e-ISSN 2785-2709

Lagoonscapes
Vol. 5 – Num. 2 – December 2025

Sounding Carbon Ruins: Speculative Design for Climate Futures

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Abstract How do you teach the climate changed future? Can we sound it out to get our bearing in the present? In this article, we articulate our experiences teaching theories and methods (and devising examples) of climate futuring and ecopoetics. These are developed from practice-based work in designing, constructing and curating speculative climatic and environmental scenarios. Graeme Macdonald elaborates on his experience teaching, curating, and performing a Museum of the Future. Jonathan Skinner discusses teaching poetry as an instrument for sounding environmental change, addressing an expanded field for creative practice in the Anthropocene: with site-based exercises grounded in walking, listening, and the siting of attention through ecopoetics.

Keywords Climate imaginaries. Fieldwork. Futuring. Sound Studies. Ecopoetics. Anthropocene. Speculative museum.

Summary 1 Introduction. – 2 Teaching Ecopoetics. – 3 Teaching Carbon Ruins. – 4 Conclusion: To the Future!

Edizioni Ca'Foscari

Peer review

Submitted 2025-10-14
Accepted 2025-11-17
Published 2025-12-18

Open access

Citation Macdonald, G.; Skinner, J. (2025). "Sounding Carbon Ruins: Speculative Design for Climate Futures". *Lagoonscapes*, 5(2), 405-426.

DOI 10.30687/LGSP/2785-2709/2025/02/007

1 Introduction

Humanities scholars have become increasingly interested in sociological, creative and speculative forms of futuring as a means to address ever gnarlier issues of effective climate action and environmental transformation.[1] The wealth of 'imaginaries' in climate-facing literature, cinema and television series is now well-stocked and catalogued. The speculative work of 'imagineering', however, is not exclusive to evidently fictional works. It stretches across an array of mediating forms. It is discernible, for example, in architectural renditions for future cities, or in renewable energy policy, in company sustainability reports, or in municipal resilience plans. It is spread across a swathe of commodity advertising and can be heard in pop music and political speeches, in activist protests, news bulletins, banal conversations about the weather and so on.

Today's students are exposed daily to a dense infrastructure of speculative futuring. In this article, we reflect as teachers in the fields of Environmental and Energy Humanities on developing and evolving methods to afford students the means to recognise and negotiate this complex of futures by 'futuring': co-creating and participating in practices and techniques that seek to render possible and transformative futures into the present. Such work seeks to orient a present increasingly haunted by climate futures into more effective paths towards just forms of mitigation and transformation.

Our teaching in this area takes place in the context of an expanding array of emergent futures volumes from prominent scholars working in different disciplines as well as significant figures in environmental politics and media. These offer a range of speculative scenarios as a means to induce debate on the possible consequences and eventualities of the present. Some ask readers to choose between densely textured descriptions of good and bad outcomes. Others offer creatively stretched far future timelines. Others intersperse scholarly criticism and research with creative fictive scenarios.[2] There isn't one way of doing this work. Futuring offers the choice of visioning open and closed future scenarios, with a range of techniques and objectives to anticipate, forecast, test and speculate on predictable and unpredictable outcomes. But the climate future it seeks to alter is ever foreclosing.

1 This article was jointly conceived by the two authors. Jonathan Skinner is the author of section 2; Graeme Macdonald is the author of section 3. All other sections are co-written.

2 See, for example, Buck 2019; Conway, Oreskes 2014; Holthaus 2020; Figueres, Rivett-Carnac 2020; Frase 2016; López Galviz, Spiers 2021; Vettese, Pendergrass 2022; Wainwright, Mann 2018; Wallace-Wells 2019 to name but a few.

e-ISSN 2785-2709

Many forms of futuring, such as climatic or statistical modelling, military or corporate scenario planning or demographic forecasting seek ways to render possible, likely and planned futures, although unplanned, unlikely – and even impossible – scenarios also can come into consideration through diverse forms of storytelling or creative design. Scholarship as we practice it moves sideways (though not away) from the pages of criticism and narrative interpretation. We find in modes of immersion and defamiliarization an effective and stimulating means to wrench the future into a present that needs to shift and pitch in fundamental ways. We sound out futures, not only in practices such as sound walking or active listening in the field, but in the more metaphorical sense of sensing out, testing and debating the credibility and feasibility of such futures as likely or alternate scenarios.

As teachers we have designed, honed and developed practical and physical techniques: working with the body, designing physical installations, conceiving digital apps and assembling portfolios, co-curating climate music playlists and recording soundwalks. We have collaborated with artists, musicians, poets, and dramatists, but also with town councils, schoolteachers, activists and policymakers. We have done so individually and collectively, working with a range of scholars and practitioners in other disciplines. Our aim, broadly conceived, is to construct as many roads as possible for students to apprehend and understand what might best mitigate the crisis: not only to scrutinise what sticks but also what obstructs and prevents effective movement.

Regardless of appropriate contexts or effectual techniques, the developing broth of futuring work requires some degree of examination. When we think of climate and/or environmental change we necessarily think futurally, of something coming in the post. But we equally are haunted by the Capitalocene dynamics and casualties of the heritable future we have now; a future we continue to pack and send forth.[3] While the extent to which any future outcomes are seeded in the present has long featured in science fiction criticism, the 'wicked' multi-dimensionality of the climate crisis comes folded in a critical temporality and geo-spatial unevenness that demands the future be urgently attended to everywhere and in everything. So, how to do this? How to teach it? And where? And when?

