

PICTURING CLIMATE: STEPS TOWARDS EMBEDDING ARTISTIC PRACTICE INTO CLIMATE CHANGE RESEARCH

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INTRODUCTION

Climate change represents a paramount challenge within the contemporary era, marking a critical juncture in human history. From shifting weather patterns that threaten food systems, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale.¹ Without drastic action today, adapting to these impacts in the future will be more difficult and costly.² However, much of the science that predicts and models climate systems and climate change is not typically seen by publics and therefore remains mystified in popular culture, hidden behind specialist terminologies. This lack of engagement with climate science could be improved by introducing new ways for climate scientists to engage with the public by employing the creativity found within the visual arts. Communication as a multidisciplinary endeavour and its ability to educate and inform the public remains a critical tool as we reach such a crisis. This paper proposes that a potential way to achieve deeper cultural communication of climate science is to establish ways of demystifying and ‘picturing’ the complexities of climate by directly embedding artistic practice into climate change research, employing an interdisciplinary approach to exploring, encouraging and enhancing collaboration between visual artists and climate science communities. This can result in a greater connection between climate science and communities by bridging the gap between specialist knowledge and public understanding of critical issues via a visual language. This paper acknowledges the principle that *understanding* the anthropogenic cause of climate change is the strongest predictor of climate change risk perceptions.³ Thus, raising climate literacy through a shared cultural vocabulary is vital to public engagement and support for climate actions. A shift from representing the past effects of climate change through alarming imagery to one more representative of how climates are understood and studied (such as via prediction, modelling and curiosity) can help shift the perception of climate change from ‘unchangeable’ to that of a participatory problem that can be overcome through collaboration.

A CASE FOR INCREASING COLLABORATION

Communication research has found that multi-faceted and complex issues such as climate change can result in the issue itself being ignored and in an individual’s failure to act and take adequate measures to try and resolve the problem.⁴ Further, strictly science-based messages have been shown to increase public polarisation on controversial scientific issues such as climate change, and simply providing scientific information is not enough to communicate climate change and inspire change.^{5,6} This is besides the fact that there are over 88,125 (and counting) scientific papers that study earth’s climate in

relation to climate change⁷—making it an incredibly dense and multi-modal concept to comprehend. Unsurprisingly, when problems are simpler to visualise, such as air pollution, people do indeed find it easier to relate to them.⁸ Thus, given the difficulty of seeing and representing the *causes* of climate change, as well as the *climate itself* and changes within it, the role of visualisations and the use of imagery have become pressing topics of exploration within climate communication research. Therefore, it is crucial to make the hidden aspects of climate science and climate change more visible. The creative use of visual arts and related media can be better integrated in a way that goes beyond producing images that we are used to seeing, such as melting glaciers, natural disasters and infographics. Much like Susan Sontag proposed in *On Photography* in the 1970's, repeated exposure to shocking images can lead to desensitization, a phenomenon she describes as an erosion of 'shock value.'⁹ Picturing climates and climate change is a complex endeavour, and the climate scientists collecting and analysing data could certainly benefit from creative strategies to disseminate it effectively as well.

Visualising Complexity

As a practicing visual artist who has visited over 40 laboratories and field research stations, I can attest to the burdens in representing scientific concepts and experiments, such as understanding dark matter and massive particle accelerators, or the dense concepts surrounding quantum entanglement. The disciplinary knowledge gaps can be massive when considering practical expertise and training. This certainly does not exclude the expertise required to study the incredibly complex factors that make up climates and climate change. However, curiosity and creativity can lead to invigorating ways of working together and lead to an understanding of the similarity of each other's goals and motivations.

Climate science terminologies such as karst systems, speleothems, and U-Th dating are unfamiliar terms to all but experts, and leave little space for fruitful dialogue amongst non-experts. As such, an interdisciplinary, collaborative and visual approach to climate science communication is much more likely to be effective in connecting with the public, stakeholders and policy-makers.¹⁰ Some research into how collaborations between climate scientists and visual artists have addressed the problem of visualising climate and its impacts exists; however, this research is often limited in scope and does not consider a systematic way of embedding the arts within climate science, and often considers artistic practice in isolated circumstances. As an example, a recent publication drew from a linked project pairing six artists and six scientists exploring conservation issues in the Sonoran Desert in California.¹¹ It resulted in many positive outcomes, with one scientist quoted as being “much more prone to think about integrating an artistic approach with my science, or from the start of a scientific project thinking about how I might be able to communicate either the process of doing the science or the results of the science in a much more artistic way.”¹² This enthusiasm for collaboration is quite common after the fact. However, there are very few established guidelines for such collaboration and—from my own experience—most researchers do not know where to start.

