

## **Changing the World: Environmental Breakdown and Natural Science Collections**

NatSCA Online conference [@Nat\\_SCA](#) [#NatSCA2021](#)



ABSTRACTS FOR ALL SESSIONS

### **DAY ONE: Thursday 27 May 2021**

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**10.00am – 10.30am**

**Keynote Presentation**

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**Simon Turner**, UCL / Anthropocene Working Group [@samdavtur](#)

*Recognising the Anthropocene Epoch in geological strata: the ongoing process of collecting and archiving a potential “golden-spike” section*

Human activity is leaving a pervasive and persistent signature on Earth and vigorous debate continues about whether this warrants recognition as a new geologic time unit. Anthropogenic influence on stratigraphic signals commenced thousands of years ago, but the most pronounced inflection in most global trends away from Holocene patterns is in the mid-20th century, which represents the preferred timing of onset for the Anthropocene Epoch.

This presentation outlines the work of the Anthropocene Working Group (AWG) in gathering diverse evidence to constrain and assess the Anthropocene, including: 1) the appearance and rapid dispersal of many new compounds (e.g. plastics and industrial fly ash), rock types (e.g. concrete) and sediment bodies including artificial ground, together with sediments released by land use changes; 2) modified geochemical signals providing widespread, sometimes global, and geologically isochronous markers, especially through perturbations to the carbon and nitrogen cycles (through fossil fuel consumption and nutrient enrichment), at rates and magnitudes unprecedented in Quaternary times, and from novel artificial radionuclides traces from nuclear bomb tests; and 3) biological evidence as a consequences of extinctions and extirpations, unprecedented global movement of animal and plant species (intentional and accidental), and increasing abundance of domesticated species.

Formalisation of the Anthropocene requires proposal of a Global Boundary Stratotype Section and Point (or “golden-spike” section). The AWG is coordinating a study collecting core material from diverse potential host environments and geographical sites. The Haus der Kulturen der Welt in Berlin, will document the process of collection and analysis of the cores and present the social, cultural and historical aspects of the study at a major exhibition in 2022.

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**10.30am – 11.15am**

**First Session: Talks**

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**C.Giles Miller, Lyndsey Fox\***, **Tom Hill, Marina Rillo\*\***, **Steve Stukins, Epi Vaccaro**, Natural History Museum, \*University of Kingston, \*\*University of Groningen  
[@cgilesmiller](#) [@NHM\\_Micropalaeo](#)

*Making the most of a collection that illuminates the debate on anthropogenic climate change: The HMS Challenger and Ocean Bottom Deposits Collection at The Natural History Museum*

In February 2020 a publication in Scientific Reports (Fox et al. 2020) compared 1875 Challenger plankton tow collected planktonic Foraminifera with material from the recent Tara Oceans expedition that visited the same region of the equatorial Pacific Ocean in 2011. Using nano-CT scans, comparison of two species present in both collections showed that all modern examples have thinner shells and for some species they can be up to 76% thinner. Although there are many drivers for production of calcium carbonate shells from sea water, the conclusion was that the Foraminifera are finding it increasingly difficult to secrete their shells because of the increased acidity of our oceans. It is also increasingly harder for anthropogenic atmospheric carbon to be

locked into our oceans which has potentially catastrophic consequences for marine ecosystems of calcifying planktonic organisms such as pteropods, planktonic Foraminifera and coccoliths if this trend continues. This high-profile publication was widely covered in the media but was the result of many years of study and much background work to encourage use of the HMS Challenger Collection and the Ocean Bottom Deposits Collection which are housed at The Natural History Museum. This presentation covers the HMS Challenger case study and another recently published research article (Rillo et al. 2019) that has raised the profile of the Ocean Bottom Deposits collection. Both collections have been digitised and are available on the NHM Data Portal and this highlights the need for additional collections advocacy so that the full potential of these collections can be reached. Both examples show the importance of the historical data available from these collections and their potential for answering big questions like the effects of anthropogenic climate change on biogenic carbonate production in calcifying planktonic organisms.

