EGOR: Environmental Guidelines: Opportunities and Risks Ms Nancy Bell

Amount Awarded: £24,368.00

Current environmental parameters and tolerances set out in national and international guidelines and standards as well as Governmental Sustainable Development Targets play a critical role in shaping practices in the cultural heritage sector such as building construction, and environmental management. This includes the control of temperature, moisture, light and pollution - the main factors affecting the conservation of material culture. Environmental guidelines impact significantly on how collections are stored, accessed, loaned and displayed.

Equally, the cultural heritage sector is not immune from the challenges posed by global responsibility: reducing reliance on fossil fuels, changing behaviours in favour of re-use and alternative energy sources, for example. It is within this context the appropriateness of current environmental guidelines designed to meet an agreed standard for managing material culture change, enable visitors to access and experience collections to a seasonal standard of comfort, and provide access to collections both locally and internationally is being questioned as the 'costs' of this are being realised. Unfortunately, there are no easy or headline-grabbing answers to this problem: the risks need to be identified, the costs understood, the options appraised.

Understanding complex structures: the conservation, display and interpretation of lace and natural objects Prof Tom Fisher

£23,171.00

This Research Cluster is running a series of three workshops looking at conserving, displaying and re-interpreting complex artefacts and natural objects by scientists and conservators working together with arts and humanities researchers. It will build a new community, generating new research ideas and proposing possible solutions to a range of practical issues. To focus the workshops they will concentrate on the challenges thrown up by the lace collections at Nottingham Trent University (NTU) and the Victoria and Albert Museum (V&A) and the collections of botanical, zoological and fossil objects at the Natural History Museum (NHM). These collections are a vehicle for the interdisciplinary exploration of a range of solutions to the conservation needs, curatorial demands and cultural challenges that such complex artefacts create. The cluster will encourage innovative thinking by extending its exploration beyond material culture by comparing the demands of lace collections with the challenges of conserving and reinterpreting complex natural objects as found in natural history collections.

Participants will include physicists, conservators, curators, technologists, cultural practitioners and designers, drawn from universities, museums, archives, SMEs and other institutions The workshops will enable discussion of the application of science to the conservation, interpretation and representation of complex artefacts and natural objects, through presentations and 'close encounters' with artefacts at NTU, Nottingham City Museums and Galleries (NCMG), V&A, and NHM. This exchange of skills, experience, resources and scientific knowledge will generate a range of topical and insightful research questions.

Ecologies of Modern Heritage: Studying the Cultural and Material Environments of Recent Historical Change Dr Dan Hicks

£24,505.00

This Research Cluster focuses on the multi-disciplinary study of modern heritage, and employs the idea of 'heritage ecologies' to facilitate new collaborations in their interpretation and representation. Responding to the outcomes of two recent research projects funded by EPSRC and English Heritage, Ecologies of Modern Heritage brings together leading researchers - from engineering, ecology, microbiology and conservation to planning, anthropology, archaeology and the creative arts - and engages with a range of stakeholders from outside higher education, including the professional heritage sector.

The Cluster will operate over 5 months, convening two intensive site-specific workshops that use the site of Bletchley Park, Bucks as a case study. The Cluster will be carried out in partnership with English Heritage and the Bletchley Park Trust, who will both be represented on the Cluster Steering Committee. Bletchley Park is an iconic and internationally-recognised historic site, associated especially with the history of technology and 20th-century military history. Reconciling intangible heritage, the international historical significance and contemporary cultural and economic values of the site, with the demands of conservation and management of the material fabric of collections, buildings and landscapes is a current and pressing challenge for the Bletchley Park Trust, and one that is shared by many other heritage stakeholders.

The Cluster will not only develop new understanding of the challenges and potentials of heritage science in relation to modern heritage, but will also aim to leave behind a tangible contribution to the interpretation and representation of Bletchley Park.

Transformation and resilience of our landscapes, archaeology and built heritage: defining responses to societal and environmental pressures
Dr John Hughes

£24,291.00

Cultural Heritage will, in the near future, be subject to substantial transformation in response to changing climate. Mitigation and adaptation measures will affect economic governance, and introduce sustainability pressures on buildings and landscape (e.g. thermal efficiency, renewables), in addition to the direct physical, chemical and organic impacts from the changing environment (e.g. coastal erosion, landslides, urban development material dissolution, microbial colonisation). Affects will occur on a range of scales that will drive changes in conservation needs. We desperately need to understand the resilience of the Cultural Heritage against these transformational pressures, from a material perspective, but also how we can be more effective in decision making and management from government to citizen level. A complex interaction exists between social and material aspects; scientific understanding and innovation plays a central part in our perceptions and valuation of the Cultural Heritage. As a result, inorder to meet future challenges there is a need to develop effective, adaptable management and decision making policies and methodologies, that utilise to best effect the latest scientific and technological developments. We aim to form a cluster that will establish, in a regional context for Scotland and Northern Ireland, a unified and interdisciplinary response to these threats and opportunities for innovation.

