

**Session B7: Environmental Science and Environmental Studies.**

**Session Chair, Professor Frank Rennie**

**Room: 959/960**

<b>Presentation 1 - Digital. Remote. Connected: The future of art therapy in the Scottish Highlands?</b>	
Dr Ania Zubala, Institute of Health Research and Innovation; School of Health, Social Care and Life Sciences	
Abstract	<p>In light of technological innovations, health and care are becoming increasingly digitalised, with interventions translated into eHealth and digital therapeutics. While digitalisation of healthcare poses a myriad of questions of ethical and pragmatic nature, opportunities it creates for therapy and wellbeing should not be overlooked. Technology enables access to therapy for remote populations, does not necessarily reduce human contact, and could arguably add value to treatment and recovery. What does this mean for art therapy practice?</p> <p>In this presentation, we will consider whether and how art therapy could make use of digital technology to reach clients living remotely and in what areas, if any, innovation might extend the tool box of art therapists. We will present an essence of the findings of our scoping review documenting the growing research evidence around the use of technology in art therapy. Recurring themes in the literature will be discussed, including the reasons behind the common resistance towards digital media. We will explore the technological innovations that could make some of the challenges redundant and indicate how they might be utilized in therapy. Potential risks and ethical challenges will be also highlighted. Building on this work, we will outline a feasibility study aiming to explore the views of arts therapists practicing in remote areas and their clients. Finally, we will invite conversation to explore ways in which to further connect technology and therapy for the benefit of clients, therapists and the ageing populations living remotely.</p>
References	<p>Alders A., Beck L., Allen P.B. &amp; Mosinski B. (2011). Technology in Art Therapy: Ethical Challenges. <i>Art Therapy: Journal of the American Art Therapy Association</i>, 28(4), 165–170.</p> <p>Evans S. (2012). Using Computer Technology in Expressive Arts Therapy Practice: A Proposal for Increased Use. <i>Journal of Creativity in Mental Health</i>, 7, 49–63, DOI: 10.1080/15401383.2012.660127</p> <p>Levy C.E., Spooner H., Lee J.B., Sonke J., Myerse K. &amp; Snow E. (2018). Telehealth-based creative arts therapy: Transforming mental health and rehabilitation care for rural veterans. <i>The Arts in Psychotherapy</i>, 57, 20–26, DOI: 10.1016/j.aip.2017.08.010</p> <p>Orr P. (2016). Art therapy and digital media. In: <i>The Wiley handbook of art therapy</i>. Gussak, D.E. (Ed) &amp; Rosal, M.L. (Ed), 188-197, Wiley-Blackwell.</p> <p>Peterson B.C. (2010). The Media Adoption Stage Model of Technology for Art Therapy. <i>Art Therapy</i>, 27(1), 26-31, DOI: 10.1080/07421656.2010.10129565</p>

**Presentation 2 - Impact of Forest Management on Red Squirrel (*Sciurus vulgaris*) Conservation in Multi-functional Forests**

Dr Louise de Raad, Inverness College UHI

**Abstract**

Due to competition, disease and habitat loss, red squirrel populations are in decline. Forest Enterprise Scotland (FES) manages over 400,000 ha of Scotland's publicly-owned forests, which are used for timber production, recreation and wildlife conservation. Many of these forests support red squirrel populations. As red squirrels and their dreys are protected under UK legislation, their presence needs to be considered when planning forest management operations and any potential disturbance or damage to squirrels or their dreys need to be mitigated. FCS have developed detailed guidance on managing forests with red squirrels, however, there are significant knowledge gaps about the impact of forest operations on red squirrels. This study investigated the effectiveness of pre-operational drey surveys and how red squirrels respond to habitat fragmentation caused by thinning operations.

We trapped 23 squirrels in Logie Forest near Ferness and tagged them with light weight GPS/VHF collars. We recorded their movements by daily radio-tracking from January to September 2017, with forest operations taking place during a two week period in May 2017. Our results show that pre-operational drey surveys have a low probability of detecting dreys, which has consequences for subsequent estimates of the number of squirrels affected by operations. Survival of squirrels was relatively high and there was abundant evidence of females having successfully bred, suggesting the impact of the collars and of forest operations was negligible. Analysis of tracking data showed that drey use and habitat use did not significantly change during or after forest operations. Our findings will be used to amend FCS policy and guidance notes and will inform the SNH licensing process.