**Elizabeth Ellwood, Gil Nelson, Hamish Holewa, Dimitris Koureas, Joseph Miller, iDigBio / Natural History Museum of Los Angeles County @libbyellwood**

### *Accelerating Global Engagement Through Collaboration of Online Biodiversity Data Networks*

Online networks are helping to make global biodiversity data readily available to researchers, educators and policy makers. Networks such as iDigBio (Integrated Digitized Biocollections; idigbio.org), GBIF (Global Biodiversity Information Facility; gbif.org), ALA (Atlas of Living Australia; ala.org.au), and DiSSCo (Distributed System of Scientific Collections; discco.eu) have fostered innumerable projects, publications and analyses with the hundreds of millions of biodiversity occurrence records, e.g., natural history specimen records and observational datasets, available via their open and searchable databases. Currently, each network maintains independent databases that best serve their respective data users, though supporting numerous databases of global biodiversity data may be less than ideal. Collaboration among these data networks into a “Network of Networks” will facilitate an accelerated pace of data discovery and biodiversity research. Working closely would allow for:

- 1) comprehensive accessibility to all biodiversity data from a single resource; 2) development and support of additional biodiversity databases from underrepresented regions of the world; 3) consistent and predictable data interpretation and transformation; 4) stable and persistent references to data records; 5) unification of perspectives among research communities, and 6) sustainable development and maintenance of tools and services. Progress in these areas maximizes the benefits expected from all biodiversity monitoring, digitization, data mobilization, research, and curation efforts, and supports multitaxa studies that span domains.

Importantly, the biodiversity data provided by online networks empower anyone with an internet connection, anywhere in the world, to make use of the information. Access to specimens is therefore not impeded by the resources required to travel to natural history collections, and research can progress in ways that are inclusive of a greater diversity of data users. Here we present our efforts to streamline access to biodiversity records in support of research and actions that address today’s biggest threats to biodiversity.

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**11.45am – 12.45pm**

**Second Session: Tours**

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**Patti Wood Finkle & JP Cavigelli, Tate Geological Museum at Casper College**

*Rex Annex: providing a small museum with additional exhibit & prep space*

The Tate Geological Museum is a small palaeontological museum located in the heart of Wyoming. We would like to take you, our museum colleagues, on a tour of the Rex Annex. Built in 2017 to house our *Tyrannosaurus rex*, nicknamed Lee Rex, the annex also serves as an external prep lab for large field jackets. Currently the only *T. rex* found in Wyoming to stay in Wyoming, this amazing fossil created a problem for our small museum. The jacketed specimen couldn’t fit into the gallery. Our solution was to build an external prep lab/exhibit space adjacent to our current building with the help of our patrons and donors. We plan to keep the articulated skeleton in the jacket, as opposed to completely prepping it out of the rock as we are missing the head, tail and lower legs. The Annex is equipped with its own air compressor and the entire space is a

fully functioning fossil prep area with forklift accessibility. We would like the opportunity to introduce you to Lee Rex, tour the annex, and visit the photography corner, where one of our volunteers is working on 3D photography. We look forward to sharing our addition with you.

**David Waterhouse**, Norfolk Museums Service @DrDWaterhouse

#### *The Natural History Galleries at Norwich Castle Museum & Art Gallery*

Officially the most visited galleries within Norfolk Museums Service's ten public sites; the four natural history galleries at Norwich Castle Museum & Art Gallery represent diverse, disparate and internationally important biological and geological collections, numbering some 1.5 million individual specimens.

In 2009, the 1960s-designed 'Mammal Gallery' was completely changed, transforming it into the flagship 'Natural History Gallery' for the county of Norfolk – truly reflecting and providing an insight into these varied and important collections. At the same time, the 'British Bird Gallery' and 'Ted Ellis Norfolk Room' also had major refreshes.

In this virtual tour of the public natural history gallery spaces, we look at these updates; how they've withstood a challenging and dynamic period within the heritage sector, as well as investigating newer additions (such as an exquisite Blaschka model display), and looking at plans for integrating contemporary central themes into the permanent displays of the future – such as decolonisation, LGBTQ+ history and gender balance within collections.

There are also insights into measures to protect both visitors and staff during the pandemic, as well as the challenges of managing a partially open museum during a £13.5 million National Lottery Heritage Funded building project entitled 'Norwich Castle: Royal Palace Reborn'.

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#### **1.35pm – 2.30pm**

#### **Third Session: AGM**

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1.35pm - An introduction to the SPNHC, BHL and NatSCA 2022 conference – 4-10<sup>th</sup> June, Edinburgh.

