreflective markers were applied to each subject, over the midline between the tuber sacrale, tubera coxae, and the point of hock and lateral heel bulbs of both HLs (Figure 1). Following a five-minute warm up, two 10 second walk and trot trials were recorded. ML hock motion was measured at walk and trot. Pelvic symmetry was measured at trot by calculating minimum (PDmin) and maximum (PDmax) position differences of the tuber sacrale marker between left and right stances; left and right stance was defined using hoof markers. On a separate day, a second ACPAT physiotherapist assigned MD scores of the gluteus medius (GM), biceps femoris (BF), semitendinosus (ST), semimembranosus (SM) and gracilis (GR) of each horse (n=11) based on a previously published grading scale (Walker et al., 2016). SPSS was used for statistical analysis. A paired t-test identified differences in range of ML hock motion between walk and trot for the whole population. Associations between ML hock motion, pelvic symmetry and HL MD scores were assessed using linear regression calculations. Significance was set at P=0.05.

Results: ML hock motion was greater in walk (66±13 mm) than in trot (31±6 mm) for all subjects (P<0.001). Pelvic symmetry showed no association with ML hock motion (P>0.05). The only muscle to show any relationship with ML hock motion was BF; in both directions, a lower MD score for BF was associated with greater oscillation of the contralateral hock during stance in walk (P=0.037/P=0.038). The relationship was not significant in trot (P>0.05).

Discussion: These findings suggest that hock instability cannot be used to identify pelvic symmetry but may be associated with less BF MD in the contralateral limb. It is therefore possible that increasing BF development could increase hock stability, so exercises that improve BF strength could be of benefit. This might include walking on an incline (Crook et al., 2010) or water treadmill training (Murray et al., 2020). ML hock motion is greater in walk than trot, therefore walk is likely to be the better pace in which to assess hock stability.

Light and equine circadian rhythms: A de-brief exploring the relative advantages of utilizing onsite resources to conduct a multi-institutional collaborative research project

Linda Greening

In 2022, the Morris Animal Foundation awarded \$10,000 to a collaborative project that aimed to investigate the influence of a customized LED lighting on circadian rhythms and sleep quality relative to wellbeing in stabled horses. The principal investigator was based at Hartpury University with co-investigators at University College Dublin and the Royal Agricultural University. In addition, a number of students from different institutions were committed through project modules. Ten horses (seven geldings/ three mares, height range 14hh to 15.3hh, average age 11.6 yr +3.9) were allocated into two groups and exposed to two different lighting conditions (fluorescent vs. Equilume red/white lights) in a cross-over design. Horses acclimatised to the experimental conditions in their specified group for three weeks prior to data collection during the fourth week, before groups swapped conditions and the process was repeated. Frequency and duration of behaviour was recorded using CCTV equipment that was specifically installed for the project. Using continuous focal sampling, behaviour was recorded over 48 hr using a pre-determined ethogram. To measure clock gene rhythmicity, hair follicle samples were taken from individual horses every four hours across 48 hr to analyse the gene transcripts of five core clock genes. To measure levels of arousal, spontaneous blink rate was measured for 30 min on two nights using go-pro cameras attached to headcollars. Results are not currently available to share however the road of research is never smooth. Therefore, this session will address the considerations and lessons learnt during the project whilst presenting an overview of the project aims and methods.

Experiences of interdisciplinary working from the perspective of Society of Master Saddlers Qualified Saddle Fitters

KJ Nankervis, R. MacKechnie-Guire, C. Maddock, A. Z. Pyatt

Horse owners seek the advice and support of a number of equestrian professionals in carrying out their duty of care for their animal. In some instances, these professionals form a multi-disciplinary team (MDT). The aim of this study was to explore the experiences of Society of Master Saddlers Qualified Saddle Fitters (SMSQSF) of working with other professionals and to understand the nature of inter-disciplinary working from SMSQSF perspective.

Semi-structured, one-to-one online interviews with fourteen SMSQSF were completed. Areas explored were: the nature of the participants client base; the frequency and nature of their interactions with other professionals; their perceptions of horse owner expectations of an MDT approach; any benefits, challenges and barriers to an MDT approach within an equestrian setting. Interviews were video and audio recorded (MS Teams), transcribed verbatim (Otter ai) and imported into qualitative data analysis software (NVivo, version 12). Data were analysed using thematic analysis. Six themes were identified: 1) effective communication, 2) multidisciplinary expectations, 3) horse welfare, 4) professionalism, 5) relationships, 6) working together. Communication was recognised as a crucial component of an effective MDT. Most participants valued and desired a MDT approach. They felt they had a key role to play within the equestrian MDT, not only in prevention of deterioration in horse welfare, but in improvement in functionality and performance of the horse-rider partnership. Effective MDT working was also seen as having benefits to SMSQSFs and other professional stakeholders alike, although time and financial constraints were identified as barriers to MDT working. The role of the horse owner within the MDT was unclear and potentially complex, and this, and other factors such as professional identity of the SMSQSF, personal relationships and input from others outside of the MDT team were identified as challenges to effective MDT working.

This present study found that SMSQSF experience similar benefits and challenges to an MDT approach as seen in human healthcare settings. The role of the horse owner, communication and professional recognition are indicated as pivotal to MDT effectiveness in achieving optimal saddle fit.

Prevalence of functional trait & distal limb asymmetries & their effects on equine performance: A synopsis of the story so far?

Dr Kirsty Les'niak

Within a range of species, including humans, structural asymmetry has been proposed as an indicator of genetic quality through association with factors including disease resistance, mate choice and performance potential. Whilst research into equine biomechanical asymmetries is a rapidly expanding field, there is comparatively little research regarding equine structural asymmetries. The overarching aims of the research being presented includes an attempt to establish the existence, direction and magnitude of distal limb asymmetries within both competitive and non-competitive equine populations. Furthermore, the findings have provided a preliminary picture as to whether a 'normal' level of directional asymmetry exists within the distal limb and hoof of the horse, irrespective of competitive standing.

Previously published literature postulated associations between equine bilateral trait asymmetries and either the locomotor directionality of the competitive discipline, or indeed their associated selective breeding strategies. As similar patterns of distal limb asymmetry have been confirmed in event horses and leisure horses, the discipline demand theory of asymmetry development is refuted. The comparative patterns of asymmetry across differing population implicates a species level presence of asymmetry, as opposed to a breed, or discipline level association. However, the findings indicate that whilst bilateral asymmetry is present at a species level, horses with a proven superior athletic ability present with a greater affinity for symmetry. The asymmetries investigated are not of a magnitude likely to have a significant negative, short term effect on biomechanics. Instead, they are theorised to reflect internal disturbances; of what, and at what structural level, is yet to be determined.

Furthermore, dynamic form of the equine hoof does not compensate for distal limb asymmetries; Instead, conformation of the hoof is impacted by the loading imbalance caused by the asymmetries. To compound this further, asymmetries of the hoof increase within an increase in the size of the horse, suggesting larger horses are subject to both greater, and more imbalanced loading forces; an area of significant concern for both performance and welfare.