*Project partners include: Cairngorms National Park Authority (CNPA), Forest Enterprise Scotland (FES), Scottish Natural Heritage (SNH) and Inverness College University of the Highlands and Islands (IC UHI).*

**Presentation 3 - Assessing peatland condition using UAVs: not getting mired in "bog" data**

Henk Pieter Sterk, Environmental Research Institute, North Highland College, UHI; Neil R. Cowie, RSPB, Forsinard, Sutherland; Richard J. Payne, University of York; Jason McIlvenny, Environmental Research Institute, North Highland College, UHI; Roxane Andersen, Environmental Research Institute, North Highland College, UHI

**Abstract**

Peatland condition monitoring utilising both field surveys and remote sensing techniques is well established in Scotland. However, each has its associated strengths and weaknesses. Many of these weaknesses can be resolved if a more synergistic approach is considered between the two data collection methodologies. The aim of this PhD project is to investigate what the required data quantity and quality is from both in-situ greenhouse gas flux chamber measurements and UAV-derived imagery to assess

	<p>peatland condition in a range of settings. Target areas are located within the Flow Country: a lowland peatland classified to be in good condition - Plantlife Munsary peatlands - and an upland peatland in a degraded state, at RSPB Knockfin Heights. Sites are surveyed at short intervals over the growing season with gas flux and UAV measurements and are accompanied by spectral data gathered using a field spectroradiometer. These are supplemented by lower intensity sampling over the winter period. Measured variables include soil temperature, photosynthetic active radiation (PAR), water table depth and moisture content. Vegetation cover (-change), micro-topographic features and spectral signatures of different plant functional types are mapped using field techniques and GIS and remote sensing tools. This set of environmental and topographic parameters are then combined to model peatland condition and to upscale the technique to other sites within the Flow Country. The development of this tool shows great potential in the identification of sites with the greatest potential for restoration within what is Europe's largest area of blanket peatland.</p>
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**Presentation 4 - Validation and performance testing of a laser rangefinder for estimating avian flight in 3D**

Nicola Largey, Environmental Research Institute, North Highland College UHI

Supervisors: Aly McCluskie<sup>1</sup>, Ben Wilson<sup>2</sup>, Bård Stokke<sup>3</sup>, Elizabeth Masden<sup>4</sup>.

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<p>Abstract</p>	<p>Accurate estimation of bird flight characteristics in 3-dimensional space is useful for the assessment of bird responses to man-made structures such as wind turbines. Traditionally, flight activity has been studied using techniques such as observer-based vantage point surveys and line- and point- transects. Recently, these methods have been complemented with telemetry methods, e.g. GPS tagging, and radar. Although built and optimised as an optronic device for military and civil applications, the ornithodolite (based on a pair of binoculars with inbuilt rangefinder, inclinometer and digital magnetic compass, with laptop connection for data transfer) can also be used to track and extract bird activity in space and time. However, before tracking instruments are used, potential errors or inaccuracies in positional estimation should be assessed and quantified. Accordingly, as a tool for ornithology research, the ornithodolite currently lacks validation data. Here, we describe a method for assessing the accuracy of the ornithodolite in estimating bird position in 3D space, using a dedicated UAV test target. The positional fixes (latitude, longitude and altitude) of the ornithodolite were compared to those derived from a drone-attached GPS tag and barometric altimeter, using the drone's internal GPS and barometer measurements as a reference. Thus far, analysis shows no significant difference in the estimation of drone position between instruments. The ornithodolite is highlighted as a robust instrument in collection of positional data for ornithological research and comparability of different technology platforms in estimating bird 3D space use is emphasised.</p>
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References	<p>May, R. <i>et al.</i> (2017) 'Performance test and verification of an off-the-shelf automated avian radar tracking system', <i>Ecology and Evolution</i> pp. 5930–5938.</p> <p>Pennycuik, C. J. <i>et al.</i> (2013) 'Air speeds of migrating birds observed by ornithodolite and compared with predictions from flight theory.', <i>Journal of the Royal Society, Interface / the Royal Society</i>, 10(86),</p> <p>Shepard, E. L. C., Williamson, C. and Windsor, S. P. (2016) 'Fine-scale flight strategies of gulls in urban airflows indicate risk and reward in city living', <i>Philosophical transactions of the Royal Society of London B: Biological Sciences</i>, 371,</p>
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