Lagoonscapes

Venice Journal
of Environmental Humanities

Vol. 5 – Num. 2   December 2025

Edizioni
Ca'Foscari

Lagoonscapes
The Venice Journal
of Environmental Humanities

Editors-in-Chief
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Lagoonscapes
The Venice Journal of Environmental Humanities

Semestral journal

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edited by Lucio De Capitani, Cristina Brito, Moritz Ingwersen

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Lucio De Capitani
Ca' Foscari University of Venice, Italy

Cristina Brito
NOVA University of Lisbon, Portugal

Moritz Ingwersen
TUD University of Technology Dresden, Germany

Paraphrasing Phoebe Waller-Bridge's astute definition of love in *Fleabag* (2016-19), one could argue that teaching "is awful […]; so no wonder it's something we don't want to do on our own".[1] This statement will probably not sit well with the most enthusiastic pedagogues; and yet, perhaps, both the unease around teaching and the need for companionship might sound more universally relatable if one is tasked to convey hope in times of climate despair and escalating polycrises. It makes sense, then, that in their 2017 collection *Teaching Climate Change in the Humanities*, Stephen Siperstein, Shane Hall and Stephanie LeMenager stress the importance of gathering the pedagogical experiments undertaken by "a fast-growing community of scholars and educators working to bring the humanities into climate change discourse and vice-a-versa" (2017, 2), producing "an artifact of collective questioning and collaborative work" (2).

This special issue aims to engage in a similar work of gathering, questioning and collaboration. It aims to further trace and expand, with a European focus, the network of university teachers who are tackling the most pressing issues at the heart of the Environmental Humanities (EH), bringing humanities and social science perspectives in conversation with technical and scientific knowledges to articulate culturally embedded and geographically situated responses to the

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[1] Waller-Bridge, P. (2019). "Episode 6". *Fleabag*. BBC.

causes and effects of climate change, mass extinction and ecological devastation, and to map out pathways toward environmental and multispecies justice.

There cannot be any doubt about the urgency of developing a robust and transformative EH pedagogy, especially in the wake of right-wing resurgence and attacks on the humanities and climate science across Europe and beyond. In recent years, we have witnessed a rise of reactionary formations, which, among other unsavoury positions, variously represent what Cara Daggett calls "fossil fascism", hell-bent on "shor[ing] up fossil fuel systems by denying climate change and dismantling a host of environmental policies" (Daggett 2018, 27). Andreas Malm and the Zetkin Collective have recently mapped fossil fascism throughout Europe in their poignant investigation into the political ecology of the European far-right (Malm, Zetkin Collective 2021), showing how it combines climate denial and ethnonationalism (40) while serving the interests of fossil capital (37). If fossil fascism employs climate *denial* to "make a statement about immigration" (101), it is worth remembering the related dangers of ecofascism, whose figureheads "proclaim their fidelity to ecological renewal, green world, and agitate ostentatiously against climate change, pollution and despoliation, declaring against those poisons in the service of another, the logic of race" (Miéville 2016, 19).

At the same time, even mainstream environmentalisms are still entrenched in questionable frameworks of development, growth, and empire: a case in point being the European Green Deal, which, as some critics warn, risks acquiescing to neoliberal (Isailovie 2023), colonial and neo-colonial (Vela et al. 2023) imperatives. Such environmentalisms, moreover, are easily paired with the logic of the technological fix, which promises a solution to the climate crisis while disregarding the cultural and political systems that drive it, clinging (in good faith or otherwise) to the idea that the climate crisis does not, indeed, as Naomi Klein (2014) would put it, change everything. All of this results in environmental teachers throughout Europe having to navigate a field of "false environmental knowledges" that risk perpetuating "an ideology in which [acts of ecological violence] are seen as 'necessary evils'" (Misiaszek 2020, 8) and that tend to be "deeply hidden by prevalent noncritical environmental pedagogical models" (9). Teaching environmental knowledges and ethics without connecting them to genuinely transformative and radical shifts in our politics and epistemologies risks wasting crucial opportunities to promote climate justice. In this context, the role of educators working under the umbrella of the Environmental Humanities is, at the very least, to develop a pedagogy that can foster and model inclusive, hopeful, resistant and transformative responses to the climate emergency and ongoing environmental and social injustices. The cultural and political stakes could not be higher.

The specific European focus of this issue emerges as an expansion of a network created in the context of the 2023 EUTOPIA Connected Community on the Environmental Humanities, gathering scholars from Ca' Foscari University of Venice, NOVA University Lisbon, TUD University of Technology Dresden, and the University of Warwick. In its inaugural symposium, in May 2023, the members of the network committed themselves to fostering "a comparative discussion of environmental challenges faced in [their] respective locales, as cities across Europe confront different but related manifestations of the climate crisis".[2] Such place-based approaches have become a staple in EH education – O'Gorman et al. talk, more broadly, of grounded thinking, that is, teaching strategies "that are grounded in specific case studies, sites, or even texts" (447). Reflected in all essays presented in this issue, our contributors develop EH teaching from specific sites – whether these are cities, regions or countries – and situate their pedagogies in dialogue with emplaced communities, activists, researchers, institutions, landscapes, and environmental conditions.

The special issue gathers contributions beyond the original EUTOPIA network, and traces pedagogical experiments in different European contexts. If anything, its variety shows that there has been a considerable expansion of programmes, practices and institutionalisation of the EH in Europe over the last few years, or at the very least of forms of teaching that capture the spirit of the EH even in the absence of their formal recognition. Already in 2019, the global mapping of EH teaching practices carried out by O'Gorman et al. included an encouraging section on Europe. However, they also pointed out that "EH teaching" was "relatively underdeveloped in the UK and Ireland" (O'Gorman et al. 2019, 437) and that "in 'Continental' (Western, Eastern, and Southern) Europe" (439) the entrenchment of national traditions resulted in, at least at the time, no specific programme dedicated to the EH.[3] With contributors from the UK, Ireland, Portugal, Germany, Austria, Italy, Poland, Sweden, and Belgium – only counting their current academic affiliations – this issue demonstrates how EH teaching is increasingly emerging, both as experimental practice and as institutional formation, also in previously underrepresented parts of Europe.

Alongside an emphasis on place – and place-based pedagogy – the collection engages decidedly interdisciplinary approaches, from literary studies (both contemporary and classical), cultural studies, visual and conceptual art, (eco)pedagogy, to ancient, early modern

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2 https://warwick.ac.uk/global/europe/confluence.

3 Other recent surveys of EH teaching have offered a global emphasis (e.g. Hubbell, Ryan 2021).

and maritime history, ethnography, and (coastal) archaeology. While simply collecting these disciplines within one publication does not, by itself, produce interdisciplinarity, many of our contributors' approaches transgress traditional disciplinary boundaries and promote conversations beyond customary classroom settings. The experimental teaching methodologies presented in this issue leave the comfort zones of established teaching paths, drawing on arts-based, embodied and narrative methodologies, museum exhibitions, walking exercises, outdoor poetry readings, digital storytelling, role play and citizen science, to mention just a few.

Finally, the essays collected in this special issue, many of which emerge from the collaboration of multiple authors, are testimony to the fact that EH teaching and learning is a collective endeavour. In their explorations of dialogue and resonances across different knowledge and teaching practices, united by a shared commitment to socio-ecological change, they foreground interstitial spaces in which heterogeneous experiences, backgrounds, methodologies, and concerns come together. In resonance with what Anna Tsing, Andrew Matthews, and Nils Bubandt call the "Patchy Anthropocene" (Tsing, Matthews, Bubandt 2019), they remind us of the profoundly patchy nature required of the Environmental Humanities, and of EH teaching in particular, inviting us to embrace turbulent synergies and collective solidarities to face climate chaos and breakdown.

The issue opens with Moritz Ingwersen's and Sophie Lindner's collaboration on the design of an arts-based literary and cultural studies seminar around the concept of 'geostories' that activated student engagement with human-lithic enmeshment around Dresden, Germany. Drawing on the results of a multi-modal assignment that they call "The Carrier Bag of Geostories", they offer examples of how aesthetic practice and embodied experience can mediate difficult theoretical concepts, and how situated encounters with the world through narrative foster self-reflexivity and socio-ecological literacy in relation to more-than-human placemaking with the elements.

Also focused on arts-based methods, Siobhan Leddy's essay is framed as an investigation into posthumanities education, aimed at challenging "common preconceptions about nature, matter, nonhuman agencies, even our own bodies and identities". In particular, drawing from her own teaching, Leddy explores three case studies that mobilize arts-based methodologies: a series of teaching workshops held at the Faculty of Fine Arts at Brno University of Technology (Czech Republic) that focused on exploring non-human agency through playful engagements with sound recording; a seminar at the Freie Universität Berlin, Germany that aimed at challenging received ideas of the weather and understanding the interconnections of weather and bodies through experimental and sensory exercises; and another seminar at the same institution that mobilizes larp methods (live

action role play) to help students imagine themselves as non-human entities with different sensory capabilities. What unites these three experiments is the aim of "challenging the anthropocentrism of our shared sensorium [...] that only permits sensations that reinforce human separation and exceptionalism from environments, climate, (nonhuman) nature, and the world generally".

The essay by Katja Sarkowsky, Marco Formisano, Paweł Piszczatowski outlines efforts of establishing a joint MA in the Environmental Humanities that strings together three institutional, pedagogical and geographical contexts (Warsaw, Augsburg and Ghent). The connecting element between the three interventions is a reflection on history, place, and context, as the three contributors ponder on "the context-specificity" of EH discourses and highlight the importance and possibilities of place-based teaching and corresponding methodologies. The latter include poetic engagements in/with the Warsaw urbanscape, encounters with water bodies in Augsburg, mediated by literature, and the challenges of working on a "discipline without a place" (the Classics, in Ghent).

Similarly highlighting a network of research, teaching and collaboration, the essay by Cristina Brito, Isabel Gomes de Almeida, Isabel Araújo Branco, Ana Catarina Garcia, and Nina Vieira outlines a series of case-studies of teaching-learning practices in Ancient History, Early Modern History & Archaeology, Marine Environmental History and Literary Studies at NOVA University of Lisbon. Their interventions (and teaching practices) emerge from within the sub-field of the Blue Humanities and are united by an engagement with water as both material and symbolical element. Discussing the potentialities of teaching the Blue Humanities in the context of Lisbon, the essay also details the first attempts at introducing EH teaching in Portugal, where the label has not yet been formally institutionalised.

The essay by Eva Bauer, Nicole Haring and Fabiana Fazzi presents the results of an International Teacher Training Program carried out in 2025 with students from the University of Malaga (Spain), Ca' Foscari University of Venice (Italy), and the University of Graz (Austria) within the framework of the *EcoStories* project. The program combined principles of ecopedagogy – a transformative and critical pedagogical model that engages societal and extractive violence while promoting learners' agency – with the methodology of digital storytelling, understood as a citizen-centered tool for the activation of public engagement through the sharing of stories. Within the context of the teaching training program, *Eco*-storytelling was offered to the participants as an experiment in speculative creation designed to remediate the imaginative and discursive crisis around environmental futures in the Anthropocene.