3 The term is Jason Moore's (2016), referring to the long historical system of capitalist modernity as the origin and repeat mechanism of the climate and environmental crisis. The term critiques the more familiar 'Anthropocene', arguing that for centuries the capitalist world-system, in accumulating and appropriating land, goods and commodities, has relied on 'cheap natures'. The exploitation of cheap natures distributes resources unevenly and produces pollution regimes that impact adversely on some humans and non-humans more than others.

To reiterate: this is not a task that Humanities scholars have been shy of taking on. They not only seek to activate a more effective public environmental consciousness and climate literacy but also claim an activist role beyond the tired clichés of the human sciences as the communication managers and sentinels of the harder ones. Results and perspectives range from the abundance of apocalyptic cautionary tales wallpapered around us in today's popular and highbrow cultural genres to maximalist utopian scenarios that are as alluring and provocative as they are misaligned. The disarticulated geographies of climate futurism offer different, multiple approaches, as do their political and economic variations. There may be no shortage of futures from which to choose, though some, such as the UN Sustainable Development Goals (SDGs), adopted in 2015, are inevitably higher profile and better known than others. Yet, despite such visions becoming orthodoxy, complemented by other conventional future scenarios offered by the Shared Socioeconomic Pathways of the Intergovernmental Panel on Climate Change (IPCC), there remains a degree of stubborn reluctance to change directions towards effective climate mitigation. In addition, the growth in this last decade of a reactionary populism sceptical of climate scenarios and 'Net Zero' futures demonstrates how exploring a wider range of scenarios, techniques and visions outside the realms of orthodoxy seems more important than ever.

We elaborate on two approaches in what follows: immersive and critical futuring through curating, performing and narrating a future museum of decarbonization, and, through a range of ecopoetic and participatory reflective practices, inhabiting the embodied modalities, alternate rhythms and affects of environments undergoing profound transformation. In both we seek to design and maintain a speculative space for students to inhabit and recreate – if only momentarily – a critical sense of a different future, sometimes by being more attentive to the present. They are challenged to measure such a future in distinction to the world they presently inhabit, a world which must change to some significant degree. This makes any work of climate futuring inherently and unavoidably political.

What undergirds our pedagogic outlook in these practices is an insistence that climate breakdown both is and is not in the future. It suffuses, dilates, and even paralyses the present. It collapses space and can derange our sense of scale, overwhelming us with myriad registrations of what it now is and what it might become. The potential for catastrophe, that state of exception magnified in multiple genres of climate fiction is increasingly here, no longer on the other side of a fictional (or even a real-world) border, another 'world', 'over there'. Potential solutions, meanwhile, offer another mode of the climate speculative, and are often subject to an alternative 'bad faith' futurism, ranging from geoengineering to corporate

e-ISSN 2785-2709

greenwashing. These offer a kind of endlessly mortgaged future in which everything is pushed into just that: the not now. To avoid this presence invites catastrophe: the loss of future. ('No future' – we've been there before.) This mode of suspension of effective climate actions, plans and aspirations haunts a present that we know will become increasingly uninhabitable. But inhabit it we must. Attend to it we must, by adjusting our attentive practices to different objects and antennae. We tell our students: climate change is present, but we ask them: where, when, and how do we look for it? How do we sound it out?

2 Teaching Ecopoetics

We begin, standing in a circle outside, in a clearing beside a natural area (a fragment of ancient woodland on the campus where I teach). To begin, we locate the body and through this location an embodied contact with the site, noticing and relaxing our spine and joints, aligning our posture to breathe more consciously, feeling the earth through our feet. We energize our bodily sensation with various simple Qigong movements.

Exercises drawn from meditation (Nhat Hanh 2006) and Deep Listening (Oliveiros 2005) introduce techniques for the walk: an introduction to 'extreme slow walking', attending to the relation between walking and breathing (challenging students to slow their pace enough to accommodate three breaths per step), and flexing attention to move at will between listening to an entire soundscape and focusing on particular sounds.

Once warmed up, we form a tight circle facing outward, and I ask students to close their eyes and walk as slowly as they can for three minutes (I keep track of the time). When we open our eyes, the variety of journeys is always surprising: some students will have traveled to the outer edge of the clearing, others only moved out a couple of feet. We discuss the differences, sensations and challenges – the difference, for instance, between listening and hearing, as we don't always listen to what we hear.

From the circle again, we then read a poem aloud, collectively, each reader in turn speaking a line. I use one page from Mei-mei Berssenbrugge's "Green":

> It's quiet in the pine woods, pine cones falling on pine needles.
> Branches dying away from below form overhead a tangled, dark net showing light through.
> I like when I can't see the source of light, here, where it's impeded and uncertain in a green cave of flexible forms.