Research Presentations: Veterinary Nursing

It's not all about the Vet! How the waiting room environment impacts canine fear-related behavioural expression

Izzy Riley

Canine patients commonly express fear-related behaviour while in practice. Prior research predominately focuses on the efficacy of interventions, such as DAP, often without consideration for surroundings. This study aimed to identify and evaluate the influence environmental factors in the waiting room may have on the expression of fear-related behaviours in canine patients visiting a veterinary practice. Convenience sampling was utilised to obtain environmental data from 21 practice waiting rooms and 54 dogs aged one to 10. Of the 21 practice five also enabled behavioural data collection via a modified ethogram at the beginning and end of routine consultations. Environmental variables and behavioural data were analyzed to identify significant relationships and differences. There was a significant difference identified between pre-post consultation behavioural scores ($Z = -3.821, p < 0.001$), demonstrating a reduction in fear at the end of consultations. Environmental aspects of each practice were scored and analysed against behavioural data, a weak negative correlation ($r_s = -0.27, p = 0.050$) between environmental scores and pre-consultation behaviour scores were identified. A weak positive correlation ($r_s = 0.28, p = 0.035$) between slippery flooring and increased fear was also found. No demographic variables were identified as statistically significant. A significant reduction in ethogram element observations were also identified across eight factors, including trembling and reluctance to move ($p < 0.001$). Dogs consistently demonstrated fear during the pre-consultation phase, and this reduced during the exiting of the consult room across all elements measured, except trying to escape. Flooring, negative aspects of the environment and high levels of noise and footfall should be considered and manipulated where possible to promote a positive experience aimed specifically at patients. Seat spacing and species-separated waiting areas are an important aspect of design and should be incorporated where possible, however the physical distance from one to the other requires further review. The influence time spent in the waiting area has on patients should be further considered to assess if habituation alters the occurrence of relaxation behaviour. Further research should utilise a stratified sampling method to ensure variance between patients and practice designs. This research has provided proof of concept for this methodology and field of enquiry, providing scope for further research of this kind on a larger sample population of practices and patients.

**To investigate how veterinary professionals are affected by companion animal euthanasia,
in the UK in 2022**

Hannah Poulton

The experience of euthanasia is seen as a privilege amongst the veterinary profession. With a suicide rate higher than the national average, it is important to evaluate the effects of euthanasia on veterinary professionals. To understand whether this potential moral stressor is a cause for a decline in mental health, a qualitative study was completed. The aim was to investigate how veterinary professionals (veterinary surgeons and veterinary nurses) in the UK are affected by companion animal euthanasia. The objectives were to identify what effects euthanasia is perceived to have on the veterinary professional, to identify whether the circumstances of euthanasia affect the response of the veterinary professional, to identify whether job role affects the response of the veterinary professional and to investigate how veterinary staff feel about support provided for coping with euthanasia in practice.

Six interviews were conducted with veterinary nurses and veterinary surgeons, with open questions and a scenario-based discussion, where participants ranked scenarios according to the effect that each would have on them. Data were analysed thematically. Results found that the circumstances surrounding the euthanasia affect the veterinary professional in different ways. This study found that some circumstances were 'justified', and some were 'unjustified'. Moreover, job role affects the way the veterinary professional views the euthanasia. Veterinary surgeons tended to have a more clinical view on the euthanasia, understanding why it is taking place for the benefit of the patient. Veterinary nurses and non-clinical staff had a more emotional approach, acting as support for the client, the patient, and the veterinary surgeon. Euthanasia is a potential catalyst for a decline in the mental health of veterinary professionals. The study suggests that more mental health support may be needed to help veterinary professionals to cope with this procedure, such as targeted continuing professional development or interventions at early stages in veterinary education.

An Investigation into Clinical Coaching from the Student Veterinary Nurses Perspective in the UK

Megan Rice

All student veterinary nurses (SVN's) spend time in an accredited veterinary practice as part of their training, in order to gain competency in Day One Skills for Veterinary Nurses as required by the Royal College of Veterinary Surgeons. During this time SVN's will be allocated a clinical coach to help guide and assess them. Whilst published literature on clinical coaching is widely available from the perspective of clinical coaches, there is very limited research investigating this from the SVN's perspective. This research explored the practice of clinical coaching from the perspective of SVN's, including factors such as the amount of time students estimate they spent with their clinical coach, key qualities for a clinical coach to possess and the expectations and reality of the support students received. To achieve this, an explanatory sequential mixed methods approach was used. A total of 372 responses to a quantitative questionnaire were collected and 6 interviews were conducted to collect qualitative data.

Overall, 60% of students felt they did not spend enough time with their clinical coach in practice, this being attributed to the busy nature of practice resulting in clinical coaches having other responsibilities and a lack of scheduled time with students. Furthermore, a positive correlation was identified between students who described having regular one-on-one meetings and those who estimated they spent enough time with their clinical coach in practice. Throughout the questionnaire and interview responses, approachability, understanding, friendliness, and patience were identified as key qualities. Additionally, 52% of respondents identified that their clinical coach was their role model in practice. A positive correlation was identified between the frequency of one-on-one meetings and students whose expectations of support were met in practice. SVN's interviewed identified the value of spending time with their clinical coach, which resulted in them feeling supported. A feeling of inferiority was identified as a barrier to SVN's advocating for further support in practice.

Companion animal neutering: Exploring the purpose, process and power dynamics of consent

Carol Gray

In contrast to the vast and critical literature on sterilisation in the human medical sphere, neutering in the veterinary arena has not been subject to widespread social scientific or ethical study. Indeed, the neutering of companion animals is seen by many veterinary professionals as uncontroversial, forming part of the programme of 'preventative treatment' sought by any responsible animal owner. In the human field, sterilisation is viewed as particularly contentious when performed on patients lacking consent: in the animal field, patient consent is, of course, lacking. This comparison raises questions about how informed consent is achieved for animal neutering, where decisions must be made, principally to protect animal welfare, by those involved in providing care. This study utilised an interpretive description methodology, involving thematic analysis of qualitative interviews with veterinary professionals, representatives of professional organisations and companion animal owners, together with observations of consultations in a large veterinary practice in the UK, to investigate consent to animal neutering. The analysis suggests that, first, the purpose of informed consent in veterinary practice is multifaceted and goes beyond the idea of agreement; second, that consent is best understood as a process rather than an event, raising questions about how it is managed, by whom and when; and third, that an understanding of informed consent requires recognition of the power dynamics at play in any clinical encounter. The fundamental questions raised by animal neutering are elided by processes of obtaining consent which construct the procedure as routine and non-risky. The implication is that the somewhat uncritical professional endorsement of neutering is problematic, and the recommendation is that 'consent consultations' should address the fundamental issue of why the animal is being neutered.