Pooja Nayak's essay offers a course concept on 'Human and More-than-Human Ecologies' at the Rachel Carson Center of Environment and Society at the University of Munich. Reflecting on the specific experience of teaching students in Germany, while referencing case studies and examples from a variety of global contexts – from India and the Himalaya to Lebanon and Palestine – Nayak explicates her syllabus and teaching practices with an eye for postcolonial interventions in EH education. With an ethnographic sensitivity, she makes a case for attending to "the specifics of Human and more-than-Human ecologies" – the historical, political, economic, and cultural contexts in which human and more-than-human relations develop and play out – in order to work towards "a cross-cultural education which goes beyond relativism, challenges liberal environmentalism, and counters the dehumanization of people and cultures".

The joint paper by Jonathan Skinner and Graeme Macdonald works under the conceptual umbrella of critical futuring, focused on speculative backcasting and embodied poetics that mediate transformative futures in the present. They offer two different teaching methodologies to achieve that goal. One focuses on Macdonald's involvement in and co-conception of Carbon Ruins, a series of museum exhibits originally developed by the *Climaginaries* research project and featuring artefacts from the fossil era to be discussed from a speculative sustainable future. He explores how "curating, performing and narrating" this museum can be deployed as teaching practice, as well as how the museum can be 'localized' in different contexts (such as Scotland, as done by the author). The other methodology introduces "a range of ecopoetic and participatory reflective practices" developed by Skinner that allow inhabiting "the embodied modalities, alternate rhythms and affects of an environmentally transformed world". These activities, centered on facilitating "an encounter between poetry, body and site", try to attune participants to the uneven reality of the world-ecology while allowing them to grasp relationships to multiple possible futures. Skinner, in particular, describes an ecopoetics workshop performed in the outskirts of the University of Warwick (where both authors teach), in the shadow of ancient woodlands and environmentally devastating infrastructure projects.

The final two papers of the issue are rooted within the context of Ireland. Rory Connolly and Alan Healy present co-creative citizen science as a promising area of EH pedagogy, arguing for the importance of public engagement and the potential of "site-specific and locally grounded perspectives". Focusing on archaeological practice and the possibilities it offers for the encounter with "landscapes, monuments, and heritage sites", they explicate the PRISM project (Preservation by Record of Ireland's Shell Middens),

a citizen science pilot scheme in Ireland that involved volunteer non-specialists to record vulnerable coastal shell middens via a digital reporting platform.

Finally, the essay by Francis Ludlow, Eva Jobbová, David M. Brown and Christopher Morris takes as its starting point the inherently interdisciplinarity of Environmental History and its necessity (and ability) to mobilize both human and natural/physical archives as a research and teaching tool. Arguing that the literacy to read both archives should be fostered already at an undergraduate level, the authors zoom in on Irish dendrochronological records. Through "a reflective 'reading' of one notable oak sample" from the Botanic Gardens Park, Belfast, they illustrate how tree rings provide a source of climate information that can be fruitfully employed in classroom discussion. From this case study, they show how students can be led to discuss conjointly and weave together seemingly distant archives and sources – from the history of botanical gardens, and the reports of newspapers on droughts, to tree-ring chronologies.

Learning from these teaching experiments, each focalising different affordances, site-specific environmental materialities, and interdisciplinary crossings, is both inspiring and daunting. The temporality we work on, in the context of the climate crisis, accelerated by ethnonationalism and unsustainable economic systems, is short, the need for climate (justice) action urgent. What we hope this special issue demonstrates is that withdrawing from the task of learning how to teach (and learn) with, through, and about environmental precarity and embeddedness in the uneven Anthropocene is not an option. Let these pedagogical reflections, best-practice examples, and model exercises be a helping hand in this most mundane, most difficult task.

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The Carrier Bag of Geostories: Transformative Pedagogy for Human-Lithic Enmeshment

Moritz Ingwersen
TUD University of Technology Dresden, Germany

Sophie Lindner
Visual Artist

Abstract   This article presents the conceptual framing and course design of a literary and cultural studies seminar that brings arts- and place-based methodologies into dialogue with elemental ecocriticism, feminist materialisms, speculative geology, geopoetics, and inhuman geography. Introducing a process-oriented assignment titled 'The Carrier Bag of Geostories', we reflect on the course as an occasion for transformative learning and advocate pedagogical strategies of generative estrangement and the cultivation of familiarity with the inhuman to foster eco-systemic literacy and expand students' capacities for environmental affect and agency.

Keywords   Elemental ecocriticism. Environmental affect. Transformative learning. Geological turn. Planetary sensing. Place-based education. Artistic research. Aesthetic practice.

Summary   1 Geostories: A Concept for Environmental Humanities Pedagogy. – 2 Read Your Stone. – 3 Emplaced Geostories. – 4 The Stone That Carries You. – 5 The Carrier Bag of Geostories.

> How can we live without or against the four elements,
> without thinking like them, without turning toward
> them, into them, through them, for them, with them?
> (Michel Serres, *Biogea*, 2012)

> A stone is a thought that the earth develops over
> inhuman time. (Louise Erdrich, "The Stone", 2019)

> There was a word inside a stone.
> I tried to ply it clear,
> mallet and chisel, pick and gad,
> until the stone was dropping blood,
> but still I could not hear
> the word the stone had said.
> I threw it down beside the road
> among a thousand stones
> and as I turned away it cried
> the word aloud within my ear
> and the marrow of my bones
> heard, and replied.
> (Ursula K. Le Guin, "The Marrow", 1981)

1 Geostories: A Concept for Environmental Humanities Pedagogy

Since Sheryll Glotfelty's foundational framing of ecocriticism as "an earth-centered approach to literary studies" (1996, xviii), the environmental humanities have unfolded through a compounding number of ways to translate the scalar derangements of the planetary into situated apprehensions of earthly entanglement. Reflecting on the reconceptualization of agency in response to the paradigmatic proclamation of the Anthropocene, Bruno Latour calls for a shift from history to "our common *geostory*" (2014, 17), a concept taken up by Donna Haraway in *Staying with the Trouble* (2016, 40-1), where she moves away from the grand category of the planet to immerse the human in lowercase-earth: "human beings are with and of the earth, and the biotic and abiotic powers of this earth are the main story" (55). Literalizing Latour – who explains that "[t]he prefix 'geo' in geostory" stands for "the return of object and subject back to the *ground*" (2014, 17) – Haraway foregrounds narratives of "earthly worlding and unworlding" and programmatically declares: "we inhabit the humusities, not humanities" (2016, 97).

In this article, we present the conceptual framing and multimodal course design of a literary and cultural studies seminar that mobilized the concept of 'geostories' as a flexible learning tool for cultivating a critically embodied and emplaced engagement with eco-systemic enmeshment and geologic materiality, in ways that build on and expand current directions in ecocriticism and environmental theory. Co-taught by the authors at TUD University of Technology Dresden in

the fall of 2024 under the title *Geostories: Literature and Earth*, the seminar was structured around a motile understanding of 'geostories' as a layered metaphor for exploring more-than-human narratives and poetic articulations of geomorphic becoming, transformation, and entanglement. Framed by what material ecocritics call "storied matter" (Iovino, Oppermann 2014, 1), we encouraged our students to experiment with different conceptions of geostories through the interplay of language and materiality, e.g. as the poetics articulated in specific rock formations or as human-geologic relations explored through art and narrative. As the second installment of an ongoing seminar series titled *Literature and the Elements*, *Geostories* was inspired by the elemental turn,[1] and focused on cultural circulations and implications of geologic matter. Drawing on a combination of place-based, speculative, analytical, and creative methodologies, our aim was to activate critical, situated, and embodied understandings of socio-environmental interdependencies, while decentering the affective grammars and epistemological molds of anthropocentrism. Taught in the borderlands of Germany, Czechia and Poland, *Geostories* stood in conversation with the geologic identities of a region shaped by iconic rock formations and a long, layered mining history – from tin and copper, to coal, uranium, and lithium. We wanted this course to speak to and expand our students' own storied landscape imaginaries and embodied histories of place, particularly with the awareness that many of them will stay in the region to become high school teachers and thus agents of socio-ecological change and earthly worlding themselves. In co-designing this course as an experiment in multimodal teaching, we brought together our respective backgrounds in artistic practice and literary/cultural studies. One of us is a conceptual artist born in the region, and her ongoing projects on speculative figures of thought – such as *Planetary Nurses* and *Die Spirituelle Astronautin* – employ feminist methodologies to explore eco-systemic worldmaking and cosmologies beyond extractivism. Her work combines local experiences of post-socialist disruption with performative settings for encountering planetary grief in times of the climate crisis.[2] The other is a university teacher of North American literature and culture specializing in critical futures at the intersection of the environmental humanities and speculative fiction studies, with previous work on elemental ecocriticism, global weirding, petrocultures, and critical pedagogy.[3] Together, we wanted to curate transformative learning experiences anchored in

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1   See, for instance, Cohen, Duckert 215; Peters 2015; Starosielski 2019; Jue, Ruiz 2021.

2   See https://sophie-lindner.de.

3   See Ingwersen 2019; Ingwersen 2020; Ingwersen, Müller 2022; Ingwersen, Raschke 2025.

generative estrangements of habitual modes of sensing, narrating, and inhabiting the self in relation to geophysical environments. Our aims were threefold: i) to probe the relations between cultural and environmental modes of worldmaking, using human-lithic relations as a conceptual nodal point; ii) to build up analytical competencies and foster flexibility and creativity in adapting to a present of eco-systemic precarity, through conversations between literary-artistic case studies, environmental humanities theory, and practice-based experiments; iii) to expand existing concepts of knowledge production and critical practice by offering aesthetic-artistic settings in which environmental learning is embodied and situated outside the university classroom.

Over the course of three months, the seminar alternated between a series of special events, and in-class focus sessions that were organized around various encounters with geologic matter.[4] We assigned readings and discussed literary-artistic examples on themes and fields that included extractivism,[5] feminist ecocriticism,[6] geological media,[7] inhuman agency,[8] geopoetics,[9] and Indigenous petroglyphs and land-based epistemologies.[10] The special events took the students beyond the classroom and included a day-long field trip to a nearby volcanic mountain, Lausche, led by a geologist from the Senckenberg Museum of Natural History in Görlitz; a cinema screening of the experimental 2024 documentary film *Architecton* (dir. Victor Kossakovsky); the artistic research workshop *The Stone That Carries You* conducted by Sophie Lindner in Dresden's city park Großer Garten; a conversation with geography and architecture students around an ongoing student-led exhibition on former uranium mining sites; and a public symposium on regional petrocultures with guests from the UK, Poland, and the Czech Republic. As a way to curate student engagement and produce concrete results, we designed a process-oriented course assignment through which students cultivated dynamic archives of thought, experience, observation, and creation to trace their own enmeshment in interlocking geostories. Drawing on Ursula K. Le Guin's 1986 essay *The Carrier Bag Theory of Fiction*, we called this assignment 'The Carrier Bag of Geostories'.