> A fallen trunk seems to lose several feet to shadowed space on one side, then the other.
> A sapling moves to the right a fraction of an inch.
> Rocks, leaves, lady slippers interweave.
> A bug turns into the tip of blade of grass.
> All the trees are misted with this light.
> My seeing becomes so transparent and natural, a vista of awareness into which consciousness flows.
> However massive an old tree, it stands here as the embodiment of something coming into appearance.
> Tree and forest, a piece of sky and its circle of illumination on the floor are what you might call pre-given to me, because I'm telling it to you.
> Your presence is that to which my perception is pre-given.
> The tree takes this correlation, this disclosure.
> (Berssenbrugge 2013, 42)

We discuss the lines, noticing obvious things, such as how they differ from traditional, rhyming poetry, but also from prose, asking in what ways we can consider this to be poetry. I point out the poem's phenomenological approach to things "coming into appearance", one that seems to grant agency and even subjectivity to nonhuman presences such as trees ("A sapling moves to the right") and the swerve from description to philosophical language ("pre-given […] correlation […] disclosure"). But the students, many of whom come to the ecopoetics workshop with little to no experience either with the reading or the writing of poetry, always share interesting, surprising insights. I learn something new from every discussion of this poem with a new group.

Later in the term, we will look more closely at the intertextual basis of Berssenbrugge's technique, as her lines blend language drawn from a variety of sources and disciplines: students will be invited to collage language from field guides and theoretical texts into drafts of descriptive poems. For now, I end with the observation (if a student hasn't already pointed it out) that Berssenbrugge's poem works with the sentence – however straightforward, complex, beautiful or terse – as the basic unit of composition. I then invite students on a walk into the woodland.

From almost before climate change was a mainstream worry, ecopoetics has sought to bring poetry to the climate's troubled juncture between past and future. Imagination of an apocalyptic, gaslit future, sustaining pods of networked human batteries, offers one escape from the present.[4] Nihilism's lack of imagination offers

4 See for example the Wachowski's 1999 movie *The Matrix* (Warner Bros).

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another. But what if we stay with the trouble of the present moment (Haraway 2016)? Will future readers – should there be any – look to the poetry of our times in vain for clues to the collapse?

It is the nature of the 'nature reserve' to be bounded by landscapes of historical settler-colonial dispossession and modern extraction, development and their aftermath – even to occupy former sites of extraction. If a 'preserve', then the 'rewilded' landscape offers refuge not to restore the past or conserve some idea of 'nature' (all too often involved in forms of colonial violence) but to preserve future possibilities, refuge for futures, amid the overbearing present crisis.

We read landscapes for what they occlude as well as reveal, to map landscapes in transition – from carbon-based to renewable energy regimes. When we learn to read ecologically, we read not just for presence or absence but for relation and connection, and we engage in acts of translation. Ecopoetics resists the reserve and the language of preservation even as it works through ecological exclosures. As much as five minutes of silence, a weekend away from the inbox, a yielding of the floor, a limitation of use or an act of stewardship (coppicing or culling), even a word, line, stanza, page-setting or performance of a poem offer exclosures, within which attentional futures can flourish.

There is, furthermore, no reading without 'writing' – be it with the simple line walkers' footsteps make in the landscape, the 'transect' by which ecologists mark out their samples, the field notes or 'lists' that are key to species surveys, or the practices of transcription by which acoustic ecologists direct listening in the field (Skinner 2018). The attitude we bring into the field profoundly affects the encounter.

The site, the walk, and the poem configure ecopoetics. Between different yet adjacent places, conjoined and scaled at 'world's end' to the measure of a walk, we can experience the overlapping yet discontinuous horizons of world-ecology and possible futures, collapsed with daily perception into the single frame of a poem, stanza, line or word.

To enact perceptual scale shifts, encourage readers to take their learning out of doors, with brief exercises in field methods such as slow listening walks. 'Out of doors' includes disability perspectives on mobility and walking – to walk is an attentional stance, as Thoreau noted, in his alarm at having "walked a mile into the woods bodily, without getting there in spirit" (Thoreau 1862).

Ecopoetics becomes useful when it listens. While listening negotiates a tension between breaking and joining, isolation and community, to listen we must sound. In sounding together, we activate the essentially communal nature of listening and the collaborative nature of sounding, where ecopoetics resituates the social in the soundscape, and vice versa.

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The workshop begins with an exercise in listening that juxtaposes poetry, walking, listening, and writing. These activities configure ecopoetics as site-based, intertextual, embodied, creative-critical practice – it's about reading poetries, taking the work out of doors, and writing into (and out of) an encounter between poetry, body and site.

'Nature' is complicated by ecology, history, imagination, and a materialist dialectic – poem and site can never inhabit the same space-time (the lesson of Robert Smithson's non-site) (Smithson 1996, 364). Reflections on poetry (poetics) return art to the basics of making (*poiein*), liberating a range of practices. The body, itself a site, multiplies the encounter, allowing nature to interrupt writing (and vice versa).

Into the woods: having asked students to bring a pocket notebook and a writing implement to our session, I instruct them to walk with notebook in hand, to notice what they notice, focusing on sensations rather than thoughts, activating all of their senses to make note of details. I encourage them to listen to what they are hearing, to track a single shape, color or kind of object, while also practicing 'splatter vision', paying attention to the peripheries of their vision, 'rods' as well as 'cones'. To smell, touch, and even taste things. And to be as specific as they can.

At the end of our walk – it is usually short, 10-15 minutes – we gather in a meadow where I give us ten minutes to compose one sentence, drawing on language from our notebooks and from Berssenbrugge's lines. We read the sentences aloud, going around the circle, pausing between each sentence to take in its reverberation.