Research Presentations: Animal

Animal-visitor interactions in semi-contrived tourism settings: a study of 'Meet & Greet' in UK zoos

Polly Doodson

Animal-visitor interactions are common in captive-wildlife tourism settings, but there is a lack of research exploring what is on offer. This study defines and examines 'Meet & Greet' animal experiences in UK zoos within the context of the wider wildlife tourism industry, considering the differences between semi-contrived and fully-contrived interactions. From quantitatively analysing the websites of members of the British and Irish Association of Zoos and Aquariums, the results show that Meet & Greets are frequently offered by zoos in the UK, but that these zoos do not always explicitly describe what the interaction involves. We propose that there is a need for more research on the impact of Meet & Greets, particularly looking at how zoos advertise these experiences and how they are perceived by potential participants, as there is a danger that accredited zoos could inadvertently be promoting the exploitation of animals for photo prop opportunities in other tourist settings.

An Investigation into the Public Perception of the Reintroduced Eurasian Beaver (*Castor fiber*) in Great Britain.

Carys Player

A third of mammals in Great Britain at risk of extinction are within the order Rodentia; a notable species being the Eurasian beaver (*Castor fiber*), who was reintroduced back into British ecosystems after anthropogenic hunting led to its extinction. Despite their behaviours having ecological and socio-economic value, they sometimes cause flooding to production land, disruptions to fish-migration and dangerous alterations to landscapes; stimulating human-beaver conflict. Limited studies evaluate the public perception on rodents and beavers, related protective legislation and the relationships between these subjects and public demographics, post-reintroductions in Wales, most of England, and the recent adaptations to the Conservation of Habitats and Species Regulations (2017). To generate a comprehensive understanding of public perception- surrounding native rodents, beavers, and extent of knowledge surrounding their reintroduction and legislation- a short, national survey was distributed to the British public using social media, addressing gaps in research. The survey received 234 valid responses from extensive and representative demographics. Overall, opinions on beavers and rodents was positive (70.5% and 57.7% respectively), with animal care and education occupations and students being more likely to report positive perception towards beavers; whilst, negative opinions on native rodents were mostly influenced by association with invasive species. Although the Habitat Regulations (2017) was perceived as positive within respondents, there was an overall consensus that rodents and beavers require stronger protective legislation. Most respondents reported having knowledge of the benefits of reintroduction, however the results were subjective to what the respondent believed they know, therefore an accurate evaluation of correct knowledge within the public is required. Further research is required to investigate influence occupations have over donating to charities and participating in citizen science, as education and construction occupations were less willing to make such contributions, despite general great interest which should be utilised to generate funds and data in future.

Effect of Restraint Type on Intraocular Pressure and Respiration Rate of Brachycephalic and Dolichocephalic Dogs

Megan Bailey, Melissa Packer and Alison P. Wills

Dogs are one of the most popular pets in many countries and for them to gain appropriate exercise, many owners opt to walk them on a leash. Despite health and welfare concerns, brachycephalic breeds remain popular as pets with limited research investigating the best restraint type for these animals. This study aimed to test the effect of a collar and harness during stationary and exercise conditions on the intra-ocular pressure (IOP) and respiration rate (RR) of brachycephalic and dolichocephalic dogs. Twenty-four healthy dogs, both brachycephalic and dolichocephalic, were recruited for the study and underwent stationary and exercise conditions in two restraint types in a within-between subjects design. IOP was measured by rebound tonometry and RR was measured using clinical and visual methods by the same experimenter. Just wearing a collar in a stationary condition increased IOP in brachycephalic dogs ($p < 0.05$) but not in dolichocephalic dogs ($p > 0.05$). Exercising in a collar increased IOP for both groups of dogs ($p < 0.05$) whereas exercising in a harness did not affect IOP for either group ($p > 0.05$). RR increased in exercise conditions for both restraint types in brachycephalic dogs ($p < 0.05$), with no difference between collar and harness ($p > 0.05$). Data suggest that collars may elevate IOP during exercise of all dogs and also during stationary conditions for brachycephalic breeds. Owners need to be conscious of the most appropriate restraint for their dog to avoid deleterious effects on IOP and RR.

Furred and feathered friends: how attached are zoo keepers to the animals in their care?

Vicky Melfi

Keeper-animal relationships (KARs) appear to be important in zoos, since they can enhance the well-being of both the animals and the keepers, can make animal husbandry easier, but conversely might risk inappropriate habituation of animals and possible risks to the safety of keepers. It is, therefore, important to know more about the variables involved in relationship formation. Here we use a modified version of the Lexington Attachment to Pets Scale (LAPS) to measure the strength of KARs between keepers and animals in their care, both in the zoo and in the home. LAPS questionnaires were completed by 187 keepers in 19 different collections across three countries. LAPS scores for attachment to zoo animals (ZA) were significantly lower than for pet animals (PA). There was no significant difference in ZA scores between different taxa, but there were significant taxon differences between PA scores. There were significant differences in both ZA and PA scores between different collections. Female respondents scored more highly than males for both ZA and PA. Multiple regression revealed that location, gender and time spent with animals were significant predictors for ZA, while only gender and taxon were significant predictors for PA. It was concluded that PA scores were comparable with those for the general public, and reflected strong attachment of keepers to their pets, while ZA scores, although also reflecting attachment, were influenced by institutional culture differences and perhaps an acceptance of the ambiguities inherent in the relationship.

Link to the paper:

<https://pure.hartpury.ac.uk/en/publications/furred-and-feathered-friends-how-attached-are-zoo-keepers-to-the->

Research Presentations: Sport and Exercise

Is 11v11 the Optimal Match Format to Develop the Technical and Physical Attributes of Young Soccer Players Within the English Professional Academy System?

Gerard McGinty and Dr Martin Longworth

The aim of this study was to determine whether the currently recommended 11v11 playing format is the optimal way to develop the technical and physical attributes of elite early youth development phase soccer players. To achieve this aim, we investigated whether altering the area per player (ApP) of a small sided game (SSG), within a competitive environment, influences the physical and technical outcomes produced. Forty-eight young players within the U13 and U14 age groups of two different category 3 EPPP English academies volunteered to participate in the study. Data was collected on the participants during competitive fixtures across the 2022-2023 English football season. A total of 10 technical and 16 physical variables were measured. Technical data was collected using a Veo video camera (Veo Cam; Veo Technologies, Copenhagen, Denmark) and each attempted technical action was then recorded using Longomatch analysis software (Fluendo SA, ver 1.10.6, Barcelona, Spain). To measure the physical output of the participants, Catapult 10Hz GPS units were used (Vector S7; Catapult Sports, Melbourne, Australia). Small ApP pitch sizes produced a significantly higher number of passes, shots at goal and total offensive technical actions than medium and large ApP pitches. The physical variables showed that medium ApP pitches produced a significantly higher physical demand than small ApP pitch sizes. Although few significant differences were found between the medium and large ApP pitch sizes. It is therefore recommended that coaches and practitioners use a combination of small and medium ApP pitch sizes when looking to improve technical and physical attributes of early youth development aged players within a competitive environment.