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4   In designing this course we drew inspiration from artist and poet Kathy Wu's brilliant syllabus and teaching concept on 'Geopoetics' (https://kaaathy.com/geopoetics/; https://syllabusproject.org/geopoetics/).

5   See Gómez-Barris 2017; Yusoff 2018.

6   See Merchant 1989; Plumwood 2007; Iovino, Oppermann 2014.

7   See Twaithes 2010; YoHa 2010; Goldsworthy 2011; Parikka 2015; Jahn 2019.

8   See Doyle 1928; Yusoff 2013; Cohen 2015; Mieville 2015; Bakke 2016.

9   See Hillmann 2001; Russo, Reed 2018; Leeuw, Magrane 2019; Abel 2024.

10   See Simpson 2015; Armstrong 2017; Williams 2018.

In thinking with the paradigm of the elements – specifically under the rubric of the geologic[11] – the students embraced what Jeffrey Jerome Cohen calls "human-lithic enmeshment" (2015, 6). They recognized that "[w]e constantly morph and are being morphed by our surroundings" (Lilian Kalenderian) and raised questions such as the following:

> [If] I, too, am composed of the same chemical elements as the soil and stones around me, so how am I different from them, except in form? (Paulina Ludziak)[12]

In the environmental humanities, thinking-with the elements as inhuman materialities that subtend, sustain, and suffuse human subjectivity has emerged as a productive mode of dissolving categorical distinctions between inside and outside, body and environment, and of re-embedding the study of ecological entanglement in a long history of animating matter as a bearer of affect, meaning, and agency. As Cohen and Duckert put it,

> [t]he elements might be described as metaphor magnets, but their ability to bond materiality and narrative is deeper than mere impress or gravitational trajectory. Through their action metaphor becomes *matterphor*, a tropic-material coil, word and substance together transported: of language but not reducible to linguistic terms, agentic and thick. (2015, 10-11; emphasis in the original)

For literary and cultural studies pedagogy, the elements invite consideration of the myriad ways in which human cultures have invested 'natural' environments with meaning through narrative and metaphor, while also revealing how human subjectivity and its techno-social extensions are shaped by the planetary circulation of substances, exposure to ambient forces, and more-than-human constellations of distributed agency. Imaginations of the lithic, especially, recall a long history of invoking stone as animated matter in art and science – from alchemy to romanticist poetry in the Western tradition, or the role of teaching stones, petroglyphs, and sacred rock formations in many Indigenous knowledge cultures across the world.[13]

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11 See Yusoff 2013; Cohen 2015; Bakke 2016; Harris 2021.

12 Throughout this essay we cite directly from some of our students' Carrier Bag submissions. All students cited have granted permission to include their work and names.

13 For influential meditations on stone through the intersecting lenses of anthropology, phenomenology, and environmental philosophy, see, for instance, Caillois 1985; Bachelard 2002; De La Cadena 2015; Ingold 2022; Raffles 2022; Luisetti 2023.

Kathryn Yusoff associates the Anthropocene with a "new understanding of *being as geological*", extending "the temporal and material imagination of the capacities of the human [...] into the contemplation of the social as composed through the geologic" (2013, 780; emphasis in the original). As we had hoped, our students would go on to produce their own variation of this ontological reckoning by the end of the seminar: "I realised how much more geological materials are part of my life than I originally thought [...]. We are stones and stones are us, we are each other's present and past" (Christina Chatzara).

Building on Cohen, who invokes the category of the "inhuman" as a signifier of "both difference ('in-' as negative prefix) and intimacy ('in-' as indicator of estranged interiority)" (2015, 10), our course aimed at fostering a transformative understanding of both the human *as* geologic and of earthly materials such as rocks, soil, and sediment as *agentic*, *intimate* companions in the collective articulation of geostories – defamiliarize to refamiliarize. Once customary perspectives had shifted, students realized that "there are geostories everywhere, no exceptions" (Ruby Bellmann). Becoming attuned to these stories involved not only gathering evidence about the specific geophysical histories of our students' places of origin, but also expanding our affective sensibilities as we interrogated the uneven distribution of dust in our nostrils, the pebbles in our pockets, and the minerals in our phones, blood streams, and dietary supplements.

When we envision the learning experiences of this project as "transformative", we build on the environmental humanities' commitment to "intervention and change (cognitive as well as worldly)" (Cohen, Foote 2021, 2), and draw on conceptions of transformative pedagogy. Jack Mezirow's theory of transformative learning, in particular, has become a recurring reference point in reflections on sustainability education and environmental humanities teaching (see Siperstein, Hall, LeMenager 2017; Singer-Brodowski 2023). Defined as "the process of effecting change in a *frame of reference*", transformative learning begins with a disorientation of "habitual ways of thinking, feeling and acting" (Mezirow 1997, 5-6; emphasis in original). Mobilized in response to the difficult emotions, cognitive dissonances, and phenomenological estrangements of living in an age of compounding environmental crises, such self-reflexive dishabituations can foster a recalibrated understanding of the self and the environment, supporting the learner's activation of "response-ability" in more-than-human worldmaking for change (Haraway 2016, 12). In the context of our course, it was thrilling to see our students perceive this process as one of "shifting perspectives, of learning to look differently" (Nathalie E. Jöhren). By moving from the quintessential image of stone as the natural world externalized

into resource toward conceptions of geologic life, confronting the lithic in a literary studies classroom is well-suited for producing generative irritations of reference frames. As student Nina Heller notes about her geostories: "They remind me that the Earth is not just a silent backdrop but a living, breathing system in which every rock, every trace, and every discovery is part of a greater cycle of transformation, memory, and renewal".

2 Read Your Stone

Upon entering the classroom for the very first session, the students were asked to blindly select a stone from a bag containing rocks that one of us had collected on the Baltic coast. Encouraged to take their time, students let their haptic sense guide them in choosing (or being chosen by) their companion – their "oddkin" (Haraway 2016, 2). Once everyone was settled, they received a single prompt, with no further instructions: Read your stone. After an initial moment of hesitation, curiosity took over and the students began to examine their specimen – tracing its veins, fissures, and edges with their fingertips and writing utensils, observing subtle shifts in coloration and composition. There was knocking, sniffing, even licking. Estrangement turned into an encounter: an opening into multisensory activation, lithic animation, epistemic disorientation, and material semiosis in practice **[fig. 1]**.

This exercise set the stage for a conversation with three texts that were programmatic for this course: the prologue of Jan Zalasiewicz's *The Planet in a Pebble* (2010), Louise Erdrich's short story "The Stone" (2019), and Val Plumwood's auto-ethnographic eco-theory essay "Journey to the Heart of Stone" (2007). Zalasiewicz's popular science book – like many of his writings shaped by his role as a geologist and long-time head of the Anthropocene Working Group – offers a poetic journey into Earth's deep history and opens with an appeal to our sense of wonder in recognizing "just an ordinary pebble" as a deceptively sized "capsule of stories": "These stories are gigantic, and reach realms well beyond human experience, even beyond human imagination. They extend back to the Earth's formation – and then yet farther back, to the births and deaths of ancient stars" (Zalasiewicz 2010, xii).

First time realizing that a stone is more than just a lifeless object—its meaning shifts with perception, shaped by what we create from it and what we choose to see in it. It is not just cold but a vessel of significance, waiting to be understood and stories be told.

*added to the carrier bag

Figure 1   Nina Heller, *Read your Stone*. 2025. Screenshot. Excerpt from Carrier Bag *The Stone that Carries Me*. Student work submitted in the seminar *Geostories*, TUD University of Technology Dresden. Used with permission

For the Anishinaabe writer Louise Erdrich, a "stone is, in its own way, a living thing, not a biological being but one with a history far beyond our capacity to understand or even imagine" (Erdrich 2019). Her story enfolds cosmic temporalities and millennia of human history into the lived companionship between a woman and a found stone, chronicling their shared intimacy across a single human lifetime. It ends with a vision of human-lithic enmeshment which projects the cyclicality of becoming-earth into ecological deep time: "Molecules that had existed in her body would be joined with the stone's molecules, over and over in age after age. Flesh would become stone and stone become flesh, and someday they would meet in the mouth of a bird". Following Erdrich, geostories are materialized not only through inhuman kinship but as a matter of reciprocal composition and incorporation: earth becomes flesh becomes earth. Meditating on the embodied resonance with their own stone companion – named Joe – one of our students similarly "wondered if how I felt could somehow be absorbed by Joe, or if the frequency my body puts out into the world somehow interacted with his frequency" (Lilian Kalenderian).

This type of exploration of stone vibrancy and the inhuman transfer of affect also lies at the heart of Val Plumwood's essay, framed by her experience of building a home from foundstones. A key figure in critical ecofeminism, she argues against the "instrumental reductionism" that underpins Euro-Western constructions of the nonhuman as primarily resource and, at the same time, cautions against the pitfalls of a long-rehearsed Romantic mode that casts Nature as Other through aesthetic mystification (2007, 22). Grounding

this critique in a transformative awareness of stone agency, she explains:

> The central question is: can we write stone teaching, stone acting, stone speaking, stone guiding, without being trapped in the familiar 'New Age' or gothic-romantic repertoire of the dualistic, the irrational and the romantic discourses that instrumental culture has set aside for us – the permitted realm of exceptionality and intentionality allocated for superstition, the haunted, or the supernatural, the eerily inexplicable? Can we write stone as much from SCIENCE as from ART, from philosophy as from poetry, from reason as from emotion? Can we write nature as active, responsive partner for everyday stone and daily experience, not just for the occasional impressive or exceptional place? (33-4)

Framing engagements with the geologic as fundamentally a task of writing – the core of "a decentering program" that "cultivates more self-reflection" and widens "our sensibilities beyond the conventional boundaries of the human-like, towards inhuman elements of the world" (20) – Plumwood's questions centrally reflect how we envisioned the multimodal production, examination, collection, and interpretation of geostories in this course.

3 Emplaced Geostories

Aside from the Latourian geologization of history and the designation of earthly narratives, the term 'geostories' gestures toward a physical layering. In German, this resonance is sharpened by the word 'Geschichten' (stories, tales), which contains 'Schichten' (layers), a term also used for geological strata. Reminiscent of the way in which land artist Robert Smithson speaks of the mind as being in "a constant state of erosion", where "ideas decompose into stones of unknowing, and conceptual crystallizations break apart into deposits of gritty reason" (1996, 100), one student's response to the dynamics of geostoried stratification became an evocative reflection on the interplay between world, words, and embodied experience:

> Underneath my utterances, under the words I say and in the way I say them lie experiences, coming to the surface one at a time to re-sink and be changed and mix and reform at various times. The surface is the words I'm writing, and on the surface is geology, erosion happens. It is constantly being eroded by wind, heat and water. Here it will be eroded by time, by me again, changing. (Rosa Preißler)

This layering of language and geology came alive during our field trip to Lausche, the highest peak of the Upper Lusatian Mountain range, where the rock face is elementally textured by both volcanic activity and the marine sedimentation of sandstone. As we read aloud from the opening pages of Jordan Abel's intensely geopoetic *Empty Spaces* (2024) –

> A deep, narrow chasm. Black rocks. The river lies still on those black rocks. A mile above, there is a tumbling; there is a moment. [...] A deep hollow. No shape. No consistency. No breaking some hundred feet in the air. Some places are softer than others. (3)

– our geologist guide Dr. Jörg Büchner had no hesitations about invoking the rocks as storied, stratified as 'Geschichten;' as, that is to say, geostories. One student perceptively seized upon his description of the mountain's volcanic geogenesis as "geo-fantasy" – "no one knows what was really there" – and crafted a poem giving voice to the geo-epistemic uncertainty of deep-time worlding [**fig. 2**].

