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Climate museums: powering action

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ABSTRACT

Innovative museums dedicated to climate change have opened over the past decade. At the same time, increasing numbers of established museums are rethinking their missions and activities to refocus on care of nature and its people, using diverse approaches and methods. While the museum sector has only recently started to draw together in more interlaced conversations about shared goals in the face of the climate crisis, there is nevertheless a notable degree of cohesion of mission across these institutions as they face the shared global challenge. The missions and activities of five climate museums in Bremerhaven, Hong Kong, Rio, New York and Oslo are explored, finding high levels of audience reach and impact. This paper focuses on the ways these museums are helping people to understand, care about and act on the climate crisis, stepping up to local and global collective efforts to bring the changes we need.

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“The Climate Museum is clearly a leader in the movement that might just save us from ourselves.”

Tom H., visitor, *Taking Action* exhibition, Climate Museum, New York.

A set of powerful institutions has emerged in the public science and culture space over the last decade. These are pioneering centres dedicated to supporting and inspiring the public to learn about, come to terms with, and gather tools to take action on climate change. They may use a variety of terms to describe themselves, but all their modes of operation can be encompassed under ‘climate museum’. This paper offers an opportunity to get inside these bold, innovative places, to understand the people and the drivers that led to their creation, along with their missions, priorities, methods and reach.

Museums dedicated to climate change are certainly few. Here we explore five and give a quick introduction to several others. Our journey begins with the opening of the Klimahaus Bremerhaven 8° Ost in 2009. Then we move to the Jockey Club Museum of Climate Change at the Chinese University Hong Kong (2013), before travelling to Rio to the Museu do Amanhã (Museum of Tomorrow) which opened in 2015. We then explore the approach and impacts of Miranda Massie’s Climate Museum in New York (2016). We finish with a glimpse into one of the most recent climate-dedicated museums, Klimahuset, in Oslo (2020). It is heartening that other new initiatives are also focussing on human

responsibility for creating a positive future: the Futurium in Berlin (2019) and the Klima Arena in Sinsheim, Germany (2019). The latter is an adventure centre for ‘climate experience’, which promotes ‘intensive discussion with us, our present, and above all our future’ (Klima Arena 2020). There is a huge Museum of the Future under construction by the Dubai Future Foundation. This group has already produced an exhibition for the World Government Summit in 2017, promoting the United Arab Emirates as a future producer and exporter of climate solutions.

The form and content of all these museums, and the networks and digital museums I consider briefly near the end, are markedly different – but their missions have a high degree of cohesion as they face a shared global challenge. All focus on connecting to people and empowering them to learn and take positive action.

All of these initiatives are experimental and have moved beyond relying solely on text panels and cases of objects. Like most new public centres of culture and science, built within the landscape of the New Museology, these ventures are highly participatory. They are dialogic rather than simply didactic. All focus on telling stories that matter, using compelling voices and emotional resonance, and connecting the local to the global. They are taking action, overtly or implicitly, to advance the UN Global Goals for 2030 (the Sustainable Development Goals) in their public mission. Put simply, all are dedicated to igniting care and providing tools to act on that care.

Museums taking this mission forward are worth understanding because it is clear we need more of them. Levels of understanding and concern about the climate crisis are rising in many countries, though there is a long way to go. A 2015 global study by the Yale Program for Climate Change Communication found that globally, four in ten people had not heard of climate change. The weighting of awareness of climate change is higher in the Global North (over 75% in most countries) (Lee et al. 2015). In the Global South, the causes of locally observed changes are less known. Awareness of climate change across many parts of South-East Asia, India and Africa can be as low as 30%–39% (Ibid). This restricts capacities to respond. While awareness may be higher in the Global North, in many countries underestimation of personal risk is common. Countries in the Global South that have higher levels of climate change awareness tend to have more realistic assessments of risk and levels of concern (Ibid). The Yale Program discerned six audience segments: ‘Alarmed’, ‘Concerned’, ‘Cautious’, ‘Disengaged’, ‘Doubtful’ and ‘Dismissive’ (Leiserowitz et al. 2020). Even within the largest segment, ‘Alarmed and Concerned’ (73% of the population in the USA in 2020), taking action does not often follow. Many respondents express discomfort with discussing climate issues. In the USA, of over 25,000 people asked over the 2008–2020 period if they ‘discuss global warming at least occasionally’, 64% responded ‘Rarely’ or ‘Never’ (Marlon et al. 2020). There is an urgent need for more leadership from entities skilled in engaging the public, providing reliable, relevant, empowering information from a source that people trust. And there is an urgent need for safe spaces for questions and dialogue. There are few ways to declare ‘this matters’ quite as loudly as setting up a dedicated museum.

As befits an enterprise that deals with disruptions to the complex, interrelated systems governing life on the planet, creators of institutions dedicated to climate action describe their initiatives with terms that reflect the broad, non-traditional nature of their endeavour: ‘public attraction’, ‘a mix between science centre and theme park’, ‘climate house’

or ‘extracurricular learning centre’. They all use objects and exhibitions, no matter how contemporary or spare those objects might be. They are often not active collecting institutions. Nonetheless, in the current conceptual landscape, the term ‘museum’ is sufficiently boundary-crossing, dynamic, inclusive, hands-on, sufficiently attentive to nature, science, technology and culture, and sufficiently connected to the world to encompass the work of the five museums of climate change featured here. This paper has been informed by discussions with staff, by visits to these museums’ rich digital presences, and by data they have generously provided. Being uneasy about flying while calling for climate action, I have not visited in person. It should be noted that despite restrictions and long closures due to COVID-19, each museum has found creative digital and controlled in-person ways to retain connections to audiences.