The average and 5-minute high intensity demands of trained female football players and acute fatigue responses from match-play.

Andrew N. Hearn, John F.T. Fernandes, Kirsty M. Hicks, Hannah Clarke & John K. Parker

Participation in female football has grown substantially and is accompanied by a greater number of competitions and leagues at every level (Martinez-Lagunas, Niessen and Hartmann, 2014, *Journal of Sport and Health Sciences*, 3, 258-272). It is important to improve understanding of competition demands and responses along the development pathway (e.g. collegiate level). Therefore, the aims of this study were to 1) quantify the average and 5-minute high intensity phase (HIP) match-play demands of collegiate female football players and 2) quantify the acute fatigue response elicited from competition. With institutional ethical approval granted, twenty-one trained female football players (age 20.0 ± 1.3 , mass 64.9 ± 12.9 kg) volunteered to take part in the study with 19 being included in the acute fatigue investigation. Participants completed 3 trials of a countermovement jump (CMJ) on a force plate (Forcedecks, Australia) pre- and post-match to quantify fatigue responses. Global positioning systems (Catapult, Australia) and heart rate monitors (Polar, Finland) were used to quantify external and internal loads during match-play. Linear mixed models with fixed and random effects were used to analyse match data and compare between positions. Forty-five and 63 observations were used for the average and HIP demands. CMJ data ($n=35$) was analysed using paired samples t-tests, with thirty-five observations being analysed. Players covered total distances of ~ 8315 , with 509m covered at high speed and 155m covered at sprint distance; defenders covered less distance than other positions ($P < 0.001$). During 5-minute HIP's, no differences were observed for accelerations and PlayerLoad between positional groups ($P > 0.05$). Attackers covered more high-speed running ($P = 0.005$) and sprint distance ($P = 0.019$) than central defenders and midfielders ($P = 0.012$; $P = 0.017$). Comparisons between thirds showed evidence of transient fatigue within match-play ($P < 0.05$) however, fifteen of the eighteen CMJ metrics analysed did not change post-match ($P > 0.05$), though concentric peak force relative ($P = 0.035$; $d = 0.28$), mean power relative ($P = 0.034$; $d = 0.25$) and RFD relative ($P = 0.033$; $d = 0.29$) were significantly different compared to pre-match. These data indicate that HIP's are significantly greater compared to average match intensities and further highlight the importance of using HIP to condition female football players for match-play. The stability of CMJ performance pre- to post-match supports the notion of transient fatigue. Moreover, coaches can use this data (i.e. transient fatigue) to inform tactics in female football (e.g. substitutions).

The effects of the menstrual cycle on performance markers in female rugby players

Hannah Clarke, John K. Parker, John Fernandes, Kirsty Hicks, Andrew Hearn

There is no consensus as to the effects of menstrual phase on sports performance. Moreover, studies only include analysis from a single menstrual cycle phase; as a result a longitudinal analysis is needed (Helm, McGinnis, Basu., 2021 Remero et al., 2020 and Keane et al., 2015) , Therefore, the aim of this study was to examine the impact of the menstrual cycle on highly trained female university rugby players across two menstrual cycles. Following institutional ethical approval, 25 female- university rugby players (18-25 years) participated in the investigation. Participants took part in their normal schedule consisting of on pitch training, strength and conditioning sessions, and competition once a week. Each participant completed a daily online monitoring questionnaire focused on menstrual cycle phase and symptoms as well as oral body temperature. To monitor fatigue and recovery participants took part in 3 countermovement jumps and 3 push ups on the Force Decks (FD4000, Vald Performance) 2 days pre-competition, immediately before training, and 2 days post-competition. A variety of metrics were recorded; jump height, peak force, landing forces, limb stiffness, concentric peak force, eccentric peak force. After competition and training participants completed a load monitoring form including duration and rating of perceived exertion (RPE) (Borg., 1998). The menstrual cycle data was analysed and categorised into 4 different phases: Early Follicular, Late Follicular, Ovulation and Mid Luteal based upon a consensus statement in research proposed by Elliot Sale et al., 2020. The performance metric data was analysed by comparing the peak force (N) from both upper and lower body to normative data taken at the start of the season. In addition, a regression analysis was used to compare peak force (N) with the menstrual cycle timepoints. The results highlight that the menstrual cycle can impact fatigue markers of the upper body significantly more than the lower body. Future investigations should focus on the menstrual cycle across a season and determine the most effective way of implementing menstrual cycle tracking as well as fatigue monitoring into high level female sport. Data was analysed using a repeated measures ANOVA (performance/training load x menstrual cycle phase), with post hoc t tests. A regression analysis was conducted to establish the influence of training load and menstrual cycle phase on performance markers. These data will have important implications for female rugby union players as it will provide a comprehensive overview as to the impact their menstrual cycle has on different types of training, ie pitch training and gym session rather than just focusing on single type of training. It will allow individuals to gain an understanding into whether different recovery lengths are required at different time points in the menstrual cycle to allow for sufficient recovery from exercise to in turn prevent injury. Overall, it will provide a greater comprehension of the relationship between a female athlete and their menstrual cycle across a greater time period.

The impact of sport scheduling on sleep duration and social jetlag in student-athletes: A pilot study

Sandy M. B. Wilson, Stephen B. Draper, Martin I. Jones, and John K. Parker

Introduction: Previous research indicates that student-athletes display poor sleep characteristics in response to sport-related and academic-related risk factors. It is known that sleep duration is reduced when preceding early morning training or following evening matches in elite athletes, and can result in inconsistent sleep placement known as social jetlag. However, the impact of sport scheduling on student-athlete sleep is unclear. Therefore, the aim of this study was to examine the impact of sport scheduling on sleep outcomes in student-athletes.

Methods: 12 student-athletes in the University 1st Rugby Union team wore GENEActiv actigraphy monitors overnight for a 2-week continuous period and completed sleep diaries. Raw accelerometry data was processed using the GGIR R-package to assess sleep outcomes. Training and match timings were retrospectively collected from coaching staff.

Results: Independent t-tests revealed that sleep on nights preceding early morning training (before 7am) had a shorter sleep duration of 0.7hr compared to non-training mornings (6.5hr vs 7.1hr, $p = .004$, $ES = .488$, 95%CI [.157, .818]), alongside earlier sleep onset and waketimes. Nights following evening matches had a shorter sleep duration of 1.2hr (5.8hr vs 7.0hr, $p < .001$, $ES = .860$, 95%CI [.355, 1.361]). Social jetlag (SJL) as a consequence of early morning training was present in all athletes (SJL (mean \pm SD) = 1.0 \pm 0.6hr, but only 50% of participants when corrected for sleep debt (SJL_{SC} (mean \pm SD) = 0.4 \pm 0.6hr).