A (Very) Brief History of Art/Science Collaboration

This may come down to the fact that the British art-science field has a short history. Emerging in the 1990s, it has mostly been predicated on the ‘public understanding of science’ paradigm: that art can communicate science and its social, cultural and ethical dimensions.¹³ This includes a history of popularising science and communicating the more visual aspects of scientific endeavours, often with the aim of offering wider social engagement with scientific principles and ideas. Many collaborations today are mainly driven by a similar desire to popularise science and enhance its cultural and ethical resonance within society. Examples include initiatives such as the British Science Festival, the

Wellcome Collection exhibitions and the Science Museum's Dana Research Centre events, which are exemplary of efforts to bring science to the public through artistic expression.

However, the intersection of art and science remains a niche area, rarely *embedded* into the process of knowledge construction in a truly collaborative and innovative way. There remains a vast disciplinary boundary around the contemporary institutions of art and science, despite the fact that both are equally invested in understanding the world around us and share similar philosophical origins. The reasons for such disciplinary boundaries are manifold, ranging from institutional barriers to the challenges of translating increasingly abstract and complex scientific data into visually compelling narratives.

Perhaps the most well understood instances of contemporary art/science collaboration are artist in residencies (AiRs) that embed artists within the spaces of science production. However, these are not necessarily fit for purpose within climate science as they are often relegated to large multi-billion-dollar science projects such as CERN located within the European Organization for Nuclear Research.¹⁴ One reason being that such projects are so large in scale that significant amounts of public monies have been dedicated to their operation, and thus it is necessary to disseminate (and justify) the work of the project to the non-specialist public. This public funding eventually trickles down to include artistic dissemination in an effort to support communication, though no such centralised mechanism exists within climate research institutions. Within this context, AiR programmes are also always a bi-product of scientific inquiry, destined to a communicative rather than philosophically investigative role in the project.¹⁵

Clim/Art as a Testing Ground

If we are to pave new ways that the humanities can interact with the sciences and provide benefits via collaboration, the climate sciences can be an ideal testing ground for new strategies given its un-centralised, dispersed global nature. What is learned can then be trickled down to other fields of science where more community and cultural involvement would also be beneficial.¹⁶ Further rationale can be found in the fact that it has been shown that perceiving climate-related art provides a personal and direct experience with climate change, providing the emotional basis for deeper understanding and taking individual action.¹⁷ Visual art can also provide *the* direct personal experience of climate change, for those that have not yet been affected by it in a significant way, making viewers see climate change as less uncertain and feel more confident that their actions will mitigate it.¹⁸ A shining example within climate science is the collaboration occurring within the *Cape Farewell* project. Since the early 2000s, it has brought together artists and scientists to create works of art and new visual strategies that communicate the urgency of climate change. The project demonstrates how successful and long lasting such interdisciplinary actions can be; hinting at the potential of further embedding (and normalising) such interdisciplinarity into the practice of climate research.

This paper proposes that properly embedding artists into climate change science means introducing collaboration as early as possible, such as during the grant writing process, and imagining early on what value visual art can add to the impact of current scientific research. Much research shows that interdisciplinarity can not only invigorate both disciplines in many ways¹⁹—which will be discussed later in this paper—but can also positively impact the ways independent researchers consider their own expertise within the fields. Mindfulness of other disciplines allows practitioners to more effectively engage the public and have an impact on communities by challenging and transforming existing ways of thinking about the nature of art and science.²⁰ Shifting cultural norms in climate science and its communication requires creativity, community involvement, and a shift to dynamic narrative-based communications, in which the visual arts excel. Considering the scale of the climate

change problem, it is important to consider how the public perceives it and how communication about it can improve.

APPROACHES

As mentioned above, climate science functions in a very different way than particle physics or other projects that rely on massive capital expenditures or centralised facilities. Climate science is much more dispersed internationally and employs countless scientists and science teams to collect data at sites dotted around the world. There is, however, another way to conceptualise how we design artistic collaboration within scientific environments than residencies. Rather than an afterthought, embedding the artistic into scientific research from the education of new graduates and the grant-writing stages of project proposals could offer many benefits that would enable more creative experimental design.²¹ Embedding artists within science teams affords the opportunities of communication that much climate science is predicated on; as there is no point in studying the climate if no one believes, is listening to or cares about the research being conducted. Thus, if an artist can conceptualise a way to communicate the importance of data alongside its collection and analysis, and possibly contribute to new ways of thinking about the very data that is being collected, it is more likely to happen if involved at all stages of any given project. The added value of having a cultural producer within the study of a planet changed by human endeavour, should not be overlooked. This foundation will be explored in more depth below.