As those who established these museums know, it is crucial to extend climate outreach to those who feel they ‘belong’ in a museum by finding keys to open doors (Simon 2016; see also, Krmpotich and Peers 2013; Newell, Robin, and Wehner 2017). It is also crucial for museum staff to go through these doors into communities to have meaningful conversations. The kinds of learning that come from listening – to what climate change means to people, what they are experiencing, how they are responding, what sorts of futures they envisage, and how they think they’ll get there – are foundations for building effective connections.

Rising awareness around the climate crisis is inspiring not only new museums but the renovation of some old ones. Established museums are increasingly exhibiting and talking with audiences about climate change and the Anthropocene. Some of them are large traditional museums that are rethinking their missions. In London, the Natural History Museum, in an inspiring shift announced in January 2020, is focused on creating advocates for the planet. Their Anthropocene Engagement Manager, Camilla Tham, is galvanising local and international collaborations. In Berlin, the Museum für Naturkunde, which acts ‘for nature’, is helping the Fridays for Future movement by supporting young activists (and their teachers). Young people use the Museum as a safe space to gather, have workshops, and meet with government representatives. Hundreds of activists are participating in conversation forums with scientists ‘at eye-level’, a rewarding experience for both scientists and youth (Rössig et al. 2020). The Carnegie Museum of Natural History in Pittsburgh has a clear mission ‘to find inspiration in our collections and advocate for a sustainable future.’ Nicole Heller, its Curator of Anthropocene Studies, works to weave social-ecological systems science into the museum’s educational programming and exhibitions, such as *We Are Nature: Living in the Anthropocene*, as well as supporting sustained, impactful learning partnerships exploring local climate impacts and solutions with nearby urban and rural communities (CRSP 2020). The Australian Museum in Sydney, where I am manager of Climate Change Projects, has a revised mission with a stronger focus on action on climate change and the promotion of First Nations knowledge, with a new vision of being ‘a leading voice for the richness of life, the earth, and culture in Australia and the Pacific’ (Australian Museum 2020). We are starting a broad-reaching initiative to connect with harder-to-reach parts of the community to upscale engagement in climate change solutions.

In addition, an increasing number of established museums are staging permanent exhibitions about human-induced climate change, the Anthropocene, and human relationships to nature. The Museums and Climate Change Network maintains a list of

climate change and Anthropocene exhibitions. It tracked the slow start in the 1980s and is now challenged to keep up with the recent, rapid-fire level of exhibition activity around the world (MCCN 2020b). This includes new permanent exhibitions such as the Smithsonian's National Museum of Natural History new *Journey Through Deep Time*, with a climate change display and interactives to select climate actions suited to visitors' interests. The American Museum of Natural History features an interactive video and data wall in the *Hall of Planet Earth*. The Australian Museum has opened the *Changing Climate* permanent exhibition about climate impacts and solutions in Australia. The National Museum of Australia in Canberra is developing a permanent gallery of environmental history that empowers visitors to respond to the cultural, emotional and practical challenges of the Anthropocene. Te Papa Tongarewa/National Museum of New Zealand's bi-cultural approach helps visitors to 'get ready for our future as kaitiaki [guardians]'. Their beautiful *Te Taiao/Nature* exhibition advances this goal.

There are many other examples around the world. As the climate crisis becomes more acute, the need expands for places that help populations understand the deep interconnectedness of people and nature along with the imperative to act as custodians. Informed by Indigenous approaches to practices of care, access to current science on climate impacts and solutions, and our finely-honed skills as communicators, museums are a powerful tool for positive change.

Klimahaus Bremerhaven 8° Ost, Bremerhaven, 2009

We begin our tour of climate-focussed museums with a grand opening in June 2009 on the water's edge in Bremerhaven (pop. 108,200), on the northwest coast of Germany. A crowd gathered inside the curving glass forms of a 125m-long, ship-like building, Klimahaus Bremerhaven 8° Ost. Bob Geldof stepped up to the microphone and called the Klimahaus 'a love letter to our planet' (Klimahaus n.d.[a]). This bold project rapidly became the city's major tourist attraction and is equally popular with local families. With a myriad of energy-saving measures across the building's 18,800 m², the Klimahaus has a CO₂ emission rate of only 300 g per visitor (Klumpp 2019). It gives full reign to immersive landscapes and interactive games that deliver captivating learning experiences. The Klimahaus is innovative – it is almost certainly the world's first substantial public attraction dedicated to climate. The project started in 2000 when municipal authorities approached the consultants of Petri & Tiemann Ltd to design a unique visitor attraction. As Bremerhaven is home to the Alfred Wegener Institute for Polar and Marine Research and is aware of growing concerns about planetary warming, Petri & Tiemann suggested an attraction focused on climate and weather.