> Broken light mingles into petrichor heavy beneath the canopy.
> Curled up leaves like sleeping mice, frozen tails stiff, white snow in their hoods.
> Two squirrels scurry from their rendezvous, embarrassed by the line of gawking eyes.
> Orange leaves, charred and smoky, swim on their backs in the grey water.
> It's a relief to know that the sun is shining and somewhere people are taking a flight, probably to Dubai.
> The fern's feeble leaves tremor in the stillness.
> Ivy throttles the trunks of the trees.[5]

We discuss similarities and differences between the sentences, comparing what was or wasn't noticed – and what no one noticed, what might be missing from the picture – how our one group walk was

5 From the 2024 *Ecopoetics* workshop.

in fact as many walks as its participants. We ask where the language in some of the sentences comes from, what it brings to the walk and how the walk impacts the language.

I type our sentences up to read aloud, again, in the next class, to see whether, and in what ways, they compose a poem. We edit and discover, together, how small decisions can have a big impact on meaning. This simple exercise undermines any sense of future as something that pre-exists our own ability to change our interaction with its shifting, recurring, varying dimensions.

We take this walking, listening and writing practice through a construction site adjacent to campus – the HS2 (High Speed Rail) railway line connecting London to Birmingham. This controversial project was meant to extend to the north of England, but the section north of Birmingham was cancelled due to mounting budget overruns. Sunk costs have locked in the London to Birmingham segment – the sole advantage of which, for commuters, will be to shorten the journey by 30 minutes, with no benefit to communities along the route impacted by its construction.

HS2 remains one of the largest infrastructure projects in the world, with an output that, due to the amount of tree felling, earth moving, and concrete poured, will never be carbon neutral in the project's 120-year lifespan (Barkham 2020). In its path, ancient woodlands have been bisected or destroyed outright and heritage landscapes marred, obliterating the rural character of landscape surrounding the University of Warwick campus (including a Diamond Jubilee woodland, planted around the time I took up my post at the University in 2012). The construction site, with its massive berms taking shape, held in place by ruderal growth, and piles of earth in various states of transport, resembles nothing so much as an ancient pyramid complex. At the same time, around its margins one can observe much publicized habitat creation and terraforming take shape, as part of the project's 'carbon offset'.

I remind the students that 'Nature' (Greek *phusis*, from the verb *phuein*, 'to grow') has always held a double sense: the evaluative sense entailed in a judgment that something is or isn't 'natural' (according to its essential intrinsic characteristics, what it has 'by nature') and the descriptive sense addressing the natural world as a whole, a 'nature' that includes the entire physical universe. To paraphrase poet Juliana Spahr, ecopoetics addresses not just the bird's nest but the bulldozer about to destroy the nest (Spahr 20011, 69. I invite students to walk and reflect on the built environment, whether urban or rural, including transport infrastructure, as well as what we cover on our own feet. What, I ask students, is your vision of our collective future? How does our impact on earth systems affect that vision? And how do poets ('makers') best respond?

A set reading for the walk is Smithson's "A Tour of the Monuments of Passaic, New Jersey" as well as excerpts from his essay on the Spiral Jetty. As we pass through the construction site, we consider various structures, earthworks and machines as paradoxical monuments of the future, eliciting the weird Anthropocene logic of past futures and future pasts. If we are the past of the future, how are we living that time now? We discuss Smithson's "zero panorama" that "seemed to contain ruins in reverse, that is – all the new construction that would eventually be built" (Smithson 1996, 72). We emulate Smithson's picturesque walk, or science fictional adventure, pondering a future "lost somewhere in the dumps of the non-historical past; it is in yesterday's newspapers, in the jejune advertisements of science-fiction movies, in the false mirror of our rejected dreams" (74).

I ask us to return to the woodland walk, as a practice of sensate attention, slowed to the scale of breath and pace. Only now we are surrounded by the rumble and roar of giant, earth-moving machines, our sightlines gridded by fencing, inhaling the smell of diesel and freshly scraped earth. Corvid commentary pierces the air over the fracas. Students pause to make note of striking features or 'monuments' in the landscape.

Smithson connects scale with "actualities of perception": "Size determines an object, but scale determines art. A crack in the wall if viewed in terms of scale, not size, could be called the Grand Canyon […] Scale depends on one's capacity to be conscious of the actualities of perception" (Smithson 1996, 147). A toy car someone has left on a construction site generator further dislodges an already dehumanized sense of scale. Poetry enters as a practice of uncertainty – "negative capability", in Keats's phrase, or the perception of scale released from size, according to Smithson (Keats 1935, 72). Using their notes, students compose a "Tour of the Monuments of Diamond Wood". What images and conditions of the present landscape will they preserve, and at what scale, for future readers?

Experience, we learn, is something much less "pre-given" and authoritative than usually assumed, yet, for all that, meaningful in ways we cannot fully 'own' (Berssenbrugge 2013, 42). Our first slow listening walk provides the attentional matrix for our tour of possible futures across landscapes-in-construction, amongst other field exercises, and a practice the students often return to as they develop their ecopoetics portfolios. It introduces us experientially to the concept of the commons. And it offers a ready, portable exclosure for the cultivation and flourishing, within the present moment, of dissident futures.

3 Teaching Carbon Ruins

The student scrutinizes the strange object in her hands. She moves it around, considers its shape and purpose, raising it up for her classmates to see. She feels its weight, considers what it is; what it *was*. How was it properly held, back then? She traces her fingers along the elegantly curved steel tube at one end to the rubberized hosing at the other. Her hand affixes what is clearly some kind of handle. She squeezes what appears to be a trigger and points the 'barrel' end into the air, mimicking the sound of gunfire. Her classmates laugh. She passes it to her neighbour. As it moves through the group, the teacher asks several questions:

"Who can tell me what this is and what it was used for?"
"Does anyone know anyone who once used these?"
"What made them obsolete?"
"Does it resemble anything we have now?"