Networks

The key for the kinds of connections and collaborations envisioned above are significant and adequate networks that stress the shared interests and desires to work towards a common intellectual cause, yet highlight unique and distinct skillsets that could benefit potential research projects and aims. Climate communication is an area that has a very high likelihood of communicative alignment between artists and scientists. There are many artists that recognise the climate as a significant contemporary concern that is worthy of dissemination and contextualisation through artistic production. Undoubtedly, there are many scientists that engage in earth sciences due to produce data that makes a difference within the contemporary climate crisis. Both sets of individuals have a shared intellectual goal, yet lack either the cultural or scientific skills to tackle the problem alone. A network dedicated to ‘picturing climate’ in its broadest sense is a necessary starting point towards merging these two vital and interconnected skillsets and motivations. This shared goal—alongside the dispersed nature of climate science occurring in pockets internationally—points to what potential a network has towards fostering collaborations among those who would likely never connect.

As climate research is not based at a handful of research sites, but is dispersed amongst countless regions globally, opportunities for collaboration are not as obvious and natural as larger shared sites of research such as CERN where scientists interact at an international level. Networks serve as important tools with the potential to connect interdisciplinary researchers across the disparate and often evolving sites of climate research. An active network grounded by climate scientists and artists trained in visualising hidden contemporary phenomena can and should also include a variety of related researchers and stakeholders, such as: climate communicators, museum curators, philosophers of science, NGO’s, communities and government/policy stakeholders. Network activities should primarily host international hybrid networking conferences bridging thought leaders dedicated to the task of investigating how collaboration can benefit each discipline. However, further activities such as producing an online platform that maps research and researchers geographically, disseminates collaborations as they occur, provides best-practice for future collaborations, promotes potential opportunities and highlights pilot project outcomes is necessary. As both climate science and artist

networks are often tight-knit communities, a legitimate network that embraces collaboration between the two disciplines would be easy to promote and disseminate for those interested in participating. However, a strong network needs the kind of projects that can pave the way for collaboration and point researchers in the right direction.

Pilot Projects

In order to activate and inspire a network focussed on picturing climate, pilot projects are a necessary precursor and ongoing challenge to disseminate the benefits, challenges and pitfalls of collaborative activity. Moments of ‘convergence’ is a term that can reference the construction of interdisciplinarity as an active process of knowledge and practice assembly.²² By instigating interdisciplinarity within fields where there is little cross-pollination but shared interest, interdisciplinarity itself becomes a research methodology that can arouse new perspectives, new spaces for innovation, and even new disciplinary syntheses. Properly designed pilot projects should be co-created by multi-disciplinary teams and focus on innovative strategies of co-production that involves invested project partners and diverse community organisations to help disseminate the work being done. Artists can gain insights that can turn into *informed* cultural communication and artifacts, while scientists gain perspective of new ways of disseminating their practice and a cultural understanding of their own research. Pilot projects can thus provide the inspiration, direction, and best-practices for network members to help develop the impact of research from both disciplines, serving as an initial archive for future researchers and research papers analysing the impacts of such activity.

Pilot projects should be grounded within questions and concerns affecting communities where the participants are based including underrepresented and minority participants, via consultations with project partners. Project partnership case studies can then include diverse strategies, such as: (i) mentorship pilot projects that focus on mentoring artists/scientists from underrepresented communities in the Global South, (ii) artist in residency pilot projects that can embed artists in climate science laboratories or established field research stations, (iii) Indigenous knowledge pilot projects that support different knowledge economies into a contemporary understanding of climate, and (iv) pilot projects that ingrain an understanding of how climate justice can be integrated into the practice and dissemination of climate awareness. Arts, sciences and community collaborations can then act as case studies that “assemble to reveal new insights...by opening up new scales of visibility, or by articulating alternative conceptual paradigms that realise new deployments of arts and sciences”.²³ The purpose of the above pilot projects and case studies would be the legitimisation of such activities, so that the inclusion of artistic practice within climate research becomes obvious, and a network supporting such activity could be referenced in grant proposals within scientific funding circles, but also leading arts council grants and related funding opportunities.

CONCLUSION

Only when properly integrated will it become common practice to collaborate, and networks and pilot projects can lead the way towards such normalisation. Such activity naturally lobbies, through original research and proof of concept, for an increase in creative interrogations alongside climate research. However, it does not necessarily address the barriers to such collaborations. Pilot projects and an active network are thus key towards building the vocabulary and resulting literature that will emanate from such collaborations, and hopefully begin to address and resolve the barriers of working relationships. These can include the aforementioned disciplinary gaps in knowledge and skillsets, but also matters of trust in research and barriers towards instigating, planning and executing truly collaborative projects. Comprehensive case studies must be presented to research councils and scientists demonstrating the effectiveness of arts-based research on climate science dissemination,

alongside its ability to serve and inform communities. The production of a legitimate network with external stakeholders and diverse pilot projects can showcase tangible benefits, providing a toolkit for integration and engaging with policy makers can begin to address barriers that are obvious, but also barriers that arise in much more specific circumstances to specific research problems and questions.