#### **1.50pm - NatSCA AGM**

Please see the NatSCA website for Agenda and Committee Reports, and information regarding committee nominations and elections <http://natsca.org/natsca-2021>

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#### **2.45pm – 3.30pm**

#### **Fourth Session: Talks**

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**Teva Kami<sup>1\*</sup>, Michael Hands<sup>2</sup>, Florent Lager<sup>3</sup>, Pierre Mberi<sup>3</sup>, Yvette Harvey<sup>4</sup>, Martin Cheek<sup>5</sup>** 1 Université Marien Ngouabi, 2 Inga Foundation, 3 MPD Congo, 4 RHS Wisley, 5 Royal Botanic Gardens, \* Presenting

*Herbarium specimens inform species selection for agroforestry trial of African indigenous rainforest species in Republic of Congo*

In 2012 an experiment was initiated at the Zanaga project in the Massif du Chaillu, Republic of Congo, to test the hypothesis that indigenous tree species with potential for agroforestry could be used to reforest areas of long-established, fire maintained secondary grassland resulting from repeated slash and burn of forest. Indigenous tree species from adjoining forest were selected for the experiment using herbarium specimens to screen for one of the principal characteristics required in the "Inga Model": production of large, coriaceous leaves. The herbarium specimens had been collected during surveys for a comprehensive botanical checklist of Zanaga. Two other principal characteristics screened for were: 1) potential for Nitrogen fixation (Leguminosae in nodulating groups), 2) ability to regrow after pollarding (revealed by visits to slash and burn farm sites). A shortlist of 14 species was produced. Seed was collected and sown in a dedicated project

nursery, the seedlings raised in polypots. Seedling planting out began at a trial site chosen for being representative of degraded, Pteridium-infested, secondary grassland on highly acidic (pH 4), nutrient-poor soils. Plantings were made in 2012 and 2013, in alleys 3.5 m apart, in-row spacings 0.5 m. In the first two years, regular weeding and clearance of pioneers was needed until the trees produced enough shade, “closing the canopy”, to kill the grassland species.

After seven years, about 1 ha remained intact, with 12 single-species parcels in good condition, with eight species: *Millettia versicolor*, *Millettia laurentii*, *Pentaclethra macrophylla*, *Parkia bicolor*, *Bobgunnia fistuloides*, *Erythrophleum suaveolens*, *Albizia adianthifolia* and *Pterocarpus soyauxii*. Within the shade created, indigenous forest species had spontaneously re-established themselves, including some indicators of good quality forest, but also pioneer tree species, such as *Harungana madagascariensis* which unless removed competed with the planted trees.

**Alexandra McGoran<sup>1,2,\*</sup>, James S. Maclaine<sup>2,\*</sup>, Paul F. Clark<sup>2</sup>, David Morritt<sup>1</sup>**, 1 Royal Holloway University of London, 2 Natural History Museum, London, \* Presenting. @AlexMcGoran

*Synthetic and semi-synthetic microplastic ingestion by mesopelagic fishes from Tristan da Cunha and St Helena, South Atlantic*

Plastic pollution is a growing global issue, with plastic ubiquitous in the marine environment. Whether the result of lost fishing gear, cargo dropped at sea or coastal litter carried by ocean currents, even remote islands are impacted by plastics. As part of the Blue Belt Programme, a survey of British Overseas Territories funded by the UK Government, mesopelagic fishes were collected from the South Atlantic around Tristan da Cunha and St Helena. Samples were taken at night at depths of up to 1000 m using a rectangular mid-water trawl (RMT25), with the exception of one specimen of *Opostomias micripnus* (Günther, 1878) which was recovered from the stomach of a commercially fished species, *Hyperoglyphe antarctica* (Carmichael, 1819). Whilst numerous fishes were obtained, thirteen mesopelagic and two surface-water species were selected for the present study. Overall, the digestive tract of 32 individuals were examined for microplastics. During the removal of the digestive tract, identifiable prey items were removed and investigated separately. One specimen of *Anoplogaster cornuta* was found to have ingested a bearded sea devil (*Linophryne* sp.), a cock-eyed squid (*Histioteuthis* sp.), a bolitaenid octopus (*Japetella diaphana*), and the remains of unidentified fish, crustaceans and possible salps. Neither shallow water dwelling species were contaminated with microplastics, whilst 11 of the 13 mesopelagic species had ingested microplastics. Additionally, both *Linophryne* sp. and *Histioteuthis* sp. had ingested fibres. Two thirds of examined mesopelagic fishes had microplastics in the digestive tract, most commonly microfibres. Viscose, a semi-synthetic material, was the most common polymer. The material is associated with sanitary pads, wipes and other products.