Figure 2
Nathalie Jöhren, *Geo-Fantasies*. 2025. Screenshot. Excerpt from Carrier Bag *Mai Sola*. Student work submitted in the seminar *Geostories*, TUD University of Technology Dresden. Used with permission

4.3. Geo-fantasies

A tremor shakes where shadows string.

Earth sighs deeply, breaths align:
Forces mingle,
shivers tingle,
shaking up through ancient spine.

A fleeting flick, a spectral trail,
a solid shell, a core so frail -
tears in stone as blood flows bare -
I couldn't know;
I was not there.

A remnant of a phantom's blow?
We are never close to know.
Lost so long,
lost long ago,
lost to time,
and lost to stone,
echoes carved in beds of bone.

We walk in darkness, roots erased
of cosmic-carbon-stardust-waste,
the surface scarred
her past aggressions,
but down below, in silence, deep,
the fires stir though movements sleep.

Faithfully, but never true,
like phantom pains, faith healers' do,
a dream, a ghost, a moment rare -
I couldn't know;
I wasn't there.

Starting this semester surrounded by rocks and forest grounded our collection of geostories not only in the strangeness of the ordinary, but also in embodied perception and our student's emplaced memories. For the hike, we brought along selected entries from Linda Russo and Marthe Reed's book *Counter-Desecration: A Glossary for Writing in the Anthropocene* (2018), which we hoped would help on the way. These included "Akiw8gon", "Reciproesis", "Ecoherence", "Everyhere", "Geohaptics", "Ecopoethos", "Geopathy", "Terrotic", "Walking", "Way-dwelling", and "Polychronography". Whenever an opportunity presented itself, some of these short entries were read out collectively, while others remained as silent provocations, stored away for future reflection. Additionally, the students received a series of exercises designed to foster a self-reflexive, situated perspective on their presence in the landscape and to attune their senses to encounters with the inhuman worlds around them. For example, they were invited to experiment with pareidolia **[fig. 3]** – discovering themselves in the geologic features of the place – or to trace materializations of poetry (or poeisis) in the landscape, whether through sight, smell, taste, or touch. We also asked them to reflect on the stakes of their own presence in this place **[fig. 4]**, and to gather evidence – material or otherwise – of geostories told through the site's shifting scales, compositions, and temporalities.

Figure 3   Lilian Kalenderian, *Experimenting with Pareidolia*. 2025. Screenshot composite. Excerpt from Carrier Bag *Symbiosis & Metamorphosis | Encounter and Interconnect*. Student work submitted in the seminar *Geostories*, TUD University of Technology Dresden. Used with permission

In preparing for our excursion, we aimed to sensitize the students to modes of environmental encounter grounded in relationality and reciprocity, and to resist the logic of accumulation, instrumentalism, and extraction in gathering their impressions. "We all have been conditioned to embody the extractive gaze in one [way] or another", as one student perceptively noted; "it is unconsciously embedded within

us, in our cultures and our language" (Acsah Kulasingham). To train our senses for a different gaze – perhaps a more reciprocal approach to the inhuman world – Sophie Lindner developed an experiential assignment that also laid the groundwork for her workshop *The Stone That Carries You,* conducted in Week 4:

> In preparation for the field trip, find yourself a carrier bag, a container – whether a box, a basket, a pot, a woven net, or anything else that comes to mind. Do you have a stone lying around at home, from a collection, a hike, a trip, or just because? If not, ask a friend or acquaintance for one. Let them share its story with you. Place this stone in your carrier bag and bring it with you on the excursion. On site, you will exchange your stone for another one from Lausche. Look for it, but also allow yourself to be found. You will carry this new stone home in your carrier bag, leaving the one you brought behind. […] Now carry the stone with you. […] Where is it taking you? What is it allowing you to experience? Emotions are forces – how do you feel? Your carrier bag now becomes a vessel for this emotion, embodying it.

Figure 4   Nina Heller, *My Presence in this Place*. 2025. Screenshot. Excerpt from Carrier Bag *The Stone that Carries Me*. Student work submitted in the seminar *Geostories*, TUD University of Technology Dresden. Used with permission

Aided by this assignment and our prompts, many students perceived the field trip as a transformative experience. Noticing "the weight of my body, pressuring the ground beneath me", one student was moved to recognize an affinity – "a web of connections […] never considered

before" – between herself, the stone in her hand, and the planet (Nina Heller) **[fig. 4]**. Coupled with thoughtful meditations on the ethics of their stone exchange and on their presence in this place, many students reported an expansion of their eco-systemic self-awareness.

4 The Stone That Carries You

This section is written by Sophie Lindner alone and presents a reflection of her artistic workshop *The Stone That Carries You*, in which the stones and the students entered a cycle of narrative metamorphosis through elemental dialogue and personal bonding. Students were given an opportunity to articulate the affective dimension of their increasing consciousness of human-lithic enmeshment.

The workshop took place beneath the open sky in Dresden's central park Großer Garten, where the heavens hung a dull silver and the air held a chilly embrace. Students had received prior instructions: to seek a stone from home, carry it to Lausche, and, once on site, exchange it for a different stone, a stranger. Roles were assigned to the stones: an exchange stone and a found stone, destined to journey across landscapes. The exchange stone manifests a memory, a bond: Where was it found? Who gave it to me? Countless 'hidden' collections of stones dwell unseen, nestled on bookshelves, atop cupboards, within drawers. The students just had to dive into the hidden spots of 'home'. Students also received the motif of the 'carrier bag', with the instruction to find a container or a pouch for the stone, to cradle it and enable its passage. The found stone was not meant to be an artifact, but a meeting. Students were to be found by a stone in Lausche, to stumble, to listen, to be stirred. The exchange stone took the place of the found stone; the carrier bag was the site of the transfer. For four weeks, the found stone remained with the students, silently 'playing its part' in their daily lives. To let the stone play, to gently roll it into one's own tapestry of being? To weave memory scrolls with the stone? Something that stands silent, unmoving, without buttons or functions. Something that only carries, is carried, has been spirited away, something utterly foreign. Two planetary time–figures converge, their dawn and their endurance divided by astronomical vastness. Who narrates their tale, and to whom? Can the stone, through the might of its own timelessness, carry the person, instead of the person carrying the stone? How do they forge an alliance in these times of urgent decarbonization, of dismantling the grip of extraction? To share time. To carry time, to bear it. What qualities must the person acquire to carry time with the stone? Is relationship a woven basket? Students were invited to become a Carrier Bag of Geostories – with the stone. After the transfer in Lausche, the found stones were bathed in water, untouched by soap or sponge. The used water was held

within a sealed vessel. The stone's hidden symbioses, the tiny worlds upon its skin, were gently parted, and new unions were coaxed into being. For the workshop, students brought their stone water and the stones cradled in their carrier bags; four weeks had passed since their first encounter.

In the park, I gathered everyone at a long pasting table. The table was set with stones, utilities, and various objects of lithic estrangement and association. It was to be a dialogical place, an environment where shapes would emerge and dissolve through giving and taking. A place of accidental and forced symbioses. A place of aesthetic ambivalences, like the silver bread made of aluminum perched at one end of the table. Or a miniature moon – aglow – a stand-in for the greatest stone we are entwined with on a daily basis. Glass stones, artificial stones chemically produced, images of minting processes, a monk lost in meditation on a mountain peak. Cardboard circles in stone colors, peeled at the edges. I placed two camping stoves on the table, as well as tin pots of varying sizes, a wooden spoon, and a pair of tongs. As a prelude, we began with a slow walk. Students were invited to let their senses drift between the planet's mass and warmth, and their own bodies. We made ourselves aware of the place, calibrating our bodies and minds to the presence of the stone that carries us – The Stone That Carries You.

Once gathered around the table, students told the stories of their exchange stones and found stones. They named their stones, described shared everyday experiences, recounted their biographical entanglements, and shared the moment of passage in Lausche. What does it mean to collectively inhabit a planet? We live on the planet, but do we inhabit it? Learning symbiotically. No planetarity without reflexive, subjective, and situated knowledge. Humans accelerate stones; stones decelerate humans. Is that an approximation? In the climate crisis, the pace of planetary change is beginning to approach the temporal scale of a human life. After our stone stories had begun to reverberate through the moisture-laden air and earth, we poured the stone water from each participant into the camping pots. Something mingled, the microorganisms of all stones interwove and embraced as sisters. We mimicked deep time, not slowly, but rapidly. Symbioses. I lit the camping stoves; the stone water was heating up, accelerating the process. Steam. Elemental evaporation. We dressed the table with our stones and carrier bags, arranging, expanding. The table became fuller, the water nearly at a boil. Students were invited to add, to remove, to stack, to shift. A description, perhaps, of symbiogenesis. The scent of stones in the mist. Clouds bearing fungi and microbial life. Gently, the students lowered their stones into the hot water. The stones now shared a cave, a house, a tent. They spoke to one another. The scent of stones evaporating. Some students felt discomfort and nervousness. They worried about their

stone. It might suffer harm in the heat of the simmering water. Is the rising steam our shared figure of time? We retrieved the stones from the pots with the tongs. They were rubbed dry with kitchen towels, then nestled into open hands. Each stone held its own essence. Some scalding hot, others merely warm. The slow, soft warmth within the stone offered solace.

The final step was the farewell to the found stone. Students were to remember and to release – to become aware of the wandering cycle of stones as Earth's living skeleton (see Plumwood 2007, 20). Meanwhile, the stone water – this stony sisterhood – cooled. With a ladle, I gave each student a portion of the stone water, pouring it into the vessels they had brought. Though students left their stones behind, they carried with them a piece of a new symbiosis. They were free to decide where the sisterhood stone water would journey. The workshop closed with a reading of the passage from Val Plumwood's "Journey to the Heart of Stone" cited above.