To locate the city firmly in connection with the rest of the world, Dr. Petri called in their line of longitude – the 8th meridian east – to provide a pathway around the world that enables people to experience different climates. The Klimahaus has created model 'experiences' of countries along this longitude – with appropriate air temperature, lighting, and mocked-up landscapes and buildings. Visitors engage with landscapes from Switzerland, Sardinia, Tunisia, the Cameroon, and an Antarctic camp, then swoop back up on the matching line of longitude, the 172nd meridian west, via Samoa and Alaska, to complete the circle at Bremerhaven. Managing Director, Arne Dunker, says that the journey '... reveals spectacularly how the lives of the humans on our planet are influenced by the



Image 1. Visiting 171° 22 W/14° 1 S: Samoa in the Klimahaus Bremerhaven. Photo: ©Schwarze/Klimahaus (Bremerhaven 8° Ost).

climate and which changes are in store for us. This sensitises our visitors to targeted environmental and climate protection (n.d.)' (Image 1)

Some 5.5 million visitors have visited since opening (Klimahaus n.d. [a]). Digitally-interactive spaces such as the World Future Lab allow visitors to explore the impacts of decisions about sustainability. The partners on the project – AWI, the Max Planck Institute for Meteorology, and the German Meteorological Service – helped the project team deliver a learning environment that demonstrates 'what possibilities exist to actively protect our climate' (Ibid b). As Filip Wätjen (Project Coordinator Science & Education) reports, in addition to supporting tourism they are 'an extracurricular place of learning', with programmes for all age groups (2020). In 2019, 62,386 students visited the Klimahaus, with 6,384 of them taking part in an educational programme closely linked to the formal curriculum (Ibid). Klimahaus makes a special effort to connect with communities, such as refugee groups, that are traditionally hesitant to visit museums and science centres. It also supports the regional Fridays4Future movement and works closely with the Deutsche KlimaStiftung (German Climate Foundation), founded by the Klimahaus and Arne Dunker, creating award-winning educational outreach on sustainable living and climate protection, through travelling exhibitions and events across Germany (Wätjen 2020).

The Klimahaus orients its work towards the UN's Sustainable Development Goals. Wätjen (2020), on what this alignment to the goals entails, says:

We make use of the latest findings in climate communication and would like the idea of Education for Sustainable Development, the experience of self-efficacy, to be felt above all in the educational programmes. Thus, in the best case there is a ... gain in competence, through the visit, but the impact is part of a larger framework and the goals associated with it cannot be achieved in one day. ... in the end it is the systemic idea that counts for us.

Wätjen explains the underlying philosophy of interconnectedness and mutual responsibility, through presenting 'local and global content to show that changes on site have an impact on other parts of the world ... We are all connected – like on the eighth longitude.' Once travelling around the 'imaginary line around the planet ... we inevitably arrive back at home, at our own doorstep, because here each and every one of us can initiate a positive change' (Ibid).

The Klimahaus has adopted both physical and digital interactives to engage its audience in the globe's interconnected places and entangled futures. It captivates visitors on sensory and cognitive levels, ensuring an all-encompassing experience that engages a variety of learning styles. The majority of visitors are, as museum visitors tend to be, 'stayers' in the education system. In a 2017 survey of 500 visitors, about 60% had a university degree or entrance qualification, and about 33% had a secondary school diploma. The most cited reasons for visiting was 'general interest/curiosity' (70.3%), followed by leisure (47.9%). Interest in the topic of climate and weather was quite high at 35.3% (Ibid). The Klimahaus is well-attended by locals and nationals: in 2017 only around 3% of 457,148 visitors were international (Ibid). The Klimahaus clearly provides a well-rounded and rewarding experience, faring well on such tourist sites as Tripadvisor. Of those surveyed in 2019, 99% said they would recommend a visit to others (Ibid). Looking back over ten years of operation, Dunker commented 'We have attained our goal of turning the Klimahaus into an international centre of expertise for providing information on climate issues ... That is a strong incentive for us to continue to be active in climate protection and empowerment ...' (Dunker 2019).

The Klimahaus also engages museum peers. Through the symposium, 'How To ... ? From Climate Knowledge to Climate Action' in September 2020, it created a platform for exchange between places of extracurricular learning, to establish 'an impactful result' to take to the 52nd Session of the United Nations Framework Convention on Climate Change in Bonn, 2021 (Klimahaus n.d.[b]). Dunker and Wätjen see the symposium as a demonstration of how museums, working with communities, can create collective change. This is exactly the 'powering up' needed to advance the conversation in the public and intergovernmental sphere.

Jockey Club museum of climate change, Hong Kong

On the campus of the Chinese University of Hong Kong (CUHK) in January 2013, during the University's 50th anniversary, a photographer captured celebratory group shots at the launch of the new 'CUHK Jockey Club Initiative Gala' in partnership with the Hong Kong Jockey Club Charities Trust. While focussed on horse racing, the Jockey Club, with its wide stream of profits, has long supported major community projects. A core value is a 'sustainable future for Hong Kong' (Hong Kong Jockey Club 2020), and the establishment of a Museum of Climate Change (MoCC) was a key achievement of their Initiative Gaia. Installed into a 800 m² space on the 8th floor of a University building, the museum opened in December 2013, under the sparkling directorship of Cecilia Lam (also Director of the University's Campus Planning and Sustainability Office and the CUHK secretariat of the UN's Sustainable Development Solutions Network, Hong Kong chapter).