## DAY TWO: Friday 28 May 2021

10.10am – 11.15am

First Session: Talks

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**Sarah Wade**, University of East Anglia

Ecologising Natural History Collections through Interventions by Contemporary Artists

At this time of ecological crisis marked by climate change, biodiversity loss and the designation of the Anthropocene (Crutzen & Stoermer 2000), where humans can no longer be thought of separately from the rest of the natural world, natural history museums are institutions well placed to address these issues. Their collections and displays speak to various ecologies of humans and nonhumans, presenting complex naturecultures (Haraway 2003) and offering a context in which creative practitioners, museum staff and visitors can consider and reflect on environmental issues in the past, present and future. In recent years, various curatorial strategies have been deployed in these museums to engage visitors in ecological concerns. This paper focuses on one such strategy: the presentation of interventions by contemporary artists.

How have historic natural history collections been mobilised through artists' interventions to explore contemporary ecological concerns? What strategies have been used to engage the public in ecological issues through this work? And how have these interventions reinterpreted natural history collections to explore the cultural, as well as the natural histories they are tied to in these museums?

**Julian Carter, Sarah Younan**, Amgueddfa Cymru National Museum Wales @NatHistConserve

*No Môr Plastic: Using the permanent natural science displays at Amgueddfa Cymru National Museum Wales to support museum activism*

No Môr Plastic (a play on words where 'môr' means 'sea' in the Welsh language) was part of Amgueddfa Cymru's 'Hands on Heritage' programme supporting the format of the creative 'museum intervention'; a fast-paced and temporary way to bring contemporary topics into the museum and provide young people with a platform.

Such youth-led intervention projects can provide opportunities to reassess and raise awareness of museum practices and to enable young people and wider audiences to influence displays and interpretation in the museum environment. Such projects can open the wealth of objects and specimens found in museum collections to enable a widened active participation, and highlight key issues around our environment, culture and heritage.

The 'No Môr Plastic' intervention used the static marine displays to highlight the growing impact of plastic waste in the marine environment. The ideas and interventions were led by the Youth Forum who in keeping with the museum format of showing authentic materials, decided that 'real' beach plastic should be brought into the museum and used. For this the collections and exhibitions team played an active role in supporting the intervention through their knowledge of materials, collections and environments whilst keeping the overall control of the project with the Youth Forum itself.

The presentation will explore the collaborative work that occurred to develop the ideas, the process of collecting and conserving the waste into the museum to enable it to be safely used in the gallery environment, and the reaction and impacts of the project on visitors, staff and the Youth Forum alike.

**Jo Hatton**, Horniman Museums and Gardens @Cur8torJo

*'Nature and Love' Stepping up to the Environmental Challenge*

The Horniman Museum and Gardens in south east London has a long-standing commitment to developing sustainable practices and environmental engagement across our programmes and site. From the opening of the Horniman Nature Trail on part of the former Nunhead to Crystal Palace railway in 1973, to the installation of the pioneering green roofed CUE building (Centre for Understanding the Environment) in 1996, the

Horniman has shown its ongoing commitment to championing the environment using its collections and estate in a variety of ways.

Last year, the Horniman embarked on its most ambitious plan yet, challenging itself to make a major step change in its ambition to become a greener, more sustainable museum, actively encouraging others to follow suit. In July 2019, the Museum declared a Climate and Ecological Emergency and published its Climate and Ecology Manifesto in January 2020, setting out a commitment to accelerating a step-change in how visitors engage with nature and the environment across the estate, how it will make practical changes to 'greening' our own organisation, the local environment, and people's lives in our communities.

This presentation will map our green journey from peaceful pioneers to becoming active advocates, sharing some of our experiences and practices, sustainability successes and challenges. It will outline some of our plans for the future as we embark on 'Nature and Love', our next major capital project – a re-display of our galleries and outdoor spaces to inspire people to change their everyday lives, to re-connect with the value and importance of the natural world, and become part of a movement for positive environmental change.

