SUMMARY REPORT: ART-SCIENCE COLLABORATIONS IN THE ENVIRONMENTAL GEOSCIENCES

S1.1 OVERVIEW

This report details the outcomes of semi-structured interviews for qualitative research into the practice of art-science partnerships in the environmental geosciences. The objective of the research was to gain a deeper understanding of art-science partnerships that have resulted in inclusive opportunities for knowledge co-production across disciplines and audiences. This report is intended to provide a summary of the interviews and provide self-reflective notes on the interviews and experience-based guidance from the participants.

S1.2 PARTICIPANTS

The participants for the semi-structured interviews reported here were Kurt Jackson, a contemporary British artist; Natasha Smith, Exhibitions Officer for the Oxford University Museum of Natural History; and Dr Cécile Girardin, an artist and ecosystems scientist based at the University of Oxford. The participants led or were involved in the case study examples provided in "GC Insights: Enhancing inclusive engagement with the geosciences through art-science collaborations". The interviewees were asked in order to offer perspectives from an artist, scientist and exhibition officer. Findings of the semi-structured interviews were subsequently shared in a discussion with the OUMNH Public Engagement Team for further feedback and final reviews.

2.1 SEMI-STRUCTURED INTERVIEW QUESTIONS

The semi-structured interviews took place over Microsoft teams and audio calls with further detail provided over email. Following guidance from Kallio et al., 2016, the direction and themes of the semi-structured interview questions were directed by the results of the literature review. The key question themes were as follows and adjusted according to the interviewee:

- *Why participate in art-science partnerships?*
- *How does participating in art-science collaborations influence your artwork / research?*
- *What did you hope to show / inspire / achieve through the artwork or exhibition in question?*
- *Who were the intended audiences for this work / exhibition?*
- *What were your reflections on the process of creating this piece / exhibition?*
- *Do you have advice for partaking in art-environmental science partnerships?*

2.2 SEMI-STRUCTURED INTERVIEW RESULTS

Kurt Jackson

Contemporary British artist and Founding Director of the Jackson Foundation

Figure S1: 'Taxonomy of a Cornish Foreshore' by Kurt Jackson, on display as part of the Biodiversity exhibition at the Oxford University Museum of Natural History. The piece shows how the beach, the foreshore, has a particular resonance to many whilst also being a biodiversity hotspot, a liminal zone and the meeting point for ecosystems. As Jackson explains, "*a coastline is the front line where our impact is tangible and alarmingly visible - if we allow ourselves a moment we can see and be aware of the fragility, diversity and complexity of this world, but crucially also the beauty*". This work was on display featuring the following response from authors Rosalie Wright and Dr Lisa Wedding: "*When we gaze across this seascape, many of us will initially see a homogenous expanse of ocean. How can we protect what we don't understand or value? Upon closer inspection, the labels on the shoreline represent the many diverse species found within this unique coastal habitat. The viewer begins to see the significant biodiversity that coastal habitats support. This brings us together, as both scientist and artist seeking to identify and place value on the diversity of coastal life, highlighting the awe-inspiring ecosystem complexity and enabling us all to see the value in protecting the oceans."* (Image credit: Museum of Natural History by Ian Wallman, pixieset.com)

Where did your interest in art-science begin?

"The science and the art have always gone hand in hand for me. I came from an artistic family, who were also engaged with the environment. I've since managed to fuse them [science and art] and created the Foundation [Jackson Foundation], which has fused mine and Caroline's beliefs. The Foundation is about using art as an educational tool. We want to raise awareness of the beauty and the fragility of everything around us."

Why use art-science approaches?

"Engaging with art can broaden world views and introduce new viewpoints. Art also helps to open up conversations, make things more joyful and accessible - whilst it's important not to reduce the science, we need to speak to everyone."

"There seems to be a sharing of enthusiasm [between artists and scientists], as we both have a degree of fascination in what we are observing. Observational skills too, we share these but maybe have different responses – whether it's written word, or visual art language, statistics – at the end of the day we are all witnessing the natural world and responding in our way, likely for the same reasons of delight, interest, respect and often to show our concerns. There is a lot in common."