Conclusions: The placement of early morning training and evening matches has a detrimental effect on sleep outcomes in student-athletes. Sleep placement between days is inconsistent, but it is unclear whether this is a product of social jetlag or sleep debt accumulated as a consequence of sport scheduling. The adjustment of training timings, particularly on days around competition, may facilitate better sleep practices within student-athletes.

Research Presentations: Agriculture

Achieving Net Zero through farm level carbon assessment

Wing Kwan Pauline Ng

In order to mitigate climate change the world needs to reduce greenhouse gas emissions and seek ways to sequester carbon dioxide. In the UK, about 70% of the land area is used for farming and management practices can influence the ability of land to store carbon. The aim of this study was to measure soil carbon and nitrogen to assess differences due to land use. The soil organic carbon (SOC), total nitrogen (N) and clay contents and plant nutrient content for 30 fields were measured using real-time near-infrared spectroscopy (NIRS) at Hartpury Farm. The Fields were used for arable cropping, temporary grassland, permanent grassland or woodland. The correlation between soil and plant nutrients were assessed. In this study, thresholds of SOC/ clay ratio of 1/8, 1/10 and 1/13 were used to categorise 'very good', 'good', 'moderate' and 'degraded' soils under different land use. The SOC across fields was found to be 'moderate' to 'very good' condition. Further on-ground measurements and analysis of carbon fluxes during seasonal and land use change will explore potential relationships between above and below ground changes in plant and soil carbon due to land management.

A deep learning based vision model for cows' behaviour classification

Misbah Ahmad

Dairy cows play a crucial role in the global economy by supplying meat, milk, and various dairy products. As the demand for these products continues to rise, farmers are exploring innovative methods to enhance the efficiency and productivity of their operations. In this context, the application of deep learning and computer vision technologies to automate the monitoring and surveillance of cows has shown significant promise. This poster aims presents a novel deep learning-based vision model specifically designed for the classification of dairy cows' behaviour. The proposed model is trained on a real dataset comprising images capturing cows' standing and lying behaviour. Leveraging the power of deep learning algorithms, the model is able to analyse and classify these behaviours accurately. The classification accuracy of the developed model has been evaluated at an impressive 80%. By accurately classifying cows' behaviour, farmers can optimize their management strategies, ensure animal welfare, and enhance overall farm performance. The model's high classification accuracy showcases its potential for practical implementation in real-world dairy farming scenarios.

Impact of different Nitrogen fertiliser application methods on grass yield and nitrogen use efficiency within a UK dairy grazed trial area

Brian Evans and Torin Nicolson

Changes in food consumption habits and world population have driven the requirement for higher Nitrogen (N) rates to obtain higher crop yields. Recent increases in fertiliser cost have generated changes in N fertiliser use, with producers seeking more efficient and cost-effective application methods. One important development is foliar N application onto grass. Literature shows that foliar N has a greater Nitrogen Use Efficiency (NUE) than granular N, allowing for reduced application rates. However existing literature is based either on pot experiments; outside the UK or not inclusive of frequent biomass removal, such as grazing.

This project was designed to assess foliar N performance compared to granular N on grazed grassland. Farming Connect's 'Foliar Feed for Grassland' project ran from 2019 to 2021, aiming to enhance previous relevant literature. Three trial areas receiving different N fertiliser regimes were set up: conventional (granular), foliar and control (no N application) and were commercially grazed by dairy cattle. Dry Matter (DM) growth was measured weekly between March and October, fortnightly in February and November, and monthly in December and January using a sward plate meter, calculating yield per hectare (kgDM/ha). The clover in the sward was considered in the results and its impact on the production of the sward. The trial showed conclusively that the NUE of foliar N was 570% greater than that of conventional N application, allowing reduced N usage to obtain a similar yield. The average foliar application DM yield was 0.8% (0.1tDM/ha) greater than the conventional yield, despite the N application rate averaging 166kgN/ha less. Clover populations recovered from suppression by granular N application, from 5% cover up to 20% in the foliar and control areas. There was a 71% decrease in financial costs through foliar N, whilst achieving competitive yields. Additionally, reductions in N use will consequentially reduce agriculture's greenhouse gas (GHG) emissions whilst upholding and potentially increasing yields.

Investigating faecal bacterial communities in pre-weaned Holstein dairy calves and the influence of management events.

Aisling Carroll, Matthew D Hitchings, Emma Bleach, Lisa K Williams and Matt Bell

Introduction: From birth, a calf's gastrointestinal tract (GIT) is rapidly colonised with a large variety of microbes (Schwaiger,2020). The diversity and composition of bacteria that colonise the GIT can have a significant impact on growth and development, which can influence nutrient metabolism, pathogenic defence, immune modulation, resistance/susceptibility to infection and production outputs (Diao, Zhang & Fu,2019). The changes experienced by a calf prior to weaning could possibly disrupt GIT microbes (Meale et al., 2017b). The aim was to examine if faecal bacterial community composition was influenced by routine calf management events.

Methods: A total of 36 dairy Holstein heifer calves were used, born at Hartpury Home Farm between July-September 2020. Calves were separated from dams within 2-4 hours after birth and placed in individual pens within the calf unit. Colostrum was fed at 10% birth weight followed by 4L of milk replacer feed daily until weaning at 82 (\pm 1.1) days. At 9 (\pm 1.0) days calves were moved to group pens (n=14). Calf starter was offered ad libitum. Faecal samples collected were focused 24hrs pre and 72hrs post key management events (group housing, disbudding and weaning). DNA was extracted and 16S rRNA gene V4 regions were sequenced in an Illumina MiSeq, using a 500 cycle V2 kit. Sequences were processed using mothur (v.1.43.0) and Alpha diversity (AD) indices comparisons amongst different time points were performed in R (Version R-4.2.1).

Results: AD indices, observed species richness (sobs) and Inverse Simpson diversity was found to be different amongst the sampling timepoints, showing progressively higher values from wk0 - wk14 ($P < 0.05$). AD analysis also revealed that samples clustered into three distinct groups according to their respective time of collection: day 9, day 50 and day 82. Sobs increased across time points from birth, where a significant difference ($p < 0.001$) was present between the clustered sampling groups. There was no significant difference observed in or between groups within the sampling cluster ($p > 0.05$). There was no significant difference in community diversity ($p = 1.00$) before and after grouping. From grouping, diversity increases over time demonstrated by a significant difference between housing and disbudding ($P < 0.001$). A significant difference ($p < 0.05$) was also seen in the level of diversity before and after disbudding, and before and after weaning.

Discussion: Dramatic changes were observed at birth, group housing and disbudding. Samples at birth were highly variable, likely influenced by maternal, environmental and colostrum factors (Klein-Jobstl et al.,2019). Firmicutes were the most dominant phylum in pre and post housing move, with Actinobacteria increasing post-housing move which could be as a result of an impact of feeding and drinking behaviours (Owusu-Asiedu et al., 2006; Meale et al., 2017a). Weaning age has been seen to result in a decrease in ruminal bacterial diversity, evenness and richness, which consequently has been followed with an increase in faecal bacterial diversity, richness, and evenness post-weaning (Meale et al., 2016).