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**11.45am – 12.45pm**

**Second Session: Tours**

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**Catherine Craston & Helen Devereux**, Sedgwick Museum of Earth Sciences, University of Cambridge  
[@SedgwickMuseum](#) [@clhodgson93](#)

*How To Move a Mountain: Populating a New Collections Store at the Sedgwick Museum*

The Sedgwick Museum collections are currently stored over three locations; the public museum in central Cambridge, the A.G Brighton Building and the Atlas building, both sited on the NW edge of Cambridge. The A.G Brighton building containing our palaeontology and mineral collections also houses our conservation laboratory and archive store. The Atlas building contains the museum's petrology collection.

Recently we have seen the completion of the Colin Forbes building, situated on the same site as the A.G. Brighton building. This new building contains a purpose built store to improve the storage and long term care of our petrology collection, as well as increase accessibility to our largest fossil specimens. It also contains an archive cold store, and new spaces to welcome research visitors. With the completion of this new research centre, a collections relocation project bringing the museum collections together at our 2 main sites began in 2019. While the relocation project has been delayed by the COVID-19 pandemic, we are now up and running again and excited to share our progress with you.

In this tour we will introduce you to the new Colin Forbes Collections Research Centre, highlighting the storage capabilities of the new collections store, as well as the additional facilities and resources we now have. We will also demonstrate the workflow involved in migrating the petrology collection, including 150 tonnes of rock specimens, to the new store, and the opportunities this presents us.

The Colin Forbes Collections Research Centre will enable the museum to do so much more. We will be able to enhance our offering to researchers, and improve the access to and care of these important collections, ensuring that they can be studied and enjoyed for generations to come.

**Becky Desjardins**, Naturalis Biodiversity Center

*Tour of Priceless Objects (van Onschatbare Waarde), the special exhibit in honour of Naturalis' 200<sup>th</sup> birthday*  
[@summrtnager](#)

2020 marked the 200th birthday of Naturalis Biodiversity Center, the national science museum of the Netherlands. To celebrate, we opened a special exhibit featuring the most amazing specimens in our collections. The objects include: the very last quagga, an elephant bird egg, a 500-year-old herbarium, type specimens collected by many famous scientists, and many other truly spectacular items. You can skip the hassle of international travel during a pandemic and come join us for a virtual guided tour! You will see the exhibit and we will share a bit about how to display such special objects.

*11 pre-recorded quick-fire presentations sharing best practice, innovation and provocation.*

**Georgia Kay**, Naturalis Biodiversity Centre

*Got a Bone to Pick? Creating an easy-to-use flowchart for cleaning skeletal specimens*

In anticipation of cleaning and remounting a disarticulated and heavily polluted hippopotamus skeleton, we set out to understand the various methods for cleaning dirty bones. After a literature search, we tested various cleaning methods on specimens from the vertebrate collections at Naturalis. From this we created a concise, instructional flow chart outlining the most effective ways to clean bones based on the type of dirt and abrasiveness of the cleaning method. The flowchart begins with the most gentle and least invasive method of dry cleaning and guides the user further to more abrasive cleaning using conservation detergents such as Synperonic A7 or Triton x-100. This talk will share the flowchart that was created as well as expand further on each of these cleaning methods, including the tools and applications, as well as the pitfalls and benefits of each method.

**Lorna Steel**, Radnorshire Museum (Powys County Council)

*Fossils, firearms and naked ladies*

Regional and local museums often contain an eclectic mix of objects, depending upon local industry, business, history and people. Local collectors often donate their entire collections of curiosities, and there is a tendency for the local museum to unquestioningly accept everything that is offered, provided they have space to take it. Meanwhile, national museums tend to have a clear acquisition policy, and are not afraid to say “Thanks, but no thanks”.

What happens then, when a specialist natural sciences curator from a large national museum arrives at a county council museum, and finds an eclectic collection of archaeology, social history, art and natural history? A database that might be better to start from scratch rather than try to improve it? An object entry backlog? A store that has become an over-stuffed dumping ground? A reduced budget? Does this sound familiar?

Such is the situation at the Radnorshire Museum, one of the Powys County Council museums. It is situated in Llandrindod Wells, a small town in the hills of mid-Wales. The museum occupies the former Carnegie Library building. Financial constraints have reduced the museum’s opening hours, but with a new curator we are aiming to improve the storage of the diverse collections, refresh the exhibitions, promote the museum, and engage with the community.