"When you engage with another language, as it where, you see other viewpoints and other ways of seeing things. I think that can be really rewarding and positively impact your own work. I speak with scientists regularly and it's an absolute delight to speak to enthusiasts. The art can help to open things up; make it more accessible and sometimes more informative, more engaging. You want to do it in a way that doesn't dampen the seriousness of the science, but it's important to speak to wider audiences. It's essential."

How do you engage with the public?

"Recently, I worked with Surfers Against Sewage and members of the public who do beach cleans. They shared material that they had found for me to use as collage. I've also worked with a number of environmental pressure groups to raise funds or awareness, which has been a good byproduct of the work. There's a space in the foundation gallery to work with NGOs, campaign groups etc, in addition to the big gallery space. The other focus of the foundation [in addition to environmental] is more humanitarian, increasing accessibility, bringing communities together and encouraging people who wouldn't normally perhaps go to these spaces to come in, since we're located in a largely post-industrial, economically deprived area of Cornwall."

How do people respond to the works?

"People have found some works a bit depressing – one series created from beach cleans, for example, was shown in Cornwall with so much climate negativity, some people can't face the exhibition. There have been requests to focus more on the beauty of the marine life. It's tricky to find the balance in what to show. However, there was great feedback from COP26 exhibitions from the general public and the media. And for 'Biodiversity', we get some lovely responses from the audiences. They've been sending things that they've made themselves; it never occurred to me that audiences might respond in this way."

What did you hope to show/inspire through 'Taxonomy of a Cornish Foreshore' (Fig. 1)?

"The beach, the foreshore can be a place of meaning; the holidays, the annual pilgrimage, those memories. It has a particular resonance to many of us but more fundamentally the beach is also a biodiverse hotspot, a liminal zone, the meeting point for a number of vital ecosystems. Yes, we pick up seashells, we may look into rock pools or see the gulls but the spectrum of life that inhabits these coastal habitats is vast and often goes unnoticed. On the painting I scrawled in the sky the names of the species that readily showed themselves but then researched what has been found on this one shoreline and added their roll call as the labels. I wanted to show what is there, should be there when put under scrutiny. I want the audience to be aware of this other dimension to a place that is maybe normally seen just as work and recreation - sea and sand."

"The coastline is the front line where our impact is tangible and alarmingly visible- if we allow ourselves a moment we can see and be aware of the fragility, diversity and complexity of this world, but crucially also the beauty. Not just the aesthetic grandeur but also the extraordinary natural world."

Do you have advice for those hoping to take part in an art-science project/partnership? (environment/biodiversity related)

"As a visual artist that engages with the natural world I have come to realise the necessity of being informed, through research, dialogue and collaboration with those actively involved in the relevant field. There needs to be an understanding and knowledge of the natural processes, combined with a passion, enthusiasm and creative ability for the artist to be able to communicate. Only then can an artist facilitate the understanding of the environment. For the final work to have any profundity or agency the creativity needs to be underpinned by genuine research and knowledge."

Natasha Smith

Exhibitions Officer for the Oxford University Museum of Natural History

Why use art-science approaches?

"Across our exhibitions and events programme, the Museum has engaged art-science approaches to connect visitors to natural history and contemporary research."

"The aim of our Contemporary Science and Society exhibition series is to connect the research power of academic departments at the University of Oxford with the public engagement expertise of the Museum. Integrating contemporary art into these exhibitions provides an opportunity to engage wider audiences with research, attracting an audience who may be engaged with the arts but less likely to visit a science museum, by offering different perspectives on natural history."

"The emotive power of art can provide space for individual interpretation and reflection on the subject, as well as foster conversations and dialogue between visitors. In the case of our most recent exhibition Biodiversity: Kurt Jackson research from the University of Oxford was interwoven with Kurt Jackson's artworks and specimens from the Museum's collection, aiming to inspire visitors to appreciate the natural world around them."

How do art-science collaborations contribute to the Museum's outreach and engagement strategies?