The questions form part of a teaching session based around a 'visit' to a museum of the carbon transition. In the session the classroom becomes the museum, the museum the classroom. The teacher becomes curator and/or museum guide. Students assume the role of visitors – and are encouraged to become curators as the session develops. The class are shown objects from the museum collection, some on slides, some passed round to hold, contemplate, and discuss.[6] The particular one the students are passing around here is a fuel nozzle from a once-operational petrol pump. It's an artefact because – did I mention? – this classroom session takes place in the year 2053. The world, while not totally decarbonized, has managed to radically power-down from fossil fuel use. The transition has happened. In this scenario the petrol pump is no more. The gas station is history. The age of petroculture has passed. Welcome to the Museum of Carbon Ruins (MCR).

The MCR was designed by a team of inter-disciplinary scholars and practitioners (I was one) associated with the Climaginaries research

6 The teacher either prompts the students to reimagine the room as a museum space or can pose as a curator visiting the class with a number of examples to demo. This can depend on the nature of the classroom space, but a table and some kind of digital projector (even a laptop screen) suffice.

project, based at Lund University from 2018-22.[7] Climaginaries developed multi-format projects using speculative methods to invoke a range of climate futures. The aim was to develop new practical, theoretical and interdisciplinary methods to enhance climate consciousness and literacy, and also to provoke forms of action and debate in academic and particularly non-academic settings. Influenced by the broadening of the field of Futures Studies in the previous two decades or so (itself a reaction to the insistent futural demands and aspects of climate change), Climaginaries work involves experimental forms of participatory futuring and world-building: placing possible futures in front of a variety of audiences to try and capture what a climate-changed future within a given set of parameters might look, feel, sound, smell and even taste like.[8] The MCR began as a conceptual challenge to deploy a positive and playful climate imaginary, challenging dystopia's generic predominance. An ethos informed by envisioning relatively successful future outcomes was developed into an *actual* material museum, with physical and digital exhibits. These were determined within a framing narrative developed around the rise, fall and eclipse of the fossil age from the eighteenth century to the twenty fifties.

The museum is speculative and experimental, but as real as it is conceptual. It has been installed as an official physical exhibition with numerous objects on display in public libraries, a cathedral, universities, an official science museum, and in various pop-up exhibition spaces. It also has a mobile truncated version, literally stowed in an old trunk transportable to various venues or events. This pop-up capability proves significant in reaching non-metropolitan audiences and non-academic stakeholders. It allows instant installation and requires the performative, immersive work of museum 'guiding' in non-museum settings: conferences, work environments, retail centres, government buildings, hotel lobbies or leisure spaces. As I elaborate below, it is transferable into any classroom setting as a climate change learning session, tacking between concept, theory, method and the creative pursuit of writing, recording and curating. These can, if required, be set as assessments and can be tailored to level of educational development and specific disciplinary expertise in and beyond the Humanities.

7 See `https://www.climaginaries.org`. The description of the origins, iterations, events and theoretical co-ordinates of the Carbon Ruins project is also recorded in a number of academic papers that stress its plasticity and flexibility and cite its origins and influences from science fiction to social and political theories of futures, from climate modelling to smart design. See, for example Raven, Stripple 2021; Raven 2023; Stripple, Nikoleris, Hildingsson 2021; Van Beek, Versteeg 2023.

8 Related projects include imagined soundwalks from the future, future travel guides, an Anthropocene Climate Writing Contest.

Because the carbon complex is ('was') everywhere, we should expect to encounter its ruins anywhere. Students are initially tasked with discerning these widespread traces, by 'backcasting' (Robinson 2003): working back from 2053. This futuring technique is a temporal ploy encouraging a form of archaeology from the future. It asks students to trace steps back in order to contemplate the necessary moves forward from their actual present, the likelihood and possibility of, say, the petrol pump's journey to obsolescence. So, for example, a student might speculate on the moment (2026? 2037?) when oil infrastructure becomes shaky, then trace a set of contours around it: what happens politically or atmospherically? What scientific factors emerge? What infrastructure – technical, financial, social, cultural, economic – emerges to 'kill' or prolong oil and gas? When students realise the possibility and restrictions of temporal play, they can also 'forecast' or speculate forwards: what will a city centre sound like in 2049, for example, that may be different from a recording taken today? What will a restaurant menu, a university campus, an energy bill, a vacation look like?

Tracing the life and times of objects and materials teaches students to notice and explore hitherto unconscious or unseen carbonizing qualities and effects of objects and their relation to social processes and cultural practices.[9] It also encourages them to realise the climatic conditions that require(d) the removal or replacement of such objects and their infrastructure. Concordantly, the range of entanglements and factors that feature in any transition – or act as a retardant – are realised.

The student-visitor, prompted by the teacher-curator, is not only tasked with measuring and learning about the climate-changed and climate-changing qualities congealed or constellated in a particular object, but in doing so encouraged to construct an artefact-imaginary of their own. (I have made this an assessment component in a module on Climate Imaginaries). They project from the object 'outwards', discovering and narrating the real set of contingent conditions around it, to the speculative scenario where these conditions change in the move toward decarbonization.