There must be many museums around the UK like this one – not specialising in natural history but including many objects of this type. In this presentation I will describe the collections and discuss my plans. Where to start?

**Philip Hadland**, Hastings Museum & Art Gallery

*What’s in the Box? Exploring Natural Science Collections with Home Educating Families* [@hastings\\_museum](https://www.hastingsmuseum.org/)

What’s in the Box? is a museum collections-based community engagement project. In the first strand, home educating families helped the museum to document its natural science collections. The project is funded through an Arts Council National Lottery Project grant. Despite the limitations imposed by the pandemic, a variety of activities took place in person and virtually. This talk provides a summary of the project so far, lessons learnt and what the next steps might be.

Optional Tour: The exhibition hosted on Artsteps

<https://www.artsteps.com/view/600ef720d373f45b872bdba1/>

**Ting Hui, NG**, Lee Kong Chian Natural History Museum, Faculty of Science, National University of Singapore  
[@siputairtawar](#)

Can the dead save the Earth? Exposing postgraduate students to Southeast Asian natural history collections

The natural history collections of Southeast Asia, despite being located in some of the most biotically threatened regions on earth, are vastly underappreciated, even by academics in the field of ecology and environmental biology. In order to raise awareness on the importance of NHCs, a new postgraduate course at the Department of Biological Sciences, National University of Singapore (NUS), was introduced in early 2020 by the Lee Kong Chian Natural History Museum (LKCNHM).

The LKCNHM has its origins in the Raffles Museum and Library that was established in 1874, and the museum went through different incarnations before reaching its present form in 2014, as an independent academic unit within the Faculty of Science. The museum is located within the campus grounds and houses the Zoological Reference Collection (ZRC), one of the largest collections in Southeast Asia, the NUS Herbarium (SINU) and a 2,500 m<sup>2</sup> public gallery.

Being a university museum, the LKCNHM is uniquely placed to introduce the importance of natural history collections to tertiary students via the postgraduate course. The overall aim is for students to develop an appreciation and understanding of the key roles of collections, and to be able to critically analyse the links to biodiversity conservation, with a focus on Southeast Asia. Topics include changing roles of collections, specimen-based research from the field to shelves, gallery and beyond (e.g., in ecology, evolution, global change), and science education and communication. Given that biodiversity conservation issues often transcend borders, the course allows students to assess the significance of collections, from a broader viewpoint, i.e., that of Southeast Asia and globally. Through lectures and assignments, students are encouraged to reflect upon the utility of a natural heritage narrative as a powerful tool to engage the public and get them invested in contributing to a more sustainable future.

**Kim König**, Naturalis Biodiversity Centre

*The profile of sediment profiles from Surinam*

A sediment profile is a thin layer of sediment, a 'real-life snapshot' of soils, showing all the sedimentary structures' details. These soil peels are valuable for research and bring the beauty of the ground to the surface. In 2020 Naturalis was gifted multiple sediment profiles originating from Surinam by the engineer J.F. Holtrop. Each sediment profile is unique, and the jungle has taken over many of the places that Holtrop visited in 1960.

The profiles have sustained damage over the years from suboptimal storage conditions and issues in transport. Cracks have occurred, and sediment has come loose. In anticipation of a research project later this year, into the geology of Surinam, the soil peels will be restored and stabilized. However, there is little literature about sediment profiles and the lacquers used to prepare them. We were able to contact different Dutch experts in this sort of preparation to help guide us in finding the best methods of stabilization and restoration. This lightning talk will share the knowledge we gained for conserving these scientifically important and beautiful specimens.

**Kirsty Lloyd**, Natural History Museum [@cryoarks](#)

*Plugging the gap: Resources to support the curation of biological sample collections*

Genetic information can be extremely important in increasing our understanding of species' evolution or population dynamics. Yet barriers restricting fieldwork activities make accessing samples for fundamental and conservation research difficult, if not impossible. CryoArks is a collaborative initiative developed to address the increasingly evident need to provide a sustainable resource of animal samples for genetics research.

A vast range of biological sample collections (e.g., tissues, blood and DNA) exist in museums, zoos and aquaria, and research institutes across the UK. Acting as a bridge between these sectors, the CryoArks

initiative is working to bring the collections together, both physically and informatically. We have identified areas where help is needed and have worked to meet this need by generating resources to support anyone responsible for managing a frozen collection. We would like to share these with the NatSCA community.