"The interface between art and science is embedded in the Museum's history. As a striking example of Victorian neo-Gothic architecture, the building's style was strongly influenced by the ideas of 19th-century art critic, John Ruskin. Ruskin believed that architecture should be shaped by energies of the natural world, and thanks to his connections with a number of eminent Pre-Raphaelite artists, the Museum's design and decoration now stand as prime examples of the Pre-Raphaelite vision of science and art."

"Our exhibition and events programme presents contemporary science alongside art, in line with the Museum's strategic aim of expanding the appeal of public engagement with science. By exploring the arts:science interface, we aim to communicate natural history to as wider audience as possible, attracting an audience who may be engaged with the arts but less likely to visit a science institution."

What are the key reflections and takeaways from the 'Biodiversity' exhibition (Fig. 1)?

"We are currently in the process of creating a full evaluation report of the exhibition, which we would be happy to share once it's been finalised. As a top-level summary, over 110 tracking surveys & 15 interviews interviewees gave positive feedback about the exhibition, particularly commenting on how Kurt Jackson can make the everyday and ordinary seem so extraordinary, and how the exhibition provoked reflections amongst visitors on biodiversity and habitat loss. The predominant feeling interviewees associated with the exhibition was feeling inspired, demonstrating the power of art in connecting audiences with natural history."

What were the aims, messages and intended audiences for the 'Biodiversity' exhibition?

Main Aims

1. By presenting Kurt Jackson's work and view of biodiversity, we will provide a space to reflect upon how biodiverse the world we live in is and how this is changing.
2. We want the museum to be seen as:
    a. An active centre of research: Biodiversity will connect research from the University of Oxford with Kurt Jackson's works and specimens from the museum's collection.
    b. A place of environmental responsibility: Biodiversity will address key issues surrounding biodiversity loss, and connect visitors with contemporary research and conservation projects that tackle the current biodiversity crisis.
    c. A space for discussion: Biodiversity will provide opportunities for reflection and facilitate discussion through posing questions to visitors and capturing visitor responses. By incorporating researchers' personal responses to the artwork visitors will be prompted to think about what biodiversity means to them.

Audiences

1. Primary audience: adults and young people
2. Secondary audience: families

Main Messages:

1. We live in an incredibly biodiverse world
2. Nature is everywhere
3. Each environment has its own specific species interactions

Secondary Messages:

1. The need to document biodiversity
2. The need to preserve biodiversity

Impact tracking statistics from the exhibition

- Exhibition visitors: 197,690 visitors during its run from 3 February to 15 May
- Webpage views: 9,518 (22 Jan – 19 May)
- Biodiversity event programme attendees: 178

Dr Cécile Girardin

Technical Director of the Nature-based Solutions Initiative, The University of Oxford

Figure S2: Cécile Girardin's COP26 mural to communicate and engage wider audiences in the outcomes of the recent COP26 climate negotiations. This visualisation of the discussions taking place and decisions at the core of the negotiation process – such as agreeing on the modalities of the Paris Rulebook; the adoption of the Glasgow Climate Pact - was created during and responding to the conference proceedings. The dynamism of the piece invites viewers to interpret the interconnectedness of nature, climate, and society, explore the complexities of the climate negotiations, and alludes to some of the key debates that shaped the COP26 talks. The team worked with conference participants, relying on Dr. Girardin's extensive network of experts developed from previous UNFCCC climate negotiations, to provide a summary suitable for all audiences. Dr. Cécile Girardin is an ecosystems scientist and artist whose research focuses on the potential for Nature-based Solutions to respond to climate change. (Image credit: Cécile Girardin, http://www.cecilegirardin.com/)

How does participating in art-science collaborations influence your research?

"Synthesising complex concepts into illustrations helps me communicate the research I am involved in better: in presentations, in writing, and in illustrations. Working with a range of scientists and negotiators at events helps me forge collaborations and create connections in a creative way."

Why use art-science approaches?