Figure 5 Sophie Lindner, *The Stone that Carries You*. 2025. Workshop at Großer Garten, Dresden. Copyright by Benjamin Thomas

5 The Carrier Bag of Geostories

The motif of the carrier bag served as a throughline for this course, centrally activated in Sophie Lindner's workshop. Celebrated as an inspiration in much of Donna Haraway's recent work (Haraway 2016; 2020), the carrier bag is borrowed from Ursula K. Le Guin, who envisions it as a feminist counter-metaphor to disrupt the spear-wielding hero narratives of progress, exploration, and adventure (Le Guin [1986] 2019). For Le Guin, the carrier bag is a cradle, receptacle, and medium of "life stories",

full of wimps and klutzes, and tiny grains of things smaller than a mustard seed, and intricately woven nets which when laboriously unknotted are seen to contain one blue pebble, an imperturbably functioning chronometer telling the time on another world, and a mouse's skull; full of beginnings without ends, of initiations, of losses, of transformations and translations, and far more tricks than conflicts, far fewer triumphs than snares and delusions; full of space ships that get stuck, missions that fail, and people who don't understand. (Le Guin [1986] 2019, 35-6)

We adopted Le Guin's carrier bag for a series of nested assignments that asked students to reflect on and work through the materials, ideas, texts, and experiences of the course by curating their own fluctuating and expanding collection of geostories: The Carrier Bag of Geostories. Countering a merely accumulative, if not extractive, approach to environmental experience and knowledge production, the Carrier Bag of Geostories centers attention and care. As a transmedial archive of inhuman familiars and shifting memories, it holds stories from the deep past as well as the embodied present, weaving and projecting continuities between subjectivities and more-than-human landscapes into the future. The process of its curation sharpens an awareness of narrative contingencies, affective investments, epistemic multimodality, and the fundamental ways in which language, imagination, and materiality are intertwined. Our introduction to this semester task read as follows:

> Your Carrier Bag is a multi-modal collection and creative work-in-progress documentation of your engagement with geostories. Think of it as a sketchbook or a box that might contain poems, drawings, reading reflections, thoughts, traces, essays, short stories, videos, artifacts, photographs, physical samples – or any combination of these, or whatever else you can imagine. Following each seminar session, you will add elements to your Carrier Bag of Geostories.
>
> Think of your Carrier Bag in terms of geological strata: each new layer, amendment, or connection opens up impurities, bifurcations, fault lines, folds, tunnels, or bubbles in already existing formations. Embrace these imperfections, material traces, and polytemporalities as you would in marvelling at a geologic artifact like a rock or a blue pebble found on a beach, a mountain, in your grandparents' backyard, or gifted to you by a friend or stranger in a moment of vulnerability or kindness. Every new addition, every step you take carrying your bag, reshuffles its contents and creates new affinities, new constellations, new orders, and new contingencies.

The stones gifted in the opening session were the first elements to be added to the Carrier Bags; the first set of assignments was organized around our field trip to Lausche at the end of the same week. Each subsequent classroom session concluded with a prompt for an addition to the Carrier Bag, which, building on that week's readings and themes, encouraged students to experiment with different media, methods, and approaches as they reflected on and expanded their evolving geostories:

Material Ecocriticism: Add short expositions for four stories about geologic life: a) in which your stone is the protagonist; b) in which your stone is the narrator but not the focalizer; c) in which your stone is the setting; d) in which you are the setting.

Geopoetics: Do some research on the geographic/geologic features and histories of the place where you are from. Relate the geo-features to your own biography. Write a poem of no more than ten lines about this geostory of your place. How does your poem pick up geology/geography on the level of form?

Geomedia: Select a piece of technology that you have used to work on your Carrier Bag and do some research on the minerals it is composed of. Focus on the origins of one of these minerals and give a brief account of how it has reached your Carrier Bag.

Systems of Extraction and Entanglement: Formulate a research question or statement that indicates which systemic relations you are interested in exploring through your geostories. What are your geostories evidence of?

Teaching Rocks: What are your geostories teaching you (or others)?

To be submitted by the end of the semester (adapted into an appropriate digital format), the final Carrier Bags were to respond to a guiding question that, in all its vagueness, was designed to turn this task into an occasion for self-reflection on situatedness and implication:

How am I a geostory and which geostorical strata of local, global, planetary or cosmic more-than-human-lithic enmeshment does my own geostory intersect with?

This expanded conception of what might count as story was deliberate: subjectivity constituted as story, a narrative of self ceaselessly articulated and dispersed through semiotic-material worlds whose spatial and temporal layerings make up intersecting stories of their own.

Figure 6   Antonia Hahn, *Physical Carrier Bag*. 2025. Screenshot. Excerpt from Carrier Bag
Awareness/Consciousness. Student work submitted in the seminar *Geostories*,
TUD University of Technology Dresden. Used with permission

Figure 7   Christina Chatzara, *Police File*, *Crime Scene Exhibit*, *The Geostories*. 2025. Screenshot composite.
Excerpt from Carrier Bag *Geonapping*. Student work submitted in the seminar *Geostories*,
TUD University of Technology Dresden. Used with permission

Figure 8 Acsah Kulasingham, *A Postcard of Earth* & *The land that holds us*. 2025. Screenshot Composite. Excerpt from Carrier Bag *Systems of Extraction*. Student work submitted in the seminar *Geostories*, TUD University of Technology Dresden. Used with permission

Figure 9 Stef Busch, *Geopoetics in Practice – You too are breakable in this earth*. 2025. Screenshot. Excerpt from unnamed Carrier Bag. Student work submitted in the seminar *Geostories*, TUD University of Technology Dresden. Used with permission

The Carrier Bag submissions we received were expansive, poetic, thoughtful, and deeply moving, metabolizing stone into stories of fragility, kinship, and continuance **[figs 6-9]**. They included sound recordings, paintings, visual poems, videos, photographs, collages, short stories, and multimodal mind maps in a multiplicity of shapes and sizes, born from physical carrier bags in the form of egg cartons, duffel bags, jewelry boxes, and mason jars. Some of them operated fully within fictional or speculative paradigms, while others focused on analysis and experiments in geopoetic self-writing. One student structured their Carrier Bag as a court file about a case of "geo-napping" – the abduction of stones – to translate their unease about extraction into a discussion of "geopolitical justice from an earthen, a chthonic perspective" (Christina Chatzara) **[fig. 7]**. For many, the Carrier Bags provided an opportunity to reflect on interconnectedness, transformation, and relationality – a growing consciousness of how "local and global power structures are enmeshed with geologic life" (Antonia Hahn), how "meaning is never something imposed but something that emerges in relation, in movement, in touch" (Nathalie E. Jöhren), and how "matter is never truly dead but always in motion, reshaped by time and perception" (Nina Heller). For others, attending to articulations of the geologic shifted into moments of self-reflexive introspection, sometimes exploring geographically situated childhood memories or incorporated traces of mineral economies. One student "realised that I did search myself in each and every session" (Lilian Kalenderian).

> Dear Diary,
>   I realized something today. I'm a child of this earth. But my room is a box keeping you out / keeping me in. Like a prison of my own making, I hide from the world withering away. I long for my childhood days. Digging my fingers into the soft soil of our backyard. Burying my soul into the deep earth. Collecting stones to keep me company (was that a selfish act?). Now the only things keeping me company are the ever-present ghosts of technology. Tamed stones. Useful stones. Earth in its most desperate form. I miss you my wild friend. (Stef Busch)

Speculative diary entries, such as the one above, were a recurring mode of examining the complex interplay of geo-affects around melancholia, guilt, love, solace, loss, responsibility, belonging, and empathy. Learning to acknowledge, articulate, curate, and caress the difficult emotions of ecological entanglement amidst planetary systems of injustice and destruction is a crucial dimension of the environmental humanities classroom, and a task that is far from easy. Writing – whether through narrative, poetry, or essayistic forms – is a powerful vehicle for the potential remediation of affect into action,

or at the very least into "an intense and oddly positive existential shiver" (Lilian Kalenderian). The students' contributions demonstrate that linking the learning process to aesthetic practice and embodied experience is highly effective in facilitating the translation and comprehension of difficult theoretical concepts. Moreover, a process-oriented approach to curating situated encounters with the world through narrative – in our case mediated through the motif of Ursula K. Le Guin's carrier bag – opens up profound pathways for the development of self-reflexivity and consciousness around more-than-human implications, systems, and response-abilities. As one student concludes, "this course has reshaped my thinking, to pay attention to matter around me, to explore their agencies, to hold their stories" (Hiruni Hitihamu). Touched by our students' commitment and the thoughtful work produced throughout the semester, we come away with a sense of gratitude and hope that the geostories shared throughout this term will continue to reverberate. Conceived as an invitation and open-ended process, geostories call for "collective continuance" (Levine 2023, 11-15), a hesitant, affective appeal to action poignantly articulated in the concluding words of Stef Busch's Carrier Bag:

> When entering a narrative with non-human agents, there might not be an end to that narrative, just like there is no clear beginning. In a way, I was not meant to tell that story – I was meant to live it. By the end, I breathe. We got this.

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Entangling Sensing: Arts-Based Methods for Teaching the Environmental Humanities and Critical Posthumanities

Siobhan Leddy
Linköping University, Sweden

Abstract   Contemporary planetary crises have prompted a new wave of environmental and posthumanities scholarship, aiming to address our planet and its concerns as entangled and more-than-human. How might the radical propositions of the environmental and posthumanities be taught? This article argues that arts-based methods – characterised by sensation, open-endedness, interdisciplinarity, experimentalism and situatedness – offer generative approaches for embodied and embedded learning. Through three case studies, the article elaborates different arts-based approaches that the author has found especially generative when teaching the posthumanities.

Keywords   Arts-based teaching. Posthumanities. Environmental pedagogy. Environmental Humanities. Aesthetics.

Summary   1 Introduction. – 2 An Anthropocentric Sensorium. – 3 Recording Posthuman Sounds. – 4 Designing 'Weathering' Prototypes. – 5 More-than-Human Role Play. – 6 A Set of Permissions.

1 Introduction

Recent years have seen an explosion in environmental humanities and posthumanities scholarship, which – in ways exceeding the more traditional humanities – aim to address the problems of more-than-human entanglement. Contemporary planetary crises such as ecosystem collapse or climate change are fundamentally more-than-human concerns and, in recognition of this, the humanities have sought to adapt to these conditions: what Cecilia Åsberg and Marietta Radomska term "more-than-human humanities" (2023-). These adaptations help us to better approach the entanglements between nature and culture, as well as more broadly challenge the anthropocentrism that prevents us from recognising the connections between human and nonhuman life. In contrast to inherited assumptions that nature, nonhuman species, or humans simply are what they are, as an unchanging ontological fact, both the environmental humanities and critical posthumanities emphasise contingency, relationality and more-than-human co-constitution. Planetary crises, in this light, can be understood as *more-than*-human concerns, making it necessary to consider nonhuman, as well as human, stakeholders.