Our suite of resources includes step-by-step guidance on how to conduct an inventory of a sample collection and skills development activities to facilitate in-house training. Comprehensive and editable data collection templates are also available to help manage sample metadata. We have put in place processes to facilitate sample contributions to the biobank. Members can increase the discoverability of their collections by sharing data, or our partner hubs can support the transfer and continued curation of samples at purpose built ultra-low temperature storage facilities. Lastly, an exciting element we are working on is to make the schema for the database available! This would enable institutions to duplicate the structure of our Specify collections management system to manage their own biological sample collection.

All resources are freely available and have been developed based on the knowledge and experience of leaders in the museums, zoos, and research sectors. Help us make biological samples collected in the past available for research in the present and future.

**Klara Nordén**, Department of Ecology and Evolution, Princeton University

#### *A non-destructive method to detect iridescent feather nanostructures*

Iridescent plumage coloration, which produces shimmering, metallic colours, has attracted awe and fascination from scientists and artists alike for centuries. However, the evolution of this trait in birds has remained mysterious. A major obstacle is the lack of fast, non-destructive methods to quantify iridescence. Iridescence arises from nanostructural ordering within feather filaments, and current methods rely on imaging feather cross-sections under a transmission electron microscope (TEM). This method is expensive, time-consuming and requires feather samples to be plucked from specimens. Thus, it cannot support large, macroevolutionary studies of iridescence. Here, I present a novel non-destructive method to detect iridescent nanostructures in feathers which only requires imaging of specimens (museum bird skins). Iridescent structures function as tiny mirrors, which gives them unique optical properties compared to pigmentary or non-iridescent structural colours. I exploit this by measuring the difference in the degree of polarization of reflected light from different types of plumage. Iridescent plumage reflects more polarized light than other plumage types, which together with light intensity can be used to distinguish them. My results suggest that polarization imaging could be a powerful, non-destructive and inexpensive way to quantify iridescent nanostructures. Ultimately, this method could lead to new insights into the evolution of iridescence.

**Patti Wood Finkle, Valeris Innella Maiers**, Werner Wildlife Museum at Casper College

#### *Humanities Programming in a Natural History Museum*

Many museums seek new opportunities to creatively collaborate, whether the collaboration is between artists and art museums, science fairs and science museums, or re-enactment groups and history museums. In this lightning talk, we will take these basic concepts and mix them up. What happens when a natural history museum begins collaborating with writers, artists, and others who have a humanities background? The Werner Wildlife Museum at Casper College, located in central Wyoming, is one such museum. We have actively reached out to local artists and writers and have hosted art shows, writing workshops, and other creative opportunities in order to bridge this gap in our visitor demographics. Once seen as a museum “full of dead things” we are working to encourage a new perception as a place for learning, engagement, and inspiration to people from all walks of life.

**Laura McCoy**, Manx National Heritage [@curatorlaura](#)

*The First Striped Dolphin on the Isle of Man, Working Collaboratively to Preserve it for the Manx Museum and Public*

The first ever striped dolphin (*Stenella coeruleoalba*) stranded on the shores of the Isle of Man just before Christmas in 2017. Volunteers tried to re-float it, but it stranded again and died not long afterwards.

The Manx Museum has several cetacean skeletons on display, including a sei whale, and I decided that the remains of this animal would be a valued addition to our displays with an interesting story.

As we are a small island, different departments and organisations often work in partnership, as no one organisation has every tool or expertise, and this was no exception, with the reporting, collecting, autopsy, scanning and skeletal preparation carried out by a group of organisations.

This specimen has been a learning curve not only for me, but for many of my colleagues, and it has been illustrative in the amount of information and support there is out there and what can be achieved if there is a will.

This short presentation will describe the journey of this specimen from stranding to preparation and discuss our future plans.