Touching the Untouchable: Increasing Access to Archaeological Artefacts by Virtual Handling Dr Linda Hurcombe

£24,206.00

Computer interfaces that provide information to the sense of touch offer exciting possibilities for interactive museum displays in which the visitor can handle virtual replicas of museum objects. Experiencing objects in this way provides an opportunity to participate in the sensory worlds of the past and offers new forms of accessibility for a wide range of museum visitors. The focus of the proposed research cluster is this virtual handling of museum objects, with archaeological textiles selected as a case study. New touch technologies offer the chance to handle virtual replicas of these rare and fragile objects. In addition, such a computer system is far more portable than a large collection of real objects and so offers significant outreach potential for public groups unable to visit the museum.

The overall aim of the cluster is to develop an improved understanding of the potential for virtual handling of archaeological textiles, leading to one or more major research proposals to develop and implement these techniques. The cluster is planned to involve 24 participants (plus new researchers and research students) from at least 12 institutions, including a 'core team' of six who are responsible for overall strategy. The cluster will bring together specialists in the areas of textile archaeology, museum display, computer interfaces, etc., to establish what is currently achievable, what is realistically achievable through future collaboration, and what technologies and techniques need further development.

An integrated approach to the management, scientific study and conservation of battlefield artefact assemblages Mr Rob Janaway

£24,530.00

Modern battlefield-related assemblages, as typified by assemblages from WW1 provide distinct challenges to excavators, finds specialists, conservators and curators. These are sites that were fought over in living memory, and are subject to considerable development pressure. Twenty years ago this was not seen as the prevue of professional archaeologists and heritage organisation, but this is starting to change. These sites provide very specific challenges and do not lend themselves to traditional methods of finds processing and conservation. In addition to the issues related to identification and handling of unexploded ordinance, excavations of even short sections of WW1 trench produce vast quantities of metal artefacts. Industrial scale warfare produces industrial scale debris. With this type of excavation archaeologists and conservators are working with novel materials - early plastics such as the celluloid lenses in gas hoods, rubber and rubberised cloth, or the corrosion of sheet aluminium. While traditionally archaeologists and conservators have guidelines and well-established protocols for dealing with most types of excavated artefacts, there is an urgent need for new techniques and procedures to deal with these new challenges.

The identification of the dead from recent conflicts such as WW1 is still of great interest to families and governments. While anthropological techniques have a role to play, in reality, except where dental records survive, the body itself does not often narrow down identification. It is increasingly recognised that the detailed analysis of kit/personal effects can refine an identification. In the first instance identification due to unit or army, based on surviving uniform remains including badges and buttons is relatively straightforward. Of more importance is the ability to analyse highly degraded items for clues to personal identity in the form of initials or service number. This can be on range of materials e.g. tooth brush handles, through metal spoons to personal books and

paperwork. Unfortunately identity tags used in WW1 were not made of material that survives well after 90 years burial; these include stamped sheet aluminium and compressed card. This challenging work is at the interface between archaeology and police investigations.

This research cluster will bring together specialists both in battlefield excavation and conservation science to define fundamental requirements for new research, set new agendas and, in so doing, place the investigation, management and public interpretation of past conflicts on a sounder scientific basis.

Researching Ivory: Integrating scientific analyses, historical data, artefact studies and conservation needs. Dr Paul Lane

£24,390.00

Public and private museums throughout the UK hold objects in their collections made wholly or partly of 'ivory' (i.e. catalogued as ivory but not necessarily authenticated as such). There are many kinds of 'ivory', however, and exactly what proportion is made from non-elephant ivory is not clear, for two related reasons. First, identification of the materials may be problematic if manufacture has obliterated the original shape. Second, in many cases no attempt has been made to identify the type of ivory used for particular objects. Few texts on the identification of ivories have been written with cultural objects in mind, particularly the need for an essentially non-destructive approach. Even those with experience of handling different types of ivory can find it impossible to determine the precise nature of the raw material used for a particular object. As a result, museum catalogues and accession registers often simply record that an object is made of 'ivory' (or has elements made from ivory), without specifying what kind was used. Additionally, these visual criteria cannot address the geographical origin or date of the ivory. Even where the function, shape, style of working or decoration of a piece may be indicative of a particular period or region this may not reflect the origin of the ivory itself. (There may also be fraud: carving a contemporary tusk in an earlier style from a particular culture).