"There are many benefits to being creative. Creativity and science go hand in hand. Historically, most natural scientists were illustrators. We only started artificially separating these skills in modern science. Clarifying the messages that come out of science is useful for communicating concepts to a lay audience, policy makers, and to decision makers. It is also very useful to harbour multidisciplinary work - my conference posters help scientists working in a similar area from different disciplines communicate and find synergies between their work."

What did you hope to show/inspire through the COP26 Mural (Fig. 2)?

"The aim of the piece was to build bridges between the thousands of activists civil society representants demonstrating in Glasgow and around the world, and the thousands of negotiators debating day and night over technical points on how to implement the Paris Agreement, and how to keep warming below 1.5 degrees C above pre-industrial levels. We wanted to explore the complexities of the climate negotiations, and the piece alludes to some of the key debates that shaped the Glasgow talks."

What were your reflections on the process of creating this piece?

"I am proud of the work we created. We managed to communicate the complexities of the climate change negotiation process in a digestible way. I think oversimplifying these issues can lead to dangerous unintended consequences, and people in and around the negotiations need to understand the subtleties of the negotiations - issues like common timeframes, loss and damage, etc. rarely see the limelight in the public sphere. I hope people who explore the mural will be curious and dig deeper into the mechanics of the negotiations."

"My favourite quote from the mural is "Keep Carbon underground, what comes up must go back down" - a clear summary of the need to decarbonise our economy at unprecedented rates and the need to remove greenhouse gases from the atmosphere if we are to "keep 1.5 alive, with no overshoot". For examples, one of the main technical outcomes of the conference was the establishment of common timeframes. Professor Beniro Müller (depicted in the mural) played a central role in the development of common timeframes in the negotiation of the Paris Rulebook (see https://www.ox.ac.uk/news/2021-11-17-cop26-dont-forget-successes-oxford-experts)"

3 SELF-REFLECTIVE NOTES AND GUIDANCE

The results of semi-structured interviews and roundtable discussions have been synthesized and summarized into the advice detailed below, following a review by the participants.

Establishing a partnership	***During a partnership***	***Post-partnership considerations***
Seek insight from previous collaborations to help guide project ideation - there is no one way to participate in an art-science collaboration.	Plan plenty of time throughout the project to critically evaluate and reflect (as a team).	Evaluate the short- and long-term impacts of a project to reflect on the collaborative process and achievement of co-developed aims.
Build relationships based on mutual understanding, trust and respect for different areas of expertise, allowing for equitable partnerships whereby artist and scientist may learn from one another.	Create safe spaces for the exchange of ideas and reflective practice - be prepared to adapt and adjust throughout.	Share evaluated findings to contribute to the evidence base on best practice for art-science partnerships.
Collaborate from the very beginning of the project to co-develop aims and tangible outputs, establishing shared responsibilities.	Engage the public within the project itself (where possible) to contextualise the work and ensure it addresses relevant needs and priorities.	Support the provision of training for geoscientists in positive and engaging science communication methods that are grounded in social science research.

4.1 LIST OF PARTICIPANTS

Name	***Organisation, Role***
Kurt Jackson	Jackson Foundation, Founding Director
Caroline Jackson	Jackson Foundation, Founding Director
Natasha Smith	Oxford University Museum of Natural History, Exhibitions Officer
Dr Cécile Giradin	Nature-based Solutions Initiative, The University of Oxford, Technical Director
Dr Lisa Wedding	School of Geography and the Environment, University of Oxford, Associate Professor
Janet Stott	Oxford University Museum of Natural History, Deputy Director and Head of Public Engagement
OUMNH Public Engagement Team	Oxford University Museum of Natural History

4.2 REFERENCES

Kallio, H., Pietilä, A.-M., Johnson, M., and Kangasniemi ,M.: Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. J. Adv. Nurs., 72(12), 2954– 2965. https://doi.org/10.1111/jan.13031, 2016.

4.3 LINKS

https://www.kurtjackson.com/about/

https://oumnh.ox.ac.uk/biodiversity-kurt-jackson

http://www.cecilegirardin.com

https://www.ox.ac.uk/news/2021-11-17-cop26-dont-forget-successes-oxford-experts