Teachers should seek to inform the student of the need to 'defend' the narrative. This places some pressure on the credulousness of the timeline, the storyworld and ultimately the object itself, especially as it crosses the threshold from present to future. This testing zone of plausibility and possibility is, of course, an inevitable corollary of speculative climate narratives from literary fiction to Integrated Assessment Models (IAMs) and IPCC reports. But it is made more demanding by the complex shifting parameters of meaningful climate

9 See for example Rinkinen, Jalas, Shove 2015.

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action and its various drags, as we proceed ever further into the time of the climate emergency. The extent to which these prove significant moments or bumps in the road towards collective consensus and eventual success is a matter for students to discern and debate. Embracing a certain uncertainty or acknowledgement of a degree of failure in an ideal future is part of the reason why Raven and Stripple (2021) make the case for a critically utopian ethos as the mode best equipped for the MCR to meet and attend to inevitable changes in the political weather, and why scholars such as Godhe and Goode (2018) make the case for a Critical Future Studies as best fitted to engage a wider set of entry points and imaginaries around radical social, democratic and technological futures. The 'critical' sensibility in both expressions determines that any utopian scenario or positive future worldbuilding exercise must necessarily accept the inevitability of flaws and problems in its vision. Additionally, the exclusivity of any utopia must always be subject to reflexive monitoring. A desirable future does not come fully formed but needs built and consistently rebuilt and made subject to permanent critique.

A class session of MCR and other forms of creative futuring can take multiple forms, but some degree of temporal placement involving holding the audience 'in the future' is key. One can snap the room back to the present at any time in the immersive, role-playing section, whereupon the critical discussion and creative component (e.g. deciding on and making a particular timeline, selecting an object, creating a set of narrative descriptions, considering the social contexts or technological outcomes) can take place. In my experience of performing the museum in classrooms, academic conferences, industry workshops and public performance settings, the initial onus is on the teacher-curator not only to immersively 'fix' the audience into imagining themselves in the future but to then retain them there using a series of prompts – discursive as well as object-focussed – along the way.[10] By the time several objects have been exhibited, using a combination of pre-prepared descriptions and storylines and asking and taking questions to the group such as those noted above, the participants are usually settled and confident of being 'in' the future – at least for a time. Gradually they begin to

10 One can do this by initiating a simple ritual, a finger snap perhaps or a more elaborate acknowledgement or ceremony. There are useful resources and short films available from the Carbon Ruins Swedish school plans (hosted by the Swedish Society for Nature Conservation website) and also from the Manchester Museum run. See: https://www.naturskyddsforeningen.se/skola/bortom-fossilsamhallet/ and https://carbonruinsmanchester.wordpress.com/. The reminders are useful 'wall-breakers' – humorous reactions usually follow as participants 'forget' to speak and discuss as if they were in the future. In this way, the bridge between the present and speculative scenario is tested and constructed, even via scepticism, which is, after all, a key pedagogic strategy and intellectual task of this futuring exercise.

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speak as if they are in the world *after* transition and to 'speak back' to the past (their 'real' present) with a wistful combination of irony, sentimentality, humour and sincerity.[11]

There are inevitable leakages and mistakes as the pretence of being in 2053 and recognising or lamenting objects that have passed into history continues. Insisting students refer to their present in the past tense is an important linguistic and heuristic tool for the teacher, in order to consolidate the speculative fiction in play. But treat frame breaking comments like 'that couldn't happen', or 'it wouldn't happen that way', as critically productive features of speculative provocation rather than reluctance or cynicism. 'Open' futuring is a technique to be fostered and encouraged: 'why not?' or 'what *would* it happen like?' or 'what outcomes are also possible?' are gateways to further research and discussion. The teacher should embrace the uncertainty. Comic or combative or even doubtful qualities are intellectually productive and often enjoyed by the class. This is what is meant by climate change as a wicked problem.

What constitutes a radical or rethought climate imaginary? What would an *un*just MCR look like? All of these questions are potential strategies, given the baseline fact that the future is yet to come and that effective action might not come soon enough. The MCR is built around principles of a just transition. It affords a stimulus to act and to a certain degree this means provocation. Its politics can be turned up and down, pulled left, right and centre, wherever the teacher or the student wills it to go as an experiment or with material intent. Some clumsiness of staying in or straying from time and character is welcome, since the core objective of MCR is to reflect on the tenuous present and its relation to a future that needs to be different. A just transition is a fragile thing, after all.

Occasional tears in the immersive fabric enhance a sense of temporal distance between 'there' and 'now', but this only serves to remind us what must (but may not) happen in that ever-shortening time for genuinely effective transformation. The teacher can draw these issues out later in the session once out of the scenario and snapped back into the real time class. The aim there or for future sessions should be to generate discussions about method and the

11 In my sessions, I usually have several volunteers who begin to speak to each other 'in character', agreeing and elaborating on the stories the others tell of the past as it becomes present (i.e., the future in which they are imagining themselves). Retaining people in future mode can be done by banal questions or remarks about the weather these days or travel to the venue or what they ate beforehand. It is a useful ploy to ask people about their older friends or relatives who may have experienced things 'back in the 20s' or refer to things they recall that were once in operation and are now transformed or obsolete; to keep reminding the audience they must play the game of 'being 2053'.

difficulties and challenges that remain for the collective effort to reach net zero.