The MoCC seeks to ‘reach out to and inform more people in Hong Kong and elsewhere about the latest developments in climate change issues.’ It uses a wide range of projects ‘to encourage and enable Hong Kong people of all ages and from all walks of life to get involved in carbon-reducing action and living a green lifestyle’ (MoCC 2020a). Its mission to inform, engage and enable is driven by a vision to ‘become a recognised, valued contributor to positive changes in knowledge, attitudes and behaviour in relation to climate change throughout Hong Kong and beyond’ (Ibid). The MoCC has been extremely effective in achieving these goals, working on site and in the community to create active connections to its content. The museum has received over 900,000 visitors since opening (Lam 2020).

Onsite, the museum explores impacts of climate change and what can be done, presented through a frame of the research and development carried out by University’s researchers and the Initiative Gaia. Temporary exhibitions highlight current issues and themes such as the Sustainable Development Goals, Zero Waste and ‘Eating Greener’. There are four key spaces in the MoCC. The first, which takes up about half the museum, is the *Polar Gallery* that features the work and collection of Dr. Rebecca Lee, an explorer and an environmentalist who focuses on the poles (including the ‘Third Pole’; Mount Everest). After entering through a winding corridor lined with information (in Chinese and English) about climate change impacts on the Arctic, visitors arrive onto the ‘deck’ of a research vessel, with a model polar bear and a screen welcoming them aboard an expedition to explore Arctic waters. Throughout the museum, cute models of a child-sized, standing polar bear, dressed to complement the subject of the section, lighten the tone of the data-rich displays.

The rooms along the route explore health, scientific monitoring of temperatures, disasters, and Hong Kong in the future. Most panels are introduced with questions and answers, prompting active learning. A showcase of advances in renewable energy technology being made at the University leads into the *Jockey Club Green Gallery*, which addresses the ‘what can I do?’ question. Bright, playful exhibits have chunky props and physical interactives at child height along with simple displays about the amount of waste produced in Hong Kong. Digital game consoles (solo and multiplayer) and screens on pods with cartoon characters explore actions to reduce emissions. In photo booths in the final room, visitors can pledge to take action and capture a photo of their face framed by a Polar expeditionary parka. Over 100,000 people have taken a pledge. If all are acted on, some 4.7 million kg of CO₂ would be kept out of the atmosphere, the equivalent of planting over 200,000 trees (MoCC 2020d, 2020e). The MoCC is committed to nurturing future sustainability leaders. In the past three years (1 June 2016–31 May 2020), the museum’s ambassadorship programme trained 357 CUHK students to help with the museum operations and outreach activities, and 167 secondary school students to run school-based environmental activities and projects. Surveys over a year revealed significant changes in commitments to climate action.

The MoCC is active online. Resources include the Action Monitor, for setting climate-friendly action targets and tracking with 5,622 members (MoCC 2020c). The Sustainability Hub (Ibid d) collates learning resources, reports, news, interactives and more from around the Web (drawing 5,755,100 views over the three years) (Ma 2020b). A virtual museum tour has provided 331,719 viewers the opportunity to ‘walk’ through the exhibition and zoom in on text panels and objects (Ma 2020b; MoCC 2020b).

Innovative outreach programmes include the Mobile Museum, a set of 8 stand-alone modules with digital interactives, available to schools and organisations for hire. The most recent module 'Climate Change: Past, Present, Future', includes holograms to explore key evidence of climate change over time, multimedia games to 'show nature's power at work in tree planting, wind and solar energy', and 3D presentations using the augmented reality (AR) technology of extreme weather events and climate science history. The Mobile Museum has reached 315,202 people over three years (Ma 2020b). 'Green Family Day' attracted 77,450 participants over two fairs. A Waste Reduction Project for schools worked with 273 student ambassadors, logging significant changes in commitments to climate action, and involving 45,870 beneficiaries (June 2016–May 2020).¹ Over the same three-year period, a resource package that includes self-guided tour information of ecological interests in Hong Kong and sets of museum visit worksheets drew 22,270 users, seminars attracted 864, and 2,124 people attended hands-on workshops with subjects such as engraving glass bottles, making beeswax wraps and ocarinas. The MoCC runs a particularly innovative programme of visits to green organisations, including a glass bottle recycling worksite and an electrical equipment recycling facility. In total, over the most recent 3 years, the MoCC's off-site programmes have engaged 465,009 people (Ma 2020a).

The staff of MoCC is connected to worldwide conversations and collaborations with museums and international organisations, including the UN, ICOM and others.² In all its activities, the MoCC brings its particular brand of captivating, community-centred outreach to create powerful local approaches to respond to the global challenge.

Museu do Amanhã, Rio, 2015

The *raison d'être* of the Museu do Amanhã/Museum of Tomorrow is to inspire visitors to explore our present and the future we are creating – and to consider how we might reach a better one. Santiago Calatrava's building on the edge of the harbour of Rio de Janeiro (pop. 6.4 million) is clearly designed to excite imaginations. Within cathedral-like spaces, visitors move through vistas of moving images on towering video screens. The huge, elongated form of the building references a local bromeliad, with the feel of a spaceship reaching out to open space. It also reaches out, figuratively, to tomorrow. Calatrava wanted to produce something 'so light it looks like it intends to fly' (Museu do Amanhã 2015, 114). The Museu do Amanhã was launched in December 2015. It is managed as a partnership between public and private enterprise, with concept production provided by the Robert Marinho Foundation, led by Hugh Barreto. The management and curatorial team is situated in the Instituto de Desenvolvimento e Gestão (IDG), the Institute of Development and Management.