As Åsberg and Rosi Braidotti tell us, this complex human and more-than-human situation requires its own "versatile research practices" (2018, 2). Might the same be said of more-than-human education, too? Perhaps learning the ontological and ethical insights of the environmental and posthumanities requires teaching methods outside of humanities conventions. In my own experience with teaching environmental humanities and posthumanities ideas at universities across Europe, I have found that only very few incoming students are familiar with them; their guiding principles often pose such a challenge to common preconceptions about nature, matter, nonhuman agencies, even our own bodies and identities, that it is not always easy to integrate them into a learning environment. How can the idea that 'we have never been human', as Donna Haraway puts it (Gane 2006), be learned by someone who has only ever experienced total fidelity to their own humanness? How can one learn to experience one's body not as an immutable and discrete singularity, but as a porous, contingent and co-constituted entanglement, incorporating human and nonhuman others? To do this kind of pedagogical work, we surely require more than the usual methods of humanities education. It seems likely that posthumanities education could easily make use of methods that are embodied, material, sensory and open-ended. Aesthetic, arts-based methods, operating in excess of logocentrism, and characterised by sensation, open-endedness, interdisciplinarity, experimentalism and situatedness may offer interesting pedagogical tools for developing tacit, embodied and embedded learning.

In the article that follows, I outline three different case studies from my own teaching practice, where I have adopted arts-based exercises to teach different concepts from the environmental humanities or posthumanities. Importantly, as teaching methods, the aim of these exercises is to convey or communicate existing theoretical concepts through experiment and play; it does not aim to produce entirely new knowledges in the classroom (although this may indeed happen, in the best of cases). These methods aim to augment textual materials, enliven the classroom, bring theory to the body, and allow an opportunity to explore ideas as a group, through active collaboration and experimentation. This practice-driven approach to teaching is especially helpful when teaching in international contexts – as is the case for the following instances – where students may be learning in a language that is not their native tongue. Arts-based, less logocentric, methods can provide a wider variety of pathways for student learning that can be enormously beneficial.

2 An Anthropocentric Sensorium

In *The Politics of Aesthetics*, Jacques Rancière suggests that the political power of art lies in its capacity for redistributing the sensible (2004). In other words, art's power to change what can be felt, what is ordinarily excluded from the sensorium and what is not, makes it – in the very best cases, at least – a possible tool for emancipatory politics. After all, Rancière writes, politics "revolves around what is seen and what can be said about it" and "who has the ability to see and the talent to speak" (2004, 13). Art, then, can be a mode of *dissensus*, challenging our normative sensory conditions and operating in sensory excess of normative perceptual boundaries, causing "modifications in the sensory perception of what is common to the community" (40). Art is able to shift the *partage du sensible*, that "line of sensibility that renders some subjectivities invisible, inaudible, or unavailable to the senses" (Panagia 2014, 94-8). While Rancière was writing in humanist terms, it is not a great stretch to think of this as a more-than-human concern. Considering Rancière's *partage du sensible* from a posthumanities or environmental humanities perspective, we can approach art as a method for challenging the anthropocentrism of our shared sensorium: a sensorium that only permits sensations that reinforce human separation and exceptionalism from environments, climate, (nonhuman) nature, and the world generally.

This sensory challenge is generative to environmental humanities pedagogy, which aims to create new ways of seeing, hearing, touching and otherwise sensing, producing knowledge for the student with and through their own sensing body. In a classroom's redistribution of

the sensible, through aesthetic methods, students may learn about the contingency of their sensing thresholds, and – again in the best cases – even their own bodies, and the inextricability of those bodies from the world and those that are other than human. They may learn about various entanglements and co-constitutions, since (as Karen Barad informs us) we do not look at the world from outside of it, but rather co-constitute it, as part, "in its ongoing intra-activity" (2003, 828). To sense the world is to be part *of* the world, which is to also co-create the world. While the anthropocentric sensorium limits perception according to humanist boundaries, diminishing our ability to sense our entanglement with an earth we are always and already *part of*, an environmental sensory pedagogy may seek to open up these boundaries – what Rosi Braidotti calls an "ethical transformative process" for "achieving […] awareness of our limits" (2006, 134).

It is important to note that the sensory distribution is a socio-political phenomenon that cannot be considered solely in terms of the individual; understood in feminist-posthumanist terms, as a kind of aesthetic performativity, this collective sensorium defines what *is* and *is not* legible as agential and, consequently, recognisable as *politically* agential. This is the *partage* that Rancière refers to: the boundary of exclusion and inclusion. As is the case with performative boundaries, this partition always takes place through and with bodies and subjects, but it cannot be reduced to a kind of individual consciousness: it is a social enactment, expressed through a performative matrix of norms (Butler 1990, 1-34). Performativity is powerful stuff, exceptionally difficult to break free from (as Judith Butler famously observed of gender). It is an unfair expectation to suppose that a few simple classroom experiments can rid us of our performed humanness. Even if that were indeed possible, students are rarely in a position to force the hands of lawmakers to enact wider political change. With this in mind, though, we might still hold bold ambitions for environmental or posthumanities education: to reveal performative boundaries, develop forms of knowledge about category contingency, and create subtle sensory shifts that challenge our inherited, anthropocentric beliefs about agency.

An environmental humanities, or posthumanities, pedagogy implies something far broader than typical formal education: instead, learning is worldly, relational and more-than-human, whereby *the world itself* is simultaneously teacher and student, author and reader, sensor and sensed. Education studies scholar Sharon Todd describes pedagogy in such terms, whereby learning is an everyday practice of pedagogical entanglement emerging from the "ways we move, perceive and live in, through, and with our environment" (2021, 250). This means that "all kinds of relationships are pedagogical", not simply those that take place in typical student-teacher environments

(Todd 2014, 232). Todd foregrounds the role of sensation in these kinds of learning experiences. As some sensations come to intensify more than others, they *become pedagogical*, as they enact shifts in meaning, behaviour, and even the boundaries of the self. Indeed, Todd tells us, sensations profoundly shape "how we become subjects and form understandings of the world" (2021, 254) and, as such, new kinds of sensational enactments have the capacity to reshape our knowledges, our bodies and our identities. She writes of how "through our [sensational] encounters with others (human and non-human alike) we shift the borders of our self understanding" (Todd 2014, 232), gesturing instead "toward an unnameable openness beyond our limits" (233). To bring such sensations to the fore, and to encourage a body's susceptibility and response-ability to those sensations is, for Todd, "the entire project of education" (2021, 255). She thus proposes that the job of an educator is in "creating [...] such encounters" (250).

If some of the aims of environmental humanities education lie in revealing the limits of our anthropocentrism, as well as encouraging what Todd calls 'bodily susceptibility' to more-than-human sensations, it suggests a generative role for the arts as potential teaching methods. If we are to follow from Rancière, aesthetic and artistic practices interrupt the flow of normative – and, I add, often anthropocentric – sensation, instead creating new and unexpected sensations and sensory knowledges about one's own contingent, more-than-human body, about nonhuman agencies and human-nonhuman relationality. Operating with and through the sensing body, arts-based pedagogies may be especially well suited for teaching the environmental humanities principles of contingency, entanglement and co-constitution.

3 Recording Posthuman Sounds

For new students who are unfamiliar with its ideas, the onto-epistemological implications of environmental and posthumanities can be hard to grasp at first. While text-based course materials and lectures are useful for providing a theoretical ground, these can be productively augmented with arts-based teaching exercises, giving the students the opportunity to test out theoretical concepts through bodily and sensory experiences. For a series of teaching workshops held at the Faculty of Fine Arts at Brno University of Technology, in the Czech Republic, I developed a simple programme which aimed to explore co-creation and more-than-human

agency by experimenting with sound.[1] Since the students came from a background in artistic practice, I suspected that a series of arts-based exercises might serve the students better in their learning than a series of lectures. I therefore set about designing an experiment in more-than-human collaborative exploration, using sound as an anchor to explore questions of entanglement, materiality, co-constitution and situatedness – common themes in the environmental and posthumanities.

I began the first session by asking the 25 or so students whether they had heard of posthumanism or the posthumanities. Only two hands were raised. Having established this as a starting point, I then offered a very broad and relatively brief introduction to posthumanism, pointing to general principles rather than specific details. There are, of course, many posthumanisms, and the version I offered was one rooted in feminist thinking, building on the work of Donna Haraway, Rosi Braidotti and Karen Barad. I described these cornerstone principles, perhaps crudely, as post-anthropocentrism and the recognition of nonhuman agency; the contingency of seemingly stable categories (such as human, nature, culture, or gender); the porosity of bodies and the co-constitution of worlds. Our inherited belief that humans are the only beings capable of creative or cultural production is, I noted, rooted in centuries of anthropocentrism, and I suggested that it might be interesting for them as artists to consider the ways in which nonhuman species, actors and matter (whether alive or inert) contributed to an aesthetic expression.

I don't claim that this primer to posthumanism was sufficient for a deep understanding of the topic. I had needed to omit many important details for the sake of brevity. This brevity notwithstanding, I then moved swiftly on to explaining the task ahead of us for the next three sessions. The students would be tasked with seeking out, and themselves participating in, a variety of sonic utterances, engaging nonhuman matter as vital collaborators in their sonic production. Sound, as they mostly likely had come to understand it, was entirely dependent on a division between subjects and objects: a *sounding object* is heard by a *listening subject*. This is a normative "causal and linear narrative" that, as Florence Chiew notes, positions "the perceiver and object of sensation" as "discrete entities" (2017, 48). Instead, I asked the students to approach sound as a relational phenomenon, whereby any sound is dependent upon an entirely contingent relational milieu. Sound was to be approached as a kind of coalescence, expressed as wave energies move through different materials and molecules, exciting them to the point of audibility. These vibrations not only take place in air (which includes the air in

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[1] The *Posthuman Voices* workshops were held at BUT Brno (CZ) in 2024-25.

the ear drum), but also in solid materials, such as wood or metal or even our own flesh. Any sound, then, is the collective vibration of all kinds of matter in unison: a chorus of material entanglement. Sound, understood in this posthumanist, relational way, is less a case of sounding objects and listening subjects, and more a mode of mutual touching, where the totality of matter in a particular environment vibrates and resonates all at once. This sum of vibration is what we call sound, and no single entity is responsible for it: it is always and already the enactment of a more-than-human set of relations.

The specificity of an environment and the relations that compose it makes any sound entirely unique and non-replicable. The materiality of a sonic milieu allows certain frequencies to become more audible than others, and because no two environments are materially the same, neither are two sounds. Any sound, of course, always incorporates human researchers, too, as we are part of that same relational field: as Karen Barad tells us, it is precisely our own entanglement that enables us to know anything at all (2007). This sonic and material situatedness means we can learn about the specifics of an environment through sound. By way of demonstration, I played recordings of different acapella vocals: one recorded outside, another in an empty room, and one in a room filled with large or soft objects. The students had no trouble determining which was which. Sound, then, teaches us something about the relationships that together constitute an environment, since sound is produced *by* and *with* that environment (rather than simply knowledge produced *about* it). This means that, with careful attunement and practice, it is possible to enter into a lively conversation with one's own field of relationality – and learn from it – by composing and improvising in situ with other humans, plants, animals, minerals or any other nonhuman matter.