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Conclusion: The findings from this study have suggested that disbudding stress and the age of weaning could play a key role in the progressive development of microbial communities. The relationship between microbial diversity and the subsequent success of the calf in terms of its health status and average daily gains remains to be determined.



The Hartpury Sports Business Hub

The Hartpury Sport Business Hub (HSBH), established in 2020 as a Community of Practice seeks to connect students with sport and business organisations. Through connection, students gain opportunities to engage in 'real world' research, jobs and placements, which have impact both locally and nationally. The Hub was conceived alongside the development of a MSc Sports Management where students are placed within a live, authentic project assessment experience. Furthermore, the HSBH has been closely mapped to industry leaders CIMSPA (Chartered institute for Sport and Physical Activity) and their 'Senior Manager' professional standards giving students access to additional content, industry links and international portability via a partnership with Europe Active/EREPS. This year, the hub team received £116,000 from the Gloucestershire Shared Prosperity fund to address three key themes of; 'Community and Place', 'Support for Local Businesses' and 'Supporting People and Skills'. Consequently, we are now in a position to be able to create consultancy projects and training events which will harness expertise to enhance grassroots sport and business performance at community centres in Gloucester.

Website: <https://www.hartpury.ac.uk/commercial/sports-business-hub/>

Email: SportBusinessHub@hartpury.ac.uk



How can the Hub support you?

What is the hub?

How does the Hub support your organisation?

So... how does it work?

Contact: Alex.Kay@hartpury.ac.uk

What do we offer?

Consultancy projects

Digital Marketing

Placements

The Hartpury Sports Business Hub

The HSBH is a communities of practice and service provider that connects students to industry opportunities and organisations.

Why?

The Hub offers services and support to your organisation, in the shape of **placements, consultancy projects, social media management** and much more!

You will help shape the future of industry professionals!

There are 4 stages to a succesful partnership:

1. Initial meeting to discuss the type of service required
2. **Submit** your project requirements to a member of the HSBH team and sign the **relationship agreement** to be come a **member** of the hub.
3. **Support** the student as they engage with your organisation.
4. **Receive** the findings from the service and product!

What do you need to provide?

An area or idea that you want the student to tackle!

A point of contact at your organisation for the student.

What do you receive?

An independent researcher carrying out a rigorous review of a project.

8000 word report.

Presentation and infographic.

What do you need to provide?

Access to your social media pages.

A point of contact at your organisation for the student.

What do you receive?

-Two students working on Social media **content creation** and management. This will be a minimum of **3 weeks worth of content.**

-Recommendation for continued growth via a written report and presentation.

What do you need to provide?

A point of contact at your organisation for the student.

What do you receive?

- A student working for you for 150 hours gaining valuable experience and insight into your industry.

- A way of influencing the next wave of graduates.

What are the timelines?

September

October

November

December

January

February

March

April

May

June

July

Consultancy project

Digital Marketing Support

Undergraduate Dissertation

Placement

Evaluation

Professional Support

Current Consultancy (MSc) projects supported through Hartpury Sports Business Hub

Jeremy Holt – Developing the RISE project: A programme framework aimed at individuals not in education aged 16 - 24 to upskill and boost the employability of young people in Bristol

Dan Bugg – An evaluation into the TrainAsONE AI powered running App that constantly adjusts your training plan according to you, your data and your goals.

Arabella White – An investigation into Female participation levels within golf at Hilton Puckrup Hall Hotel

Henry Phillips – A needs analysis of Gloucester City based community sport organisations that can be supported by the services of the HSBH.

Giles Winthrop & Reece Swain – To develop commercial and financial opportunities in relation to the new golf range facility being constructed at the Hartpury sports Academy.

Bevan Howells – The impact and effectiveness of the Be Active Wales fund on community clubs

Tom Handley – Cinderford Town AFC – A business plan to support club relocation and it's future viability.

Grace Simpson - What is in a 'Name': how does Gloucestershire County Cricket Club create more cut-through in the city of Bristol.

Research Posters

The visitor effect on captive raptor behaviour at a falconry centre in the UK

Ellie Martin

The visitor effects on captive animals have been researched for decades, yet most literature has centred around mammals, with no research into the visitor effect on raptors. Due to evidence of positive, negative, and neutral animal perceptions on visitors being present in existing literature, with some significant changes in behaviour and within-enclosure location, the investigation of visitor effects on raptors was essential in providing knowledge on animal welfare, visitor experiences, and to contextualise future research. Therefore, the objectives of this study were to not only investigate behavioural changes between low and high visitor density, but changes to location within the aviary, and how their temporal niche may influence any possible visitor effects. This study utilised a quasi-experimental design, investigating 12 captive raptors from three diurnal and three nocturnal species, whereby continuous observations of behaviour were analysed during periods of low and high visitor density. The only behaviour which saw a significant change in duration was locomotion, which decreased under high visitor density. This decrease is thought to be a direct result of a significant increase in nest box usage, and a significant decrease in time spent at the front of the aviary under high visitor density. Neither nocturnal nor diurnal raptors were more effected by visitors than the other, which is likely a result of habituation. These results are not immediately indicative of compromised welfare within the raptors, enabling a likely positive visitor experience. Nonetheless, this study was limited in similar ways to previous visitor effect studies, such as a small sample size, a lack global generalisability, and the presence of potential extraneous variables. This highlights the importance of future visitor effect studies in raptors needing to operate on a widespread, species-specific, and multi-institutional level to facilitate the most comprehensive results.

Does order and location of movements within Olympic GP Freestyle Dressage influence movement scores?

**Jane Williams, Lorna Cameron, Russell MacKechnie-Guire, David Marlin
and Matilda Edmund**

Freestyle dressage tests are designed by the rider and combine 16 compulsory movements with music. Individual movements receive a quality score (0-10), which combine to form the technical score. Additionally, the performance receives an artistic score considering the choreography and the order that movements occur. The final score is a combination of technical and artistic scores. When designing freestyle tests, consideration of where and when movements are performed is vital to optimise performance; despite this, performance analysis is limited in dressage. This study explored if the order movements occurred and location performed were associated with superior technical movement scores. Notational analysis identified the order and which quarter of the arena movements were performed in the Tokyo Olympics GP Freestyle test, excluding entrance/finish halts, for the 18 combinations competing. Chi-squared analysis assessed if associations occurred between the most frequent order and arena quarter movements were performed in, and final movement score. Eight movements (53%) scored their highest mark when performed outside of the most frequently observed order and quarter: collected and extended walk, half-pass left and right, one- and two-time changes, and left and right canter pirouette. While the highest marks for seven movements (47%) occurred when performed in the order and quarter they were most frequently observed: extended trot and canter, passage, piaffe and piaffe-passage transitions. Although, no significant associations between the most frequent order and quarter each movement was performed and final movement score, tactically where and when movements are performed could represent marginal gains in elite dressage scoring.