Hugo Barreto says the Museu is not named for the 'Future', which seems distant, but for 'Tomorrow', as it is closer and 'depends on what we do today' (Watts 2015). On its website the Museu describes itself as 'experimental', 'a museum of questions', that presents a narrative 'that combines the accuracy of science with the expressiveness of art, using technology as a support', with 'interactive environments and audio-visual and gaming facilities created from scientific studies ... all over the world.' Content was designed by the world-renowned museum design firm, Ralph Appelbaum Associates, artistically

directed by Andres Clerici. Environmental and social sustainability are foundations. Humanity's 'great questions' are considered: 'Where did we come from? Who are we? Where are we? Where are we going? How do we want to proceed?' Three large black cubes with artworks explore 'matter', 'life' and 'thought', in response to the question 'who are we?'

In a space dedicated to the 'Anthropocene', ten-metre-tall pillars feature moving images and data about the impact of the age of humans. Huge words appear, in Portuguese, Spanish and English: 'We have lived on earth for 200,000 years ... Since 1950 we have modified the planet more than in our whole existence ... We are more ... We consume more ... More ... More ...' (Ibid). Video clips of traffic, forests on fire and mudslides are interspersed with graphs of rapidly increasing populations, greenhouse gas emissions, and steeply-rising rates of energy and beef consumption.

From this alarming view of the present, visitors flow on to 'Tomorrow', a section that explores the 50 years to come. They play games, making choices that affect the type of future that unfolds. Their choices reveal the number of planets needed to supply their selected lifestyle. Lead curator Luiz Alberto Oliveira says, 'We hope people will come out feeling disturbed or inspired but not indifferent' (Ibid).

The Museu's YouTube video (February 2019) presents the statistics of their reach (Mda 2019). In the Museu's first two and a half years 3 million people visited. Of these, 15% had never visited a museum, and 40% were infrequent visitors to museums. Around 75,000 students visit annually, and 16 million connect to the Museu's online resources. Of those who visit in person, surveys reveal a 96% approval rating and note that 80% of visitors state they are willing to commit to changing aspects of their lifestyles as a result of their visit.

The final section is 'Us', asking 'how will we get there?' To convey that it is always tomorrow somewhere in the world, this room has a gentle sound and lightscape with over a thousand bulbs recreating the colours of dawn. The curators clearly see the importance of sharing of Indigenous knowledge practices. The design of the 'Us' room is based on the *oca*, an Indigenous house where cultural knowledge is passed to younger generations. It is here that the Museu has located its single cultural object as centrepiece, representing 'the knowledge we acquire and pass on' (Oliveira 2015, 108). It is unfortunate that this is a sacred object from an Indigenous Australian community – an object that should not be viewed outside its community. Dr. Jilda Andrews, a Yuwaalaraay woman and academic of museum relationships to Indigenous materials, explains that protocols require that such sacred objects 'be placed in restricted store, certainly not go on display, or even for their name to be uttered by those without the cultural authority to do so' (2018, 196). Dr. Andrews writes that the Museu might be commended for 'valuing Indigenous knowledge systems in discourses of the future', but points to the fact that they have done so 'in isolation from the people they invoke.' The developing environment of respectful consultation, collaboration and careful protocols within more museums around the world is creating, as Andrews says, 'a site for true cross-cultural potential ... a site where the relationship between museums and indigenous people need not be dichotomous, but united in seeking mutually beneficial outcomes' (Ibid, 197).

The imagery throughout the Museu shows people from around the globe but ensures a special focus and a platform for Brazil's Indigenous people. Talks by spokespeople and live cultural performances extend the content in the displays. The YouTube promotional

reel includes the statements ‘We care about people’ and ‘We connect with our people’ (MdA 2019). Hugo Barreto speaks of the Museu advancing the vision of a unified city working to fulfil ‘the ethical duty to promote inclusion by staying closely connected to its social, cultural and environmental context’ (Margit 2015).

The Observatory of Tomorrow is a research and discussion facility within the Museu. Staff verify content and work in partnership with science institutes and conservation bodies. The Observatory’s director, Alfredo Tolmasquim states its mission is to ask ‘what are the major opportunities and threats to society over the next 50 years?’

One of the guiding premises of the Museu is that it must be meaningful for teachers, students and the community. Before opening, workshops were held for school teachers to help them make the most of the content (Ibid). Free admission is provided for teachers, students and to 30,000 residents enrolled in the ‘Neighbours Program’ (MdA n.d.). Dom Phillips, correspondent for the *Washington Post* has pointed to a failure to mention local pollution and degraded living standards in nearby communities (2015). Nevertheless, concern for the wellbeing of the people of Brazil and their ecosystems, and for the wider planet, is embodied throughout the Museu experience, online and in person. The building is designed to sustainable architecture standards and recycles water from the bay for air conditioning units (Ibid). Jonathan Watts for the *Guardian* (2015) envisaged the Museu becoming ‘one of the planet’s most powerful arguments for sustainability.’ As Brazil struggles with many current challenges, it is to be hoped that this extraordinary centre for reflection, creativity and action continues to act as a beacon that promotes responsibility and care for people and nature.