Anyone either teaching or installing the MCR in a specific place necessarily engages in a learning process of place-based historical reflection and contemporary consideration. This influences the curational selections. This also applies to both physical installations and conceptual exercises such as in a classroom session. Any space is easily adapted. You could do it in a bus shelter. A dinner hall. A waiting room. The objects of a high carbon lifeworld are literally everywhere. I come armed with a few simple artefacts to pass around and show slides of others. In the experimental class, the 'place' of the museum can be notionally anywhere: one might want students to immediately connect with their home institution's (de)carbonizing properties, or the town or region in which the campus is located. There is, however, nothing to prevent a non-local geographical setting being selected, which may prove a key element in the session. The core notion must remain the same: that the world does (or perhaps does not) make the transition to successful decarbonization. 'Ruins' may take on a subtly different valence in different scenarios.

Making the exhibits and stories relevant to geographic and cultural specificity is a beneficial and often key learning and engagement task. It provides opportunity for students doing their own curating to compose a more bespoke timeline where place-based perspectives are apparent. It also allows for an exploration of historico-geographic relationality: between Global North and South, for example, or between a refinery town and a rural mountain resort in the same region. This requires students to research the explicit and 'hidden' carbon infrastructures in any particular historical geography. What would the Venetian MCR be? Would it differ from Carbon Ruins Dresden or Dakar or Doha? Why? What, on the other hand, would be ubiquitous objects, displayed in any museum of this type anywhere in the world?

The local resonance of a particular object or industry or practice as a heritage feature of a specific place also offers an enhanced gateway for audience engagement.[12] The overall objective for student-visitors

12 A range of objects offer engagement for different constituencies. In the Scottish version of Carbon Ruins I curated, for example, one exhibit was 'decarbonized whisky'. This had a backstory of imagined agro-ecological and logistical changes in this important national industry, in its transportation methods, its use of water and peat. These were all 'live' in various stages of industry discussion around sustainability as the museum was installed. The futuring narrative envisaged them as having taken place to allow peat use – an essential ingredient – to be continued. An exhibited block of dried peat exemplified a move from a carbonizing heritage fuel to a potential solution in Scotland's peat bog carbon sink climate plan. Different stories hook specific audiences. Small children made a beeline for the Lego set made from bioplastics. Petrolheads held the defunct motorbike exhaust with a nostalgic ruefulness for its passing, and so on.

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remains, however, to affix the particularities of place-based emissions (and their objects, social relations and transition currents) within the larger flow-and-burn space of carbon emissions on a continental and ultimately planetary level. But geographic salience cannot be ignored. It encourages a finer attention not only to the worldbuilding component of the exercise but also to an object or everyday practice's world-ecology – its carbon worldliness – and fosters a sense of immediate identification when asked to inhabit that world in the immersive component.

With an accompanying timeline charting the history of carbonisation over two hundred and fifty years to 2053, localised stories become important tools of learning historical and ongoing causes, effects, and consequences of carbonization and their contemporary climate ethics.[13] Understood from a climate-challenged future, specific artefacts become more prominent in particular places and times, particularly within historically hegemonic systems of use and exploitation. The steel industry is a critical feature in Swedish emissions, for example, hence the 'decarbonized steel' water bottle as a prominent exhibit. Oil and gas are more significant in Norway or Scotland, so 'The Last Jar of North Sea Oil' is a key exhibit in Carbon Ruins Scotland.[14] The coal, nuclear or petrochemical industry may remain highly resonant in Poland, France or Germany. A Vespa engine might prove a salient exhibit in Rome, Athens or Cairo, but the starter button for a *vaporetto* or collection of sample jars of 'Acqua alta 2025-2045' would hit better in the Venetian Carbon Ruins. Elsewhere, intensive dairy or meat agriculture might be/have been the prominent contributor to regional emissions in the Netherlands

13 A note on the choice of date. 2053 was chosen for the original Swedish museum for reasons to do with that being the decade for many Net-Zero agreements. A few decades hence is also critical to the published consensus of climate science around the Paris Agreement that emphasises the urgency of transition at the earliest date possible. Experientially, a decadal closer date allows what distinguishes, in science fiction criticism, between far future science fiction and speculative fiction. The latter is usually set sometime in the 'near future', in order to connect readers to the extrapolated roots of imagined changes and events in their present time. My experience guiding and performing the museum revealed that people can feel and imagine their own selves (and their younger relatives, friends, etc) in two or three decades time. This allows them to get into the role playing easily. The importance of the date as an issue in the teaching of the technique also gets students to contemplate the historically unsettled aspect of 'future history' and provides opportunity to consider the various political, social, financial, economic and technological issues that remain in play at all times around the question, state and shape of transition. But an altogether different date might work better for others. In my collaborative art project with the Coventry artist Paul Lemmon for the 2023 Coventry Biennial, the artist wanted a timeline much further into the future. The result was a more technologically utopian timeline that worked well in combination with the artist's abstract style. See Pearce (2023) for an explanation and further links to the artwork, "Memories of a Future City".

14 See: https://www.climaginaries.org/carbon-ruins-scotland/#jarofnorthseaoil.

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or Belgium, so something like 'The Last Burger' is preserved and placed on a presentation silver plate to commemorate the passing of the era of cheap meat and intensive agriculture.