**Marion Dangeon, Elodie Granget, Latty Joane, Laura Brambilla**, Haute Ecole Arc Conservation-restoration [@liquor\\_project](#)

*Losing colour: the discoloration of plants in wet collections*

The discoloration of the specimen, with consequent coloration of the conservation fluid is a typical problem of botanical wet collections. Around 18 months ago, we have prepared some samples in fluid reproducing botanical wet collections with the aim of studying the problem of specimens' discoloration. Different types of plants were chosen: flowers, green plants, red and purple fruits, plants containing tannins, ... Some specimens were immersed in formaldehyde-base or FAA solutions for an initial fixation period before being transferred to the final conservation fluid. Others were immersed directly in the conservation fluid without prior fixation. The conservation fluids chosen were: 70% ethanol, commercial white rum, 70% glycerol and 4% formaldehyde. These samples have been monitored regularly for 3 months using imaging, colorimetric and spectroscopic techniques. These data showed that distinct kind of plants reacts differently according to the fixing process and conservation fluid. However, it could be possible to observe as a general trend a progressive and continuous release of dyes in the liquid, rendering it darker and darker. The same investigations have been performed after 18 months from the preparation. The specimens showed an inversion of the tendency, highlighting a probable process of dyes degradation. The results of these analyses, including imaging comparison, colorimetric measurements, UV-vis spectra and pH measurements, will be presented during the talk.

**Matt Riley**, Sedgwick Museum of Earth Sciences, University of Cambridge [@SedgwickMuseum](#)

*"After breakfast purchase fossils of Miss Anning": Jurassic Marine Reptiles in the Sedgwick Museum, Cambridge*

At the heart of the Sedgwick Museum's collection of over 2 million rocks and fossils, is a large collection of British marine reptiles. Both visually stunning and scientifically important, they are a huge draw to researchers and are the Museum's most heavily studied specimens year after year.

38 type fossils from Jurassic and Cretaceous age rocks are complemented by hundreds of additional articulated and disarticulated skeletal remains, collected by the likes of Mary Anning, Thomas Hawkins and Henry Keeping. Since 2015, these specimens have featured in at least 47 new research publications.

Construction of a new collections research centre - the Colin Forbes Building - has enabled the Museum to significantly improve storage of these amazing fossils. Purpose-built racking and bespoke lifting equipment now facilitates full access to many specimens that were previously too large or too heavy to access safely.

Recent conservation work, including repair and restoration of several Lias ichthyosaurs by Nigel Larkin and Sarah Finney, has further enhanced the display and research potential of these collections.

With the Museum's marine reptiles now fully accessible, we look forward to welcoming research visitors to the collection.

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2.45pm – 3.30pm

Fourth Session: Talks

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**Jazmine Miles-Long**, [@TaxidermyLondon](#)

*Taxidermy – Material Sustainability & Progression*

I am interested in exploring the materials used within taxidermy currently. Most (if not all) modern taxidermists are using a lot of plastic material within their work. Such as Polyurethane, Caulk (only a 15 year shelf life), Epoxy, Acrylic, hot glue (PVC) etc... Of which we have no long term data of its stability within Natural Science objects. Is this a practical way to be creating new work? We know taxidermy using traditional materials, wood, wire, wax and glass have withstood the test of time so should we rethink our current practices and how does this affect Natural History conservation in the future? Some larger objects such as Giraffes are completely molded with Polyurethane foam structures and now after 10+ years cracks are being seen where the plastic supporting structure is degrading inside. When acquiring newly commissioned taxidermy objects should this be part of the discussion with the taxidermist?

**Alexandra Alberda**, Manchester Museum [@ZandraAlberda](#) [@IndigeniseMcr](#)

*Indigenuity and Storytelling: Pluralising Natural Sciences and Environmental Knowledges*

What science do you use when telling stories and sharing knowledge about environmental breakdown and the 'natural' world? What communication methods, cultural in their validation and construction, do you use to engage colleagues, collaborators, and publics?

Through a convergence of storytelling and knowledge sharing, this presentation aims to pluralise Natural Sciences and environmental knowledges in order to engage with environmental breakdown from multicultural (and multispecies) perspectives. In order to, Traditional Ecological Knowledge (TEK), which has also been referred to as Indigenous Science, is presented as an important concept for telling different stories and knowledge of Natural Sciences that can inspire a more harmonious and connected relationship to lands, animals and plants. Indigenous scholars, practitioners, and activists propose that TEK can work alongside other ecological knowledge in order to find solutions to climate change and environmental breakdown that is emergent from the land, is responsive to specific areas and requires the much needed shift in culture and behaviour (i.e. Indigenuity, 7 generations thinking, and "cultures of gratitude...and reciprocity" (Kimmerer 2013; 2020)). In doing so, this presentation also engages in thinking about the different ways this knowledge is passed on and communicated, influenced by cultures, which might inspire different collaborative ways of engaging with our collections and empowering our audiences.



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