The Climate Museum, New York, 2016

This next story starts with a single person’s determined energy and vision. In the years leading up to 2012, Miranda Massie, a civil rights lawyer in New York, was increasingly concerned about social injustices caused by environmental damage. As she stated in an interview in 2015, ‘if you don’t have the right to thrive as an organism, then everything else falls away’ (Foderaro 2015). Living through the troubled times brought by Hurricane Sandy, she decided to take a radical new direction. ‘I think Sandy took the urgency I was feeling about the climate and raised it by an order of magnitude,’ she said. ‘It made me feel like I didn’t have the idea; the idea had me’ (Ibid). Feeling that helping people to understand the urgency and get engaged was key, she looked online for a climate museum – she assumed there must already be one out there. She found the Jockey Club Museum of Climate Change but no similar museum in USA. New York seemed to offer an obvious location, a city of 20.1 million, surrounded by water, already profoundly affected by climate change. Not having a museum background meant it took extra courage to get the project underway, but Massie embodies the ‘determined optimism’ that Tom Rivett-Carnac and Christiana Figueres call for (Rivett-Carnac 2020). Learning what she needed to know, securing office space, and setting up an advisory board of experts, she began.

I had coffee with Miranda in this early phase, as I was working as a curator at the American Museum of Natural History and helping provide a platform for Pacific speakers on the impacts of climate change. I was electrified at the idea of a whole museum dedicated to climate action, struggling as I had at various museums for years for slight gains in climate

visibility, usually through public programmes. The Climate Museum offered new hope for achieving substantial, sustained engagement.

The Climate Museum's website makes the boldness and reach of its activities clear. Its mission is 'to inspire action on the climate crisis with programming across the arts and sciences that deepens understanding, builds connections, and advances just solutions.' This vision acknowledges the climate crisis as 'the defining challenge of our time. We must rise to meet it together'. The Museum's approach is to create 'a culture for action on climate.' Acknowledging that 'most people in the US are worried about the climate crisis, but silent and inactive', the initiative builds on the 'popularity and trust held by museums', to 'bring people together to learn about solutions and join the fight for a brighter future, providing multiple pathways into civic engagement' (Climate Museum n.d.).

The Climate Museum designs its exhibitions and programmes to address the deficit in understandings of human-induced climate change, its local and global impacts and solutions. 'Ask a Scientist Day' has drawn people out to parks and other public locations, even in the rain, to question members of the museum's Science Working Group. Visitors to the *Taking Action* exhibition have commented on the importance of reliable information to better navigate the landscape of misinformation. One visitor, who identified as 'A Hurricane Irma Survivor', wrote: 'Never has this made more sense than now' (Randle and Slater 2020).

With no building of its own yet, the Climate Museum has established effective partnerships with organisations and institutions to support and host temporary installations and programming around the city. These have included an exhibition at the Parson's School of Design, featuring Zaria Forman's stunning, finely-observed pastel drawings of ice and Peggy Wiel's film, *88 Cores* (Climate Museum 2017). *Climate Signals*, a work by Justin Brice Guariglia, featured warning signs in five languages, has been viewed by tens of thousands in public spaces. Signs flashed 'Climate Denial Kills', 'Fossil Fuelling Inequality', 'Vote Eco Logically' and more, to spark reflection and discussion and 'draw passers by into climate conversation' (Climate Museum 2018). Massie has arranged to mentor high school students to turn their poetry into spoken word performances for 'Climate Speaks' events at the Apollo Theatre. An audience member said the 'words and passion of the young poets' gave her the hope she 'so desperately' needs for the future (Randle and Slater 2020). These programmes have been profound for participants. Purva B. said that through the programme in 2020 she was able 'to find and develop my voice, and then use it to inspire change about the climate crisis' (Ibid). Another, Eliza S., stated (2019):

... 'Climate Speaks' has been the single most influential aspect in my life as an environmentally concerned citizen and student ... it completely reshaped my understanding of the ways in which we have power, and the strength of vulnerability and storytelling to compel action. (Ibid)

A new phase in the museum's journey was reached with *Taking Action*, a five-month interactive exhibition in a house on Governor's Island (Climate Museum 2019). Three rooms introduced visitors to climate solutions, to the reasons those solutions are not being advanced, and to what individuals can do. Over nine thousand people visited. Student intern guides contributed to the exhibition's effectiveness. One visitor, Karen S., wrote,

‘to experience the passion and generosity in these young faces and the clarity with which their exhibit demonstrates the forces preventing action, is phenomenally moving.’ The exhibition, she said, was a ‘superb demonstration of why & how we must take radical action’ (Ibid).

Measuring actual behavioural change created by museum visits is one of the more elusive, cost-intensive goals. Email surveys help track visitor responses. Encouraging visitors to start on taking action while still in the exhibition is one positive approach to bolstering engagement. One respondent noted ‘Action was definitely inspired, but our follow through was poor. It’s really helpful to have us complete those initial supportive actions while at the museum ... a bit of spontaneous peer pressure sure helps!’ (Ibid).

Visitors supply a rich seam of responses in the surveys, comments books, social media, letters and emails; a flow-on from the museum’s focus on empowering connections. The Climate Museum reaches wide audiences through Instagram (nearly 96,000 impressions a week in August 2020), along with over 15,500 Facebook followers and, during July 2020, 45,500 Tweet impressions. The Climate Museum’s methods – empowering, upskilling and fostering imagination of positive futures – are useful models for other museums launching their own initiatives.