NOTES

¹ IPCC. 2022. *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Edited by H.-O. Pörtner et al. Cambridge, UK and New York, NY: Cambridge University Press. <https://doi.org/10.1017/9781009325844>

² IPCC, *Climate Change 2022*, 8-15.

³ Tien Ming Lee et al., "Predictors of Public Climate Change Awareness and Risk Perception around the World," *Nature Climate Change* 5, no. 11 (2015): 1014.

⁴ Anthony Giddens, *The Politics of Climate Change* (Cambridge, UK: Polity Press, 2020), 4-7.

⁵ P. Sol Hart and Erik C. Nisbet, "Boomerang Effects in Science Communication: How Motivated Reasoning and Identity Cues Amplify Opinion Polarization about Climate Mitigation Policies," *PsycEXTRA Dataset*, 2014, 714-17.

⁶ Christian A. Klöckner, "What Is Environmental Communication and Why Is It Important?," *The Psychology of Pro-Environmental Communication*, 2015, 3-19.

⁷ Mark Lynas, Benjamin Z Houlton, and Simon Perry, "Greater than 99% Consensus on Human Caused Climate Change in the Peer-Reviewed Scientific Literature," *Environmental Research Letters* 16, no. 11 (2021): 114005.

⁸ Matthew C. Nisbet, "Communicating Climate Change: Why Frames Matter for Public Engagement," *Environment: Science and Policy for Sustainable Development* 51, no. 2 (2009): 12.

⁹ Susan Sontag, *On Photography* (London, UK: Penguin, 2019), 17.

¹⁰ Susanne C. Moser, "Reflections on Climate Change Communication Research and Practice in the Second Decade of the 21st Century: What More Is There to Say?" *Wiley Interdisciplinary Reviews: Climate Change* 7 (2016): 345-369.

¹¹ Sarah E Clark et al., "6&6: A Transdisciplinary Approach to Art-Science Collaboration," *BioScience* 70, no. 9 (2020): 821-829.

¹² Sarah E Clark, 6&6, 825.

¹³ Barry, Born, and Weszkalnys, "Logics of Interdisciplinarity," 31.

¹⁴ CERN offers residencies that allow for artists and scientists to interact within the laboratory environment focusing on the world of particle physics. Another such project is the IRB Barcelona artist in residency programme which focuses on fostering post-anthropocentric microbiology literacy in society and encourages collaborations that explore microcellular landscapes.

¹⁵ Of course, this also means that the budget for artistic explorations into such things as the meaning, ramifications or rationale for new and possibly disrupting discoveries (be it the Higg's Boson, dark matter or quantum quarks) are very minor when compared to the scientific funding. As an example, in 1997 the Large Hadron Collider project cost 4.71 billion dollars to initiate, and has an annual budget of 1.7 billion USD as of 2022. It offers residencies worth 18,000 USD, which represents approximately 0.00001% of its annual operating budget, or metaphorically, a single grain of sand on an entire beach.

¹⁶ The embedding of artists within the sciences seems like a natural way to embed new ways of thinking about the place of advancing knowledge production within culture and the cost/benefit of disruptive technologies due to scientific discovery. Considering that the climate crisis is itself a result of—at least in part—the many technological advancements that science has directly (if unknowingly) contributed to, it is rational to consider new ways of intersecting the humanities and creative fields into its discourse.

¹⁷ Liselotte J. Roosen, Christian A. Klöckner, and Janet K. Swim, "Visual Art as a Way to Communicate Climate Change: A Psychological Perspective on Climate Change-Related Art," *World Art* 8, no. 1 (2017): 91-92.

¹⁸ A. Spence et al., "Perceptions of Climate Change and Willingness to Save Energy Related to Flood Experience," *Nature Climate Change* 1, no. 1 (2011): 46-49.

¹⁹ See: Jennifer Gabrys and Kathryn Yusoff, "Arts, Sciences and Climate Change: Practices and Politics at the Threshold," *Science as Culture* 21, no. 1 (2012): 1-24.

²⁰ Andrew Barry, Georgina Born, and Gisa Weszkalnys, "Logics of Interdisciplinarity," *Economy and Society* 37, no. 1 (2008): 20-49.

²¹ Martin Braund and Michael J. Reiss, "The 'Great Divide': How the Arts Contribute to Science and Science Education," *Canadian Journal of Science, Mathematics and Technology Education* 19, no. 3 (2019): 221-224.

²² Henry Buller, "The Lively Process of Interdisciplinarity," *Area* 41, no. 4 (2009): 395-403.

²³ Jennifer Gabrys and Kathryn Yusoff, “Arts, Sciences and Climate Change: Practices and Politics at the Threshold,” *Science as Culture* 21, no. 1 (2012): 7.

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