The introduction now over, the students were split into three working groups, who would head out to play with sound and recording in the more-than-human ways we had been discussing. I asked the students to develop their own ideas and processes in collaboration, not only with each other but also together with their more-than-human environments. As they set off with various recording devices, they were prompted not to simply record 'sounding objects' 'out there', as though they – as researchers – were somehow separated from the sonic scene. Instead, they were tasked with engaging sound as a more-than-human relationality, an event unfolding in ways that implicates themselves and their material entanglements. *Co-constitution* was the key concept they were equipped with; otherwise, they were free to experiment in their groups.

After the final session, the students returned with an array of different interpretations. One group, running with the idea of their own bodily entanglement, explored the sound of their footsteps in

different environments: corridors, grassy stretches, gravel. Their movement set a sonic event in motion, they explained, but the sound's expression didn't end there: it was, they noted later in a feedback discussion, the entire space that constituted a footstep. A second group explored the multiplicity of their own seemingly singular and discrete bodies, exploring forces and agencies beyond their own conscious awareness: what sound did a body make when experiencing fear, an automatic response to an encounter? What did the sounds of their own digestion reveal about the multispecies world of their gut microbiome? In this way, they understood the body as not necessarily under the conscious control of the 'I', but instead sonically co-constituted by supposedly external forces both inside and outside the body. At such a point, can these forces really be said to be external at all?

A third group explored what they called 'elemental' matter: water, air, fire and earth. Non-living matter such as this tends to be imagined as the archetype of inert and insensate matter (at least in this part of Europe) – a foil against which the rich agency, animism and sensibility of humanity is set against. The group challenged this logic of inertia, engaging with non-living matter as vibrant and expressive, whose involvement in sonic creation was no less central than that of the researchers or their recording equipment. Among this cast of living and non-living characters, a bottle was the project's consistent protagonist. This bottle was set on fire, breathed upon, submerged into water or buried underground. A piezo microphone – that is, a microphone that picks up vibrations – picked up the sound and transmitted it to their recording device. The group were interested in how something supposedly inert was, in fact, highly expressive: sound, after all, is movement through time, and true inertia can only ever be silent.

During their experiments, and somewhat unprompted by the introduction I had given them, this latter group also experienced an unexpected flipping of causality, whereby the agency of the matter also began to affect them, as researchers. As they wrote to me afterwards:

> [Not only was] the vessel [bottle][...] affected by the elements, but also the person conducting the experiment. To expose the vessel to the elements also meant exposing oneself. Therefore, although we might think we are the ones in control [during recording], the elements also have control over us. (Jana Vysloužilová, e-mail to the Author, 29 January 2025)

It appears, then, that the students' practice-based sound experiments generated knowledge about causality that had not been given to them through my facilitation. While my introduction undoubtedly

influenced the direction of the students' exercises, and armed them with some guiding concepts, the ways in which they experimented with sound and nonhuman agency, and the conclusions they drew from these experiments, were entirely their own. While our time together was limited to three short sessions, students went from knowing almost nothing about posthumanism at the outset of the experiments to learning the basics, in ways grounded in their own creative, practical experiments. A simple posthuman provocation – *how is a sound co-produced with nonhuman others, as well as with yourselves?* – enabled the students recognise nonhuman agency which they could then design their own experiments around. This process is a pedagogical one and, as the group's reflection suggests, this kind of sensory pedagogy might even begin to, in Sharon Todd's words, "shift the borders of our self understanding" (2014, 232).

4 Designing 'Weathering' Prototypes

As I have been developing arts-based approaches to use in environmental humanities teaching, I have often been inspired by the existing work of other artists and experimental educators. Some creative experiments I have returned to several times are those devised by Jennifer Hamilton and Astrida Neimanis, which aim to develop embodied understandings of 'weathering'. Weathering, as Neimanis and Rachel Loewen Walker (2014) put it, is a way of apprehending the entanglement between environmental weather and our own bodies. Our bodies are continually weathered: our sinuses might congest when we inhale pollen in summer, and our skin might start to darken from the sun; in winter, it might dry and crack with cold – materialisations which, inevitably, manifest differently through and with different bodies and beings. While we might ordinarily understand these as cause-and-effect phenomena, in which weather condition A simply causes embodied response B, *weathering*, as Neimanis and Walker define it, does not adhere to the same linear logic (2014). We do not have weather, on the one hand, and bodies, on the other: weather is not something located 'out there', but something we co-constitute through an array of bodily, environmental and climatic relations. "This is not just adjacent living", they write, "but a mutual worlding" (2014, 565).

One problem, however, is that it is very difficult to sense weather in this kind of co-constituted, relational way. Weather is positioned 'out there', as though in an ontologically distinct environment, having little to do with our living, sensing bodies. Tim Ingold describes this as a "colonial image" of weather, which plays out "upon the inanimate surface of a ready-made world" (2005, 103). In this conceptualisation, weather is merely "presented to human life as a surface to be

occupied" (103). Ingold contrasts this with what he calls the *weather world*, drawing inspiration from the phenomenology of Maurice Merleau-Ponty, which instead situates weather as a phenomenal 'comingling', in which one's self and the sky are drawn towards each other in the dynamism of weather (101).

Adding to this sense of distance is the separation of weather from climate. This separation has served an important political purpose: nobody wishes to engage in draining discussions with climate denialists about why we have snow in April. Climate refers to a long-term average, demonstrable through data and statistics, and is therefore unrelated to the singular experience of a day's weather. However, a problem that arises through this separation is that weather becomes merely anecdotal, a short-term experience that is disregarded as meaningful when considered as part of a body of knowledge about, say, planetary warming. Weather is experienced as a series of isolated, unconnected events, rather than part of an entangled earth system that implicates us, too (Hamilton, Neimanis 2018). This conversion of phenomenal weather into data points creates a sense of distance between a warming planet and our sensing, experiencing bodies: how, then, might we "bring climate change home" (Neimanis, Walker 2014, 559), so that we might better apprehend the experience of climate change through the senses? After all, the world is not entirely reducible to data and we ought to remain wary of building a climate politics that depends solely on such a reduction. How might we build a climate politics of the *weather world*, in which the phenomenal experience of weather through the body is not disregarded, but rather cultivates "an imaginary where our bodies are makers, transfer points, and sensors of the 'climate change' from which we might otherwise feel too distant, or that may seem to us too abstract to get a bodily grip on" (559)?

How, then, might creative experiments in a classroom help to underscore the importance of the body and sensory experience as a mode of understanding not only weather, but also climate? And, perhaps even more challenging, how might such exercises stress the co-constitutionality of a weather event? Helpfully, Neimanis and Jennifer Hamilton (2018) have devised a 'field guide' of experiments and creative exercises, each oriented to foreground experiences and sensations of our weather-bodies. Designed to be carried as a series of workshops among 'weathering collectives' of two or more people, the field guide outlines a number of practice-based tasks. Ideally, the exercises are to be conducted outside, although the authors note that we are always and already weathered, even inside, meaning the exercises can also be done in classrooms or other indoor spaces. These tactics of "weathering in the field" (Hamilton, Neimanis 2018, 1) aim to close not only the gap between bodies and weather, but also that which separates artistic research as an embodied practice from

the more theoretical aspects of the environmental humanities. In the 'weathering fields' opened up by these creative experiments, sensory experience and the sensory capacities of the body are approached as sites of learning and meaning-making. One exercise, titled "Weather Mapping, Through the Body", uses a series of questions to prompt thinking about the weather as relationally embodied. These prompts open up imaginative and non-normative ways of thinking about weather, including:

> Is weather shared? How and by whom or what?
> Is weather individualized? In what ways?
> What is the weather on the last day of Earth?
> (Hamilton, Neimanis 2018, 5)

Other prompts promote a sensory intensification of weathering, as participants are asked to:

> Close your eyes. Inhale and exhale deeply through your nose for several breaths.
> What does the weather smell like?
> Can you hear the weather? What are its sounds and rhythms?
> Does weather have multiple tracks? A melody? A bass line? (5)

These reflections are then incorporated into various follow-up exercises, which ask participants to, for instance, create maps of current weather conditions, or design prototype weather sensors. Hamilton and Neimanis make no grandiose claims as to the field guide's pedagogical efficacy, and they keep things intentionally open-ended, noting their hope that "it will be applied playfully, considered critically, amended usefully, and expanded thoughtfully" (2018, 1). They are, simply, propositions for loosening "our preconceptions and corporeal habits" (1), and we are encouraged to try them among our own 'weathering collectives', too.

Taking their cue, on one chilly December afternoon, I enlisted my MA students at the Freie Universität Berlin, Germany, into an informal, weathering collective over the course of a two-hour seminar. During our session, we practised two of the experiments in the field guide, in order to test out some weathering sensations. We began in small breakout groups, using Neimanis and Hamilton's questions (above) to imaginatively expand our idea of what weather could be, and how weather and the body are interconnected. Through students' answers, and during a bigger group discussion, our shared concept of weather sensing expanded from simply the aggregation of weather data to include imaginative storytellings, memories, and speculations. Some students discussed the weather on the day they were born, one lamenting that the sun rarely shone on their

birthday. The imagination, to some degree, became a weather station, bringing locally situated knowledges into our collective's concept of weathering. These 'weather reports' took the form of imaginings, observations, and stories about personal and shared experiences of weather, as creative play lifted weathering off the pages of text.

These questions got the students thinking about weather as an emotional, embodied phenomenon, setting the stage for a collaborative arts-driven exercise that would, I hoped, allow the students to consider the weather world in relation to their own bodies. In groups of three or four, the students were asked to design and make their own prototypes for weathering 'sensors', using various found objects, craft materials, and trash. These included recycled plastic scraps, balloons, kitchen paper, scissors, glue, fabric scraps, bubble wrap, sandpaper, sponges, card, string, candles, rocks, leaves, ping pong balls, curtain rings, glass jars and other miscellaneous objects brought to the session by the students or myself. In making this list of components, though, I do not mean to give the impression that the students' weather sensors were simply the total sum of these parts. The learning was in the *doing*, the process, rather than in what the sensor itself could measure and report. The process of prototyping – the act of making – was itself pedagogical, encouraging students to think about the different ways weather can be understood through different kinds of apparatus, and how sensory experiences of weather can be influenced by their own behaviours (that is, the behaviour of making a 'sensing device'). The weather-sensors, then, intensify the sensory aspects of a weathering relation; but which sensations come to the fore, however, depends entirely on the configuration of the apparatus itself.