Empowerment is one key approach. Through its programmes, the Climate Museum gives people the tools and confidence to become more climate active. As one visitor said, ‘Day by day we’ve multiplied our actions, replacing our despair with determination.’ Mentoring, performance skills, and supportive feedback have enabled an expanding number of young people to crystallize their thoughts, speak these to others, and realise the power of their voices. They also gain strength as they recognise like-minded others, including among their peer group and family. A high school intern wrote, ‘The Climate Museum offered me a safe space to not only get comfortable talking about the climate but also let me know that I had people to rely on’ (Ibid). A 17-year old girl in Texas reflected on a home-based project on media strategies of the gas industry, following her Climate Museum internship:

I feel much more hopeful than I did before ... I feel like I have a team behind me. I got that feeling from the internship, but it felt even better coming from people that weren’t normally associated with climate action. It opened my eyes to the views of the quieter majority, and I was very happy with what I saw. (Ibid)

Like the Jockey Club Museum of Climate Change, the Climate Museum supports young people to become climate change ambassadors, including training to lead exhibition tours. A number of these interns have decided to pursue climate action as a career path, and some have already stepped up to leadership beyond the museum. The parent of a docent wrote:

... in the course of being a tour guide and climate ambassador to an intergenerational public, my son became a leader in the global youth climate movement. Not only did he organize hundreds of students from multiple schools and lead them over the Brooklyn Bridge to participate in the global youth strike on Sept. 20th, 2019, but he has become a seasoned, courageous public speaker and climate educator to his peers (Image 2). (Kathy L., Ibid)

Ensuring that its programmes are offered in places people are comfortable accessing them – whether in parks, fairs or road verges – and in multiple languages, the museum



Image 2. Panel discussion, 'Taking Action' exhibition, with Miranda Massie (far left), Dr Sonali McDermid and young Climate Museum spokespeople, Governor's Island, 2019. Photo: Lisa Goulet.

supports social inclusion. This opens up the capacity to ask questions in a non-judgemental environment and engage in non-confrontational conversations. An insightful intern wrote in 2020 that the museum is dedicated to:

... educating in a way that is inclusive, considering the social and cultural impacts of each climate solution. Because of this, it rouses support from historically marginalized communities, and creates a space for their voices in a movement that often forgets about their existence. (Ibid)

The power of art and stories is another key feature of the Climate Museum's approach. The value of storytelling is activated for witnessing impacts, sharing insights, creating meaning out of chaos and identifying hopeful ways forward amid fear. As Eliza S., a finalist in the 2019 'Climate Speaks' programme, has written:

In the months since 'Climate Speaks', I have begun to see the movement for a radical change in climate policy as deeply contingent on the stories we tell – on why we must act, how we should act, and what is at stake if we don't. (Ibid)

In common with groups such as Cape Farewell and Climarte, the Museum recognises the power of art to connect audiences to losses of people, places and ways of being to climate predicaments, and to spark personal commitments to pursue solutions (Cape Farewell 2020; Climarte 2020). An intern in 2020, regarding the myriad of social, economic and health problems that climate change entails, commented, 'The Climate Museum is not only aware of the intersectionality of the climate crisis, they know how to communicate effectively. The use of arts creates the empathy needed to push people to act' (Ibid).

Imagining positive futures is the final approach to highlight. As Christiana Figures and Tom Rivett-Carnac argue, to effectively respond to the climate crisis we need to not only communicate the gravity of the situation but also to share visions of the positive future we can achieve if we take comprehensive action now (2020). The Climate Museum creates opportunities for this fruitful imagining. As former employee Zina Precht-Rodriguez states:

[My] job at the Climate Museum has shown me that in order to shift the politics of climate change, we need an informed, curious, and proactive collective. While many individuals are aware of the gravity of the crisis and desperately want to join a movement for climate action, they lack the room to imagine what a just, sustainable world could look like; they lack central spaces to turn sparks of imagination into local climate action. (Randle and Slater 2020)

Dr. Jennifer Marlon of the Yale Program for Climate Change Communication has said ‘for every part doom, make sure you are giving three parts hope, solutions and agency’ (2020). The Climate Museum’s writing and art-based programming and inclusive, empowering practices are all crucial tools for opening up liveable futures.

The Climate Museum’s next exhibition will centre on an interactive media literacy toolkit to enable civic action in response to the lies and influence of the fossil fuel industry. It promises to be as impactful and challenging as we, global citizens, need it to be. The museum will continue to advance its mission through the young people and diverse communities it engages in deeply transformative ways.

Klimahuset, Oslo (2020)

A final example of a climate-dedicated museum is the recently opened Klimahuset at the University of Oslo. The beautiful, golden-timbered, solar-powered building was opened on June 16, 2020 by the Crown Prince (Klimahuset 2020). Elegant exhibitions, covering 650 m², offer hands-on activities with text in Norwegian and English, audio-visual components, activities, and discussions (UiO, Natural History Museum n.d). The target audience is young adults and there is a nature-based play area outside for children. The Klimahuset is directed by Brita Slettemark (former director of KLIMAFORSK, supporting research into social adaptation to climate change), and curated by Torkjell Leira. The content is introduced through captivating questions: ‘How will we live, eat, love and create in the future?’ As can be seen on their online video, activities are solutions-focused, encouraging the visitor to take a ‘Find the Solutions’ card with a QR code, and to pinpoint a personal strength to use in the ‘fight against climate change’. There are boxes to peek into, an immersive video room that surrounds the visitor with audio while rainstorms and waves crash overhead. An auditorium provides space for dialogue and events.