**Preliminary findings of prioritisation of challenges to supply water for dairy cows:
Consensus of dairy farmer and expert opinion**

D Teixeira, B Ramos, MC Yunes, M Bell, A Stratakos, D Enríquez-Hidalgo

Background

Global warming is likely to have a major role on water availability around the world. As a consequence, fresh water resources will become scarce and less evenly distributed throughout the year, causing periods of water shortage. Therefore, it is crucial to assess practices that will help to improve water use efficiency in dairy systems.

There has been a growing interest in understanding the views and knowledge of different stakeholders working within the dairy industry on different management and practices. To our knowledge, there is no research that evaluated dairy farmers and expert attitudes regarding the water supply for dairy cows, either in indoor and outdoor systems, neither exploring their concerns regarding the potential effect of climate change on dairy cows water consumption.

Objective

The objective of this study is to obtain a consensus among dairy farmers and experts (specialists in dairy production and dairy cattle behaviour and welfare) on the priority challenges to water supply for dairy cows using the Delphi method.

Materials and methods

A comprehensive list of aspects/challenges to supply water for dairy cows was completed based on the literature and an online survey was prepared to ask participants to score the aspects as a research priority challenge to supply water for dairy cows, using a Likert scale (1 to 5). Round 1 - The survey was circulated in social networks targeting to invite dairy farmers, while experts were invited using their email available using their institutional platform. Data were reviewed and the aspects were ranked according the scores given by participants.

Round 2 – Participants from round 1 were invited to participate in online focus group discussions. During the meetings, the aspects were presented to them ranked according to the scores from round 1. They were asked whether they agree or disagree with the ranking order and to give their reasons for agreement or disagreement. Participants were also asked to reassess the same aspects, to allow evaluating the effect of group discussion on getting a consensus on the priority challenges.

Preliminary findings

Eight farmers and 29 specialists in dairy production and dairy cattle behaviour and welfare responded to the online survey. Participants live and/or work in UK, Brazil, Nigeria, New Zealand, United States or Ireland. The two aspects that had the highest score given for the level of importance were “mitigation of heat stress in dairy cows” and “shade availability”. The two aspects that had the lowest score were “automatic systems to record water quality” and to “record water intake”. Focus group meeting are currently on going.

The preliminary findings indicate that getting a consensus of dairy farmers and experts opinions will also help to guide future research to address issues associated with water supply for dairy cows by identifying the gaps in knowledge where scientific research is needed.

Observation and Immersion as a Pedagogical-Strategy for developing Micro-political Literacy

William Pettipher, Dr Martin Longworth and Thomas Legge

The messy socio-political realities of working life are often a shock to neophyte practitioners moving from formal education to real world practice. Accruing or protecting desirable conditions for working life such as autonomy, resources, or protection against vulnerability, is a key area of development for neophyte practitioners. Learning to read the micro-political (MP) world and learning to manoeuvre within it to secure these contested desirable working conditions is not something many are prepared for. This study sought to further understanding about the pedagogical strategies of immersion, engagement, and reflection within a community of practice for the development of micro-political literacy (MPL) in a neophyte coach (NC) just out of formal coach education. The study found these strategies were most effective in increasing the NC's MPL and partially effective in transferring this improved understanding to practice. Findings highlighted that the benefits of these pedagogical strategies can be both direct through greater exposure to MP stimuli, improved reflection on experiences, and increasing recognition of opportunities to take micro-political action (MPA), as well as indirect by providing well-being support through an emotionally challenging process, encouraging further development of practice philosophy and decreasingly likelihood of burnout thus increasing practice time for development.

Mark Segmentation Theory and Uses

Richard Whincup

Segmenting your market allows customers to access different things, have greater choice, and have their needs more closely met. It allows companies to improve customer knowledge, identify sales opportunities, develop differential marketing strategies, to dominate smaller segments and assess the company's strengths and weaknesses (Armstrong et al, 2012). In 2010, Sport England created the Market Segmentation Toolkit, which helped delivery partners such as local authorities and community sports clubs to plan, advertise and evaluate their projects and programmes more effectively, and identify where to spend funding to maximise their return on investment. The toolkit contained 19 profiles, detailing how different types of people access and play sport, as well as suggesting what the profiles would like to do more of, and how best to reach them.

This research used a qualitative approach, with a questionnaire administered to a purposeful sample, to collect the views and behaviours of the 'Tim' (settling down males) profile from the Segmentation Toolkit. The research goal was to use the intelligence found in the chosen profile and to investigate to what extent the aforementioned intelligence was still applicable to that segment in more modern times. The research was to cover sport and physical activity participation, responses to brands and marketing messages, cultural activities, and latent demand in that segment.

The hypothesis was that although the sport and physical activity participation trends and latent demand would have remained consistent, the main areas of change will have been in marketing message effectiveness and brand awareness. One area which was not overly covered in the profiles when the Market Segmentation toolkit was created was the topic of social media. Social media has become one of the primary marketing techniques used by businesses and not for profit organisations in the last 10 years, and one would have expected the results to have echoed these trends.

The results of the research were mostly as anticipated, with the majority of respondents enjoying a range of sports, both in teams and as individuals, in both formal structured, and informal, unstructured settings. The barriers of 'work commitments' and 'lack of time' were as prevalent as when the toolkit was created, and the responses of 'more free time', 'help with children' and 'lower cost options' were reasons given for facilitating increased participation in sport. The real contrasts were seen in the 'what do they read?', 'where do you get your marketing messages from', and the 'responsiveness to brands' sections.

None of the respondents read any of the suggested sources that were featured in the toolkit profile, with online, apps and social media featuring heavily. Many of the respondents claimed to not watch a lot of TV or listen to much radio, if they did listen to the radio it was at work or when travelling. The respondents mainly rely on streaming services and podcasts or 'spotify', this will significantly alter how they receive their marketing messages. Social media was how the vast majority of respondents were marketed to, with bespoke promotions

popping up on threads whilst they engaged with and 'scrolled through' facebook, twitter, Instagram, and to a lesser extent, tiktok.

The respondents claimed to not engage with very many of the suggested brands in the toolkit profile at all, this was expected as 2 of the 10 brands were no longer available on the high street. Youtube has become one of the major brands among the respondents, both in terms of entertainment and in marketing messages, the video adverts shown prior to free content is proving to be a very effective marketing tool in reaching certain markets.

The research concludes that the Sport England Market Segmentation Toolkit is still applicable when discussing sport and physical activity participation and trends, but with the advent, development and now dominance of social media platforms and the ever-changing behaviours in how the segment, and society in general, engages with and consumes media, some of the profile will need significant updating if it were to remain useful to the original customers and key stake holders. It can be suggested that if this is the case with the chosen segment profile, the same updating could be required for many of the 19 other segments in the toolkit.