Students are reminded that the road to Net Zero is not always smooth and that conflict between vested parties will exist throughout. Perhaps a banner or photograph might be included of a Youth Climate March in Finland in 2028, but a strong farmer's movement in Austria or Ireland that same year could be envisaged leading protests against rising veganism or newly imposed dairy taxes. A roll of barbed wire or a missile fragment might mark the era of climate refugees and wars between, say 2020-40. A reactionary movement against electric cars or wind turbines or bike highways could, from the vantage point of a rising anti-net zero carbon populism in the mid-2020s, be easily envisaged in many places across the continent, despite the EU's successful advances to decarbonization. How to register such conflict in museum display and accompanying timeline is an interesting task for students and their teachers to work on together.[15]

Students might also discover that certain objects remain 'live' in their present and assumed future trajectories, in accordance with the uneven speeds and successes of decarbonization in different places and polities. Sweden, for example, was chosen as the first site for the Museum not only because this is where the Climaginaries HQ was located but more for the relatively advanced societal, political and policy discussion of decarbonization already in play by 2018. This was enhanced by an emergent and iconoclastic climate movement: Greta Thunberg's school strike. As students should be prompted to realize, action is also unevenly patterned across the world's different regions, where protest movements – like the clean energy transition – lurch back and forth (as evidenced in the democratic pressures in the world geo-politics of 2025). This might set any future conceived MCRs with different expectations and narratives for specific sectors in different regions and nations. I was sharply reminded of this difference in certainty over likely outcomes when displaying the museum as a pop-up in the official Green Zone at the UNFCC COP26 conference in Glasgow in 2021. The cookie jar full of lumps of coal I had on display was from the last electricity-generating coal plant in Scotland.

15 It is entirely feasible to imagine and curate a museum of a disastrous climate future (if there are still museums at 2 or 3 degrees!), as much as it is to task students with imagining a radical left or extreme right version. What 'ruins' would designate in such instances would be interesting. The MCR was not alone in questioning the role and purpose of museums (or, indeed any public institution) when facing the challenges of the future to come. Its selection as a key concept of possible futures among others in the *Museums for Climate Action* project and exhibition was under their rubric of Rethinking, Reimagining and Mobilising museums for the climatic future. See `https://www.museumsforclimateaction.org/`.

Visitors from India and Australia remarked that this was not the reality in their countries and nor did they expect it to be anytime soon. The uneven landscape of transition is revealed in many such instances.

Artefacts can also present solutions as transition culture develops. Like the transition itself at the time of curation these 'solutions' might be real, speculative, prototypical or outright fanciful. We might, for example, consider clothes or textiles before and after nylon or synthetic dyes. But also, from a post fast-fashion era of reuse commerce. A 'last hamburger' from the 'era of fast-food' does not necessarily signal the end of fast-food as a lower-carbon pleasure or convenience, but it *does* signal the end of the carbon-intensive meat-industrial complex. A Lego display might include a set made from the era of carbonized or post-petrochemical bioplastics. Objects can also represent registrations of climate change from eras and moments lost or passed into history. A flask of melted glacier water from the beginning of the warming era. A ski mask or pole from defunct ski-runs. A diesel-powered leaf blower. And so on. Many objects also transcend place and assume planetary resonance – a car accelerator pedal, a plastic bottle, a gas stove. Students tasked with curating their own must take this multi-dimensional connectivity on board.

4 Conclusion: To the Future!

The MCR was designed as a practical and conceptual means to afford a better and thicker affective sense of successful climate action. This responded to scholarly work that not only bemoaned a lack of positive climate imaginaries, but also ones with the ability to engage intellectual sensibilities with physical textures and senses of the coming future as a feature of crisis in the present. This misplaced sense of a future mortgaged and 'not here' remains palpable in the Global North especially.

Ecopoetics situates attention through practices of writing at critical climate thresholds between past and future. Techniques for sounding the present, through exclosures of attention and compositional frameworks, including the measure of a sentence, detonate its components – an ancient woodland, a construction site – freeing sensory data to configure occluded histories at scale. The history-making nature of the present becomes tangible, along with relationships to multiple futures.

The turns to the future we have detailed in this article in our teaching and research and activist work was inspired by what we might call a twenty-first century 'futurist-turn' in multiple scholarly, creative, policymaking and activist circles. Offering a conglomeration of techniques, theories and practices, 'futuring' as practice and

concept is fundamentally determined to consider ways and means in which the changing climate might play out in multiple sectors of concern, from political economy to foodways, from transportation to leisure activities to refugee debates. 'Futuring' is, of course, by logic and practice flawed, open to question, but rather than shy from the challenges we prefer to face its comradely, political, creative, generative and provocative potential.

Futures thinking might principally seek foresight in adaptative or preventative measures to potential scenarios, but it might also be used as a means to steer and even create desired futures. To sound them out is critical. As we have elaborated above, this depends on the aims of the constituency of futurists and their political, ideological and cultural bent. It also can depend on the state of technological or political imaginaries at specific moments. As an anticipatory, problem-solving and forecasting exercise, futuring has been around for a long time in governmental, corporate and military circles, and will be for some time to come. In climate change contexts, the scientific and computational work of modelling or envisioning shared pathways will continue to employ notably futurist outlooks. These are always shaped subject to the manner in which the present can be perceived to be taking shape, but examples of historical transitions or sharp turns in historical events can also be added to the mix. The degree to which effective and timely climate mitigation towards a truly, *truly* just transition can be confidently offered up as a credible and desirable climate imaginary will always be subject to the unprecedented moments in time that will not stop confronting us. The future will not wait.

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