The Klimahuset itself is a model of climate solutions: the building is near public transport and the architects used materials with low CO² emissions and a high proportion of recycled content (Norske Arkitekters Landsforbund 2020). While the university setting might limit visitors from across the 1.71 million people of greater Oslo, the Klimahuset team is planning programmes to reach beyond its walls with a mobile museum (Leira 2020).

Mobile museums, digital museums and networks

There is a handful of museums of climate, the Anthropocene, and the future, which are taking their missions forward without buildings or installations, exhibitions or physical collections. Brigit McKenzie's Climate Museum UK is a wonderful example, offering a 'mobile museum' hands-on experience. She and her colleagues create kits of objects, games, books, infographics and materials for imagining, modelling, drawing and writing for use with communities. This, plus workshops and digital offers, support advocacy to 'leverage change for a more Regenerative Culture' (Climate Museum UK [n.d. \[a\]](#)). As McKenzie explains in this special issue, a key principle of the Climate Museum UK is to be 'possitopian', to expand horizons about what is possible (Climate Museum UK [n.d. \[b\]](#)).

Other important means for galvanising climate action are the networks and coalitions of museum professionals, artists, designers, students and others across the cultural sector. These support those already working in the field, creating more visibility for their work and encouraging others to join in. We Are Museums is a 'community of museums good for people and for the planet'. The focus is on collaborative effort, leveraged through conferences, workshops and online discussions. Their recent 'Museums Facing Extinction' workshop in Berlin ([2019](#)) brought together museum and non-museum people with experience in climate outreach to design 'simple actions and take-outs', that could be run in any museum, 'encouraging their communities to move towards a climate-friendly future' (Drubay [2019](#)).

One of the largest networks, with over 1000 members, is the Coalition of Museums for Climate Justice, run out of Canada by Robert Janes and others since 2016. The Coalition provides tools and a range of links to support museums taking responsible action. The convenors state their vision with verve: 'Museums are key intellectual and civic resources where substantive issues can be aired, discussed, and acted upon. These unique qualities must now be put to work in finding solutions to climate emergency' (Gosselin and Janes [2020](#)). Other professional networks are also advancing climate action within museum and heritage bodies: the Climate Heritage Network within the International Council on Monuments and Sites and the International Council of Museums' Working Group for Sustainability (ICOM [2018](#)). These networks are raising awareness and supplying road maps for museum initiatives that are supportive of people and planet.

The smaller Museums and Climate Change Network, which I convene, is a hub for resources and inspiration, with lists and news and contacts for those who have signed up as members, to support connections (MCCN [2020a](#)). A study by Georgina McDowall on the role of museums in tackling climate change found that members had joined 'to become part of a wider, inspirational community' that enabled them to share information and support. McDowall notes the value of such networks for providing individuals with the confidence to push for change in their institutions, and the 'encouragement needed to remain engaged in a topic that can be overwhelming' ([2019](#), 47).

Conclusion

The arrival of climate museums, along with a range of other museum activities, reflects the rise of a global movement to regenerate human relationships to one another and with other species, and to transform our life support systems. An often-overlooked Paris

Agreement target is the commitment to substantially increase public education and participation (UNFCCC 2015, Art. 12). Museums are a powerful medium for achieving this target although we need more unity if we are to act powerfully. More climate museums dedicated to the ‘wicked problem’ of climate change are needed, alongside more visible content, programming and discussion in existing museums. And given the importance of addressing information deficits, the international museum community would do well to support museums in the Global South to secure resources to build local understanding of climate threats.

Each of the climate museums and networks we have explored here use different means to communicate the challenges and opportunities that climate change presents, yet the synergies among them are clear. Successes in creating captivating content and forging connections in Bremerhaven, Hong Kong, Rio, New York, Oslo, Sinsheim and elsewhere have collectively touched and influenced many millions of people.

The people behind these climate initiatives recognise that climate change is the greatest challenge we face. They stand as models for the tenacity, connectivity and creativity needed for museum workers to lend power to the rising groundswell of climate action. Inspiring others to learn, care and take action, their work will continue to be vital.

Notes

1. The MoCC Ambassadorship that trained two groups of CUHK students to be tour guides has engaged 35 young people (Ma 2020c). The Team MoCC programme trained 44 secondary school students to run school-based environmental activities and projects (starting in 2018, final surveys run April 2019). Surveying of their responses to the programme on their understandings and their willingness to make changes to their lifestyle to reduce carbon emissions showed an average of 83% of programme participants showed an increase in climate knowledge, 8% the same level, and 9% performed less well. An average of 91% of the students reported increasing their time on in four categories of action: ‘reading information, discussing with peers, attending activities and engaging on social media’ (Ma 2020c).
2. Cecilia Lam spoke in the opening session of the 2019 ICOM General Conference in Kyoto, in the ‘Curating Sustainable Futures Through Museums’ panel discussion, for an audience of 4,600 museum professionals (Lam 2019). Most recently, Matthew Pang presented online at the Klimahaus’s International Symposium, ‘How to...? From Climate Knowledge to Climate Action’, in the session ‘Climate Museums and their approaches around the world’.

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