One solution to these generic difficulties is to use various additional techniques of scientific analysis (e.g. radiocarbon dating, DNA & stable isotope analysis, and various methods of spectroscopy and X-Ray fluorescence analysis). Because of their different training and interests, many curators are unfamiliar with the strengths and weaknesses of these methods, what type of information they will provide, under what conditions they can be expected to produce reliable results and whether they entail any form of destructive analysis. By creating a research network where these are discussed and explained in clear English, by preparing a set of agreed protocols to be followed by researchers, and a decision tree for use by curators, and publishing these online with an annotated bibliography, it is expected that the research cluster will greatly enhance awareness and understanding of the research potential of the different kinds of ivory held in UK museums, and facilitate and improve future research on these materials irrespective of their date or origin. Ultimately, the aim is to produce a similar set of protocols and guidelines for items made from other types of animal tissue.

Decay of Ancient Stone Monuments Dr Aron Mazel

£24,427.00

Ancient stone monuments (ASMs), such as standing stones and rock art panels, reflect Britain's rich prehistoric past. Often isolated in the countryside, ASMs present a primordial allure and provide evocative visual links with our prehistoric ancestors. These unique, non-renewable heritage resources have great cultural and aesthetic value;

frequently, acquiring national significance. However, they also have economic consequence due to their value to tourism and the image of Britain. Despite their apparent robustness and resilience, they often reside in rural landscapes that are under continuous threat from human and agro-industrial activity as well as the vagaries of climate change, especially changes in precipitation patterns. Further, the majority of previous research into stone monuments has focused on built structures, which are similar in some ways to ASMs, but they also differ significantly because ASMs exist within the landscape and more ecological factors influence their fate.

This cluster will gather experts to address scientific and heritage questions needed to conserve and manage ASMs in the countryside. Although this ASM Research Cluster (ASMRC) crosses several Science and Heritage Programme themes, it is submitted under "resilience and adaptation" because ASM decay is intrinsically affected by environmental variability. As such, the ASMRC will bring together experts from environmental sciences, such as geochemistry, molecular microbiology, ecology, geomorphology, botany, and hydrology; heritage studies, such as archaeology; and managers of heritage resources within government and non-profit agencies. The technical goals of the cluster will be to identify environmental processes that promote ASM decay (e.g., biological, chemical, and physical weathering); determine how such processes might be affected by changing climate and environmental conditions; prioritise research to generate more effective treatments of decay to improve conservation practices; investigate monument monitoring procedures in light of new scientific methods; and develop ASM heritage science as a platform for future heritage and scientific investigation.

I-HE(AR)^2 [I Hear Too] - Improving Heritage Experience through Acoustic Reality and Audio Research Dr Damian Murphy

£24,538.00

Sound is often considered the poor relation of visual stimuli, yet plays a significant role in conveying information for rapid assimilation by a listener, and is a key component in the multi-modal perception of virtual/augmented reality applications. The remit of I-HE(AR)^2 encompasses the understanding and preservation of heritage through the consideration of sound objects (recordings, sound archives, music, instruments), the built environment (architectural acoustics, archaeological acoustics, auralization), sites and landscapes (sound in context). All of these elements are subject to change over time and so their audio/acoustic preservation is just as important for understanding of the past by future generations as any of their other material aspects or properties.

There are key research issues in this area that will be discussed as part of I-HE(AR)^2's activities, including the use of sound recordings and archives in heritage preservation, their restoration, organisation and access together with what to record now for future preservation; virtual acoustic reality and immersive sound as a means to preserve and render sounds and environments in new forms; the role of sound, sound-art and archival recordings as a means to access, enhance understanding, or experience the diversity of heritage; the importance of formalising acoustics research in heritage together with its proper contextualisation; the use of soundscape for conveying information to a listener or wider audience. To further support and disseminate the work of the cluster, downloadable podcasts will be made available as outputs from our workshops, thereby helping to provide our own preserved archive of activities.

BookNET: a network for the technological study of the book and manuscript as artefact Prof Mark Pollard

£24,415.00

We propose to bring together those who are active in the study of the book (including literary and historical scholars, research scientists, as well as library curators and book conservators) in a Research Cluster, and, by combining this expertise with experience from related disciplines, generate a research agenda for such a study.

A major interest of the Research Cluster will be within the theme 'Authenticity, authentication and security', since a knowledge of the life histories of books is an essential contribution to understanding their content in context. We will also be interested in the nature of transformation of the various elements of the material objects, and the implications of this for conservation practice. The interaction between the various components of the book will be an important consideration here. As such, it also speaks to the theme 'nature of transformation'..