How can social support make coaching less stressful? A longitudinal inquiry with sports coaches

Luke A. Norris , Faye F. Didymus and Mariana Kaiseler

Research on social support with sports coaches is limited, yet the benefits of social support on performance and wellbeing within other occupations have been widely reported. This study explored sports coaches' social support resources over a six-week period to understand how social support resources may alleviate stressors. Longitudinal data were collected from women (n =6) and male (n=4) sports coaches (Mage =35.2, SD=13.0 years, Mexperience =13.5, SD=9.7 years) using three semi-structured interviews over a six-week training and competition period. Interview data were analysed using abductive thematic analysis. Coaches used all four types of social support resources over the six-week period. Informational support for advice, ideas, and feedback on training sessions, new job roles, and player development was used most regularly across the different time points. Coaches also reported that they perceived social support resources may alleviate stressors through stress-buffering and main-effects. Social support resources (e.g., esteem) might be more important for buffering the effects of stressors and others (e.g., emotional) may be more important for the main effects. Given the pertinence of social support resources for performance and psychological well-being, applied interventions should aim to educate coaches on ways to develop a social support network that provides all types of social support resources to help cope more effectively with stressors. Moreover, interventions should aim to alter coaches' perceptions of potential stressors as less of a threat and more of a challenge to alleviate the prospective negative influences of stressors

Does individual movement score within Olympic GP Freestyle Dressage influence overall test score?

Matilda Edmund, Lorna Cameron, Russell MacKechnie-Guire, David Marlin and Jane Williams

Freestyle dressage tests allow riders to showcase their creativity by designing tests which optimise their horse's performance strengths to music. Scoring considers movement quality and artistic expression, which encompasses test choreography and fit of movements to the musical score. Despite the potential of performance analysis to inform test design, application is currently limited in Dressage. This study aimed to identify the influence of individual movement scores in Olympic Grand Prix Freestyle (GPF) Dressage on judges' overall test score. Videos of the GPF tests performed by the 18 combinations participating in the Tokyo Olympics were reviewed by a consistent observer. Spearman's correlations assessed if relationships existed between the final score for each movement and the overall test score for judges at K, C, E, H, M, B and F. Final movement score was positively correlated with overall test score for 12 of the required technical movements: half-pass right (K,E,H: $p < 0.009$; $r: 0.60-0.66$) and left (E,H,C,M,B: $p < 0.04$; $r: 0.57-0.80$); extended canter (F: $p = 0.002$; $r = 0.69$); one-time changes (K,E,H,B,F: $p < 0.03$; $r: 0.51-0.77$), two time changes (E,H,B,F: $p < 0.008$; $r: 0.61-0.75$); canter pirouette right (K,E,H,M,B: $p < 0.005$; $r: 0.68-0.83$) and left (K,E,H,M,B,F: $p < 0.03$; $r: 0.58-0.78$); passage (K,E,H,C,M: $p < 0.03$; $r: 0.51-0.77$); piaffe (K,E,H,C,M,B,F: $p < 0.009$; $r: 0.54-0.85$) and piaffe-passage transitions (K,E,H,C,M,B,F: $p < 0.001$; $r: 0.64-0.86$). In contrast, no correlations were found between collected walk, extended walk, and extended trot and overall test score. These preliminary results suggest the influence of movement vary by judge location and scores for walk and trot movements have limited influence on judges' final test score.

Using Machine Learning To Detect Volatile Organic Compounds in Breath Data

Prajwal Gowda

The aim of this study was to use signal processing to measure a range of compounds in animal breath. A non-invasive measure of breath compounds in livestock could provide an early detection of poor health. Commonly utilized algorithms to filter breath data have fairly low accuracy and produce a lot of false positive signals. The current study used signal processing techniques to filter, smooth and extract peaks in breath associated with compounds emitted from the mouth and nostrils of cattle. A convolutional neural network (CNN) using spot measurements of breath compounds was developed and was able to exclude background emissions and detect breath peaks with an accuracy of 90%. The CNN has significant utility in peak detection and integration for breath analysis.

Digital Poster Presentations:

1. **A Matthews**
The impact of bedding practices on quantity of sleep and its relationship to cognitive bias in the horse.
2. **B Wood**
The effects of eccentric resistance training on youth female ballet dancers
3. **E Taylor**
Equine sleep macroarousals, their sensitivity to bedding and relationship to affective state: a preliminary study
4. **K Seychell**
Effect of four water depths on canine forelimb kinematics utilising an underwater treadmill
5. **M Fenwick**
A Preliminary Investigation into the Effect of the Biopsychosocial Model and Personality on Equine Back Pain and Lameness
6. **J Parker**
An exploratory investigation into the relationship between sleep quality and intrusive imagery amongst student-athletes
7. **M Macbeth**
Does test design in the individual grand prix freestyle, at the world equestrian games, impact the score?
8. **C Farquharson**
Bridging the attainment gap: a preliminary study exploring students experiences of online formative assessment methods to assist transition into Higher Education
9. **C Farquharson**
Is flexible, contextualised online learning key for student engagement? A preliminary study exploring perceptions and experiences of online learning methods within sports therapy
10. **C Farquharson**
How do different assessment feedback methods influence feedback literacy? A preliminary study exploring perceptions and preferences of assessment feedback methods within sports therapy
11. **S Blake**
Injury Risk Factors Associated with Training and Competition in Flyball Dogs
12. **E Martin**
The visitor effect on captive raptor behaviour at a falconry centre in the UK
13. **C Vickery and V Lewis**
Investigating Functional Movement Screen Test Scores in Mounted Games Riders
14. **M Longworth**
Observation and Immersion as a pedagogical-strategy for developing micro-political literacy
15. **E Smith, S Armstrong, and L Cameron**
An investigation into owners' perceptions of colic surgery
16. **E Smith**
Works for some but not others' A qualitative study on teachers' perspectives and perceived pupil experience of a North West London school-based run/walk program
17. **R Whincup**
Mark Segmentation Theory and Uses
18. **J Williams, L Cameron, R MacKechnie-Guire, D Marlin and M Edmund**
Does order and location of movements within Olympic GP Freestyle Dressage influence movement scores?
19. **D Teixeira, B Ramos, MC Yunes, M Bell, A Stratakos, and D Enríquez-Hidalgo**
Preliminary findings of prioritisation of challenges to supply water for dairy cows: Consensus of dairy farmer and expert opinion
20. **L Norris, F Didymus and M Kaiseler**
How can social support make coaching less stressful? A longitudinal inquiry with sports coaches
21. **M Edmund, L Cameron, R MacKechnie-Guire, D Marlin and J Williams**
Does individual movement score within Olympic GP Freestyle Dressage influence overall test score?
22. **Prajwal Gowda**
Using Machine Learning To Detect Volatile Organic Compounds in Breath Data

Thank-you

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Prof Matt Bell

Prof Vicky Melfi

John Parker

Hieke Brown

Kev Harris

Christine Cox

Lily Blueman

Lucy Grieve

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Gary Dennett for the IT Support

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We hope to see you all next year.

Date for the diary the 11th July 2024