Cultural Encounters and Explorations: Conservation's "Catch-22" Ms Elizabeth Pye

£24,449.00

Conservation and collections care are deeply affected by pressures to provide greater access to heritage objects for people now, but at the same time to make sure that objects survive for future users. This highlights a paradox which could be called conservation's "Catch-22":

People interact with heritage objects in many ways: children are encouraged to handle objects to bring the past to life; museum visitors are eager to see 'the real thing', artists are inspired. Increasingly, encounters with objects are used as triggers for oral history, and are considered to have a restorative function in reconnecting people with their pasts (cultural wellbeing), or in reaching people who are isolated through age, health, social exclusion or sensory impairment (therapeutic wellbeing). However, we know relatively little about the nature of any benefit that may be derived from these encounters, nor do we know enough about the effect on the heritage objects themselves. This has limited our ability to establish effective conservation strategies.

The purpose of this research cluster, therefore, will be to explore the issues associated with physical encounters between people and objects. It will examine our understanding of changes to the physical object, our ability to define and measure condition, our conception of deterioration and loss, and the implications for current and future use of collections. This will be balanced by exploration of the social/cultural benefit gained from these encounters. A further purpose will be to explore the impact of remote encounters with digitised objects on the policy, practice and ethics of collections care and management. A key objective is that this research should guide future strategies for heritage conservation.

Modelling, Interpretation and Alternate Representations: Visualization technology, Heritage Buildings & Coastal Threats. Dr Jonathan Roberts

£24,340.00

All heritage interpretation is complex. It is often based on uncertain information, or information extrapolated from other sites. Sites may cover many periods or have had

varying functions. Our approach will help heritage managers visualize and display different stages of their site's past (and present different versions of that past if desired). We will also produce models which allow the depiction of future trends by showing different possible outcomes from different scenarios. This approach reflects widely recognised gaps within visualization and presentation and its role in heritage science, as recognised by EPOCH - the European Network of Excellence in Open Cultural Heritage - and other bodies. It involves addressing considerable challenges within visualization research, which form the first phase of the network discussions.

The network aims to further develop heritage science interest within and beyond the Welsh-Irish sea area. It builds on best practice examples, develops new visualization approaches and applies these techniques to two distinct but important forms of heritage - threatened coastal archaeological sites and buildings. It will discuss modelling informed by maritime, environmental and archaeological knowledge and by knowledge of building preservation and management. It embraces multiple disciplines and a range of heritage organisations, including the National Museums of Wales and Ireland, the National Trust and English Heritage. Wider understanding of this approach will be aided by using a 'rich-media' demo - an interactive video, developed from the discussions - displayed on the network website and in other locations. It will be used in subsequent workshops, in discussions with stakeholders, and will enhance the public engagement. Subsequently the cluster will identify new research challenges through, and lead to the preparation of an 'agenda setting' report. Finally, a substantial grant proposal will be submitted.

Research Cluster for the Investigation of Acoustic and Musical Elements of Prehistoric Archaeological Sites in Britain Dr Rupert Till

£24,487.00

What remains of ancient monuments are architectural fragments which, as John Barrett says, can 'allow us to think through the orientation of the practices which both created that architecture and which were staged within it.' Acoustic analysis is a sonically based architectural analysis that can reveal detail about these practices. Because 'time is collapsed for the archaeological observer', even a partial or fractured understanding of the use of music, acoustics and sound in a space can act to animate the information we have from these architectural fragments. Sound brings the world to life, it can appear to fill spaces, create atmospheres, and have an intense emotive power. It exists in the time domain and can add a third dimension to an otherwise flattened interpretation. Whilst architecture demarcates space, sound demarcates time.

An archaeological study of a physical space is lifeless without an accompanying understanding of the narratives that developed within it. Understanding what Giddens might call time-geographies of space, developing narratives and rites of passage, is important so that we can understand how the users of a space felt about it. In prehistory sound was a primary focus for accumulating knowledge, culture and information, as transmission largely happened using language (the acoustic), rather than writing (the visual). As Marshall Mcluhan has said, 'Among peoples at an 'oral-aural' level of culture to whom writing was unknown, the ear exercised an overwhelming tyranny over the eye.' We can therefore expect to find as much out about the reasons for the layout of a site by investigating its acoustics as by investigating its visual and physical layout, especially in a site that does not seem to be designed for strictly functional purposes such as accommodation or defence. James Gibson has told us that sound gives 'information about the temporal structure of the event that caused it and the vibratory frequency of this event . . . with great precision'. The acoustic environment, as a key focus in prehistory of communication and development within an oral and aural culture, merits as much investigation as the context of the use of bone, stone, metal, wood or ceramics.

A series of study days will create an interdisciplinary research cluster that will explore the sonic architecture of prehistory. It will involve specialists including those from the fields of archaeology, acoustics, music technology, acoustic modelling, digital modelling, CAVE and RAVE multimedia visual environments, ethnomusicology, archaeoacoustics, music archaeology and anthropology. It will aim to develop research teams and proposals that will develop focused research projects based on particular sites.

The summaries given here have been edited, to see the full summaries as submitted in the original project proposals visit our on-line funded research browser (using the link below) and select science and heritage research clusters under scheme.