As we discovered during a debriefing discussion session, the students' prototypes were incredibly diverse, as were the kinds of knowledges produced by making and using them. One group's prototype, comprised of an outdoor mobile of dangling spoons, sponges, and balloons, held up by string, would move differently in the wind according to the material density of each object, an ever-changing dance that revealed the ways that weathering differs depending on its material coalescences. Another prototype sensor set a diminutive ecological drama into motion: a small terrarium made from a glass jar, filled with foraged living moss and other organic matter, could enact a hyper-temporality, due to its exaggerated vulnerability to the elements. Their sensor was to be a canary in the coalmine, reacting to weather at a faster pace and more exaggeratedly than might be experienced with our own bodies: its small size would ensure that too much rain would quickly drown the moss, while too much sun would dry it out just as fast. As we discussed the prototype in more depth, however, the students soon realised – somewhat deflatedly – that, in creating this terrarium-sensor, and in its production of a material

boundary (in a literal sense, being the sides of the jar), they had most likely condemned any life within to death. In demarcating the boundaries of their sensor, it would soon become *over*-weathered. Overweathering – that is, when the weather-body entanglement overpowers the sustainability of life – is not an idea we had discussed in any theoretical introduction to the session. Yet the group began to outline an emergent set of ideas about the ambivalence of weathering relations and the ethics of boundaries. To be a weather body, they noted, is deeply ambivalent. Nor was a weathered entanglement, as their doomed terrarium would soon discover, necessarily a good thing; it could sometimes be harmful. The students then noted that we must take responsibility for the boundaries we unwittingly produce. While these ideas are common in environmental humanities scholarship, they emerged spontaneously and without prompting among the students, as they reflected on their own creative work. That such a generative discussion was possible suggests the pedagogical usefulness of the exercise, and while our conversation moved in a direction that differed to the one I had anticipated (about climate and sensing) and instead towards questions of boundaries and harmful entanglement, this ended up being equally beneficial for teaching environmental humanities ideas.

5 More-than-Human Role Play

A major premise of the critical posthumanities and environmental humanities is that we ought to shed our preconception that the 'human' (or, for that matter any kind of body, environment, or any 'thing' at all) simply *is what it is*. Rather, this thing we call human – far from being a stable state of being – is, in fact, a performative and entirely contingent genre, prone to transformation. However, as Judith Butler famously noted in the case of gender, it can be very difficult to perceive the performative categories of being which organise our world and shape our identities and bodies. In *Gender Trouble*, Butler points to drag as a mode of performance that can reveal the boundaries of gender categorisation, in which gender is performed in a transgressive, excessive, boundary-bursting iteration (1990). While they demurred on the radical potential of drag in later years (1993), I prefer to stay with its trouble: perhaps excessive, transgressive body performance can, imperfectly and incompletely, help to reveal the contingency of normative categories of being and the boundaries that contain them.

How, then, might role play as a kind of performance help teach often tricky posthumanities concepts like contingency, posthumanist (that is, material-discursive) performativity and the ontological permeability of bodily boundaries and identity categories? In an

attempt to find out, I've used semi-structured role play methods in the classroom several times, often adapting techniques developed by the artist and somatic practitioner, Susan Ploetz. She uses larp – acronymic for live action role play – as a method for collective storytelling and speculative fabulation; larp unfolds an improvised story between participants over the course of several hours, as they embody their appointed characters and react to one another. This enables a large degree of input from all performers. While a character may be designated in advance, a larp does not usually assign experiences or feelings to characters, nor does it follow a clearly defined script. Rather, it sets up a broad set of conditions for an improvised world, creating systems and rules that might shape a group dynamic.

In Ploetz's long-running alien larp series, *Skinship*, participants are asked to imagine themselves as non-human entities, with sensory capacities that do not align with human norms. This speculative premise means that Ploetz can guide and intensify unusual sensory encounters without ever defining what those sensations should feel like. The aim is to use this speculative, alien embodiment to defamiliarise everyday human sense experience, but what that new, unfamiliar experience might feel like is left open. *Skinship* larps begin by activating the senses in a fairly straightforward way: "merely being and observing [...] Let[ting] in an awareness of the circulation of breath through your body" (Ploetz 2022). Yet this soon develops into something altogether stranger, as those recognisable sensory experiences are used as a starting point for experimentation. Sensational experiences start to "build magic rituals, objects and poems" or "intelligences or special powers" (Ploetz 2022). Through sensory exploration, participants begin to develop an embodied form of paralinguistic storytelling, 'hacking' their imaginations to try out speculative sensoria and embodiments for size. This entanglement of body and mind (or, indeed, their inseparability) is rooted in Ploetz's own background in somatic training, a therapeutic bodywork practice that she describes as "a philosophy in motion and action" (Rumping 2020). The body (or, rather, bodymind) is approached as post-Cartesian *thinking matter*, capable of producing knowledge as it senses with, through and as part of its environment.

For my MA seminar at the Freie Universität Berlin, I had been asked to teach a seminar exploring different artistic methods – or at least this is how I had interpreted my somewhat loose brief – and throughout the semester, I had consistently sought to place arts-based methods within the environmental humanities. I frequently used creative experiments and games in teaching (such as Anna Tsing and Elizabeth Pollman's ever-useful *Global Futures: The Game*), meaning that the larp – while still a little left-of-field – was received enthusiastically by the students. We had previously held several

group discussions about bodily contingency and the instability of the human, especially after we had engaged with work by Donna Haraway, Astrida Neimanis (as noted above), and Karen Barad. However, the larp offered a way of augmenting this logocentric knowledge *with and through the body*, in which the body could be approached as thinking matter; the larp enabled theory to sink into the flesh through praxis and performance – or if that should fail, at the very least, it would offer students a memorable learning experience.

While Ploetz's larp performances are extremely durational, stretched over many hours or even days, I was limited to a two-hour seminar period. Despite this temporal limitation, I nonetheless attempted a loose adaptation of Ploetz's *Skinship* (based on my own attendance of a 2021 version, as well as Ploetz' own reports), albeit redesigned for the seminar. I began, as Ploetz does, with some warmup exercises, attuning to our fields of sensation through breath, touch, sound and smell. We then followed Ploetz's simple counting exercises to begin forging a 'collective intelligence': we would count upwards, calling the number out loud, intuiting when it was our turn to speak. After these warmups, we then began to design our nonhuman characters: we were to be aliens, strangers to this world. We gave ourselves new names and imagined certain characteristics: what kinds of bodies do we have? Do we have two arms and legs, or something else entirely? How do we sense our environments? Might we have sensing organs entirely unfamiliar to humans? Or perhaps, much like the Oankali in Octavia Butler's 'Xenogenesis' books – an important reference for Ploetz when she was creating *Skinship* – our sensing might be dispersed throughout our entire body.

Once our characters were designed, I then read Ploetz's initial worldbuilding prompt aloud to the group, which set the overall premise for our role-playing session:

> This world is alien to you, this world in this room. You may have been to earth before, so you might have other experiences on this planet, but the objects in this room are completely new. You have been sent from another place, to investigate. The main way you investigate is through your senses. […] Your mission is to explore the objects here, and gather information about them, and especially if you think they are intelligent, and/or hold any special powers. You will report back to the members of your group through words, which become chants and poems. The words help others understand what you are encountering. (Jørgensen, Ploetz 2020)

In the guise of our invented nonhuman and extra-terrestrial characters (which we hadn't disclosed to each other), we became curious explorers of earth, examining a series of objects as though they had never been encountered before. A tissue, a stone, a cup of

water, a strawberry. As I guided students to touch and smell – even, if they wished to, lick – the objects, they ascribed various characteristics and feelings to them. Their characters' sensing organs produced particular sensations, perhaps quite unlike those that their ordinary sensorium would notice. My own character, for instance, was sightless but highly sensitive to touch, so I emphasised the use of my own worm-like fingers, which became my primary mode of interacting with this strange world. I was amazed at the students' creativity: one student's character poured an entire glass of water out onto the desk in front of them, to the suppressed giggling of the other students in the room. We learned later, during our feedback discussion, that their character was only able to perceive in two dimensions. They had simply needed to pour the water out so that they could sense it.

Again loosely following Ploetz's method, the student-participants were asked to describe their sensations aloud to the group, in single words or utterances which would then be repeated by the others in unison. The character who sensed in two dimensions ascribed qualities such as shine or colour. Another student, whose character was able to perceive the emotions of non-living matter, ascribed qualities such as sadness to a seemingly inert stone (in our later debrief discussion, the student remarked that the stone was likely unhappy, having been dislocated from its place of origin, or the larger bedrock it had once been part of. Their character was able to perceive this ordinarily insensible emotional disturbance). The purpose of this collective repetition was to create a shared sensorium, which would start to feed into itself. This was, perhaps inevitably, rather awkward at first, but over time, the students became emboldened to speak their sensory experiences out loud. What began with hesitation ended almost instinctively, and more than one student reported in the debrief that their sensing almost felt like that of their characters. The imagination, even in this very short time, began to spill outwards to the senses.

In treating the objects as if never before encountered, the everydayness of the objects' sensible qualities is rendered strange and new; the emotions of stones come to the surface, even if only as an imaginative or speculative quality. In this speculation, however, the norms of our sensorium are called into question: what we sense to be ontologically true or fixed is, in fact, always a question of bodily situatedness and particularity. These are profoundly feminist, queer, crip questions (Kafer 2013), but also posthuman ones: Ploetz's *Skinship* larps ask us to imagine 'what if' we were something other than human, and in so doing, encourage us to perceive the boundaries and limits of our own humanness. Role play guides us towards knowledges of our bodies as sensuously adaptive, contingent, and prone to transformation and adaptation. Further, in deliberately seeking out processes of collective sensing, naming and chanting, it

becomes possible to open up a perceptual space that goes far beyond individual sensory experience. Instead, even over the course of a single session, something akin to a simple, yet nonetheless very real, shared sensory intelligence could begin to grow.

6 A Set of Permissions

Arts-based methods, as these case studies show, can offer generative approaches for posthumanities and environmental humanities teaching. Such methods – characterised as they are by embodied experience, open-endedness and experimentalism – not only 'undiscipline' traditional humanities pedagogy, they also generate sensational experiences that are in themselves pedagogical. It is impossible to speak for the students about their experiences as such, nor would I wish to homogenise their experiences into a unified whole. However, insofar as some student feedback has led me to believe, it does seem that arts-based teaching experiments might challenge preconceptions about causality, embodiment, subjectivity and relationality in some cases.

Arts-based methods are generative because they engage with, and intervene in, the same boundary-limits that are a focal point for much environmental humanities critical thinking. Boundaries that, for instance, exclude nonhuman agency and vibrancy, or those that seek to contain normativity or the body. On the other hand, in framing sound as a *more-than-human event*, as the exercise in my first case study sought to do, it became possible to recognise nonhuman matter as agential in the (co-)constitution of their sonic work. This challenges a sensory distribution that only allows humans to be recognised as cultural and expressive. The weathering exercise, in my second case study, led to a vibrant debrief discussion about boundaries, as students realised that their prototype-making had inadvertently produced them. And finally, through role playing as alien beings, the boundaries of normative sensing itself – the sensorium that continually reperforms our anthropocentrism – were imaginatively confronted, through speculative, fabulative sensing.

The boundaries that exceptionalise the human while excluding nonhuman agencies; or which 'contain' the human subject (a boundary often contiguous with the skin); or which separate nature from culture – these are certainly not immutable ontological facts, but they *are* held in metastability through an array of sensory norms. These norms characterise what Rancière calls the *partage du sensible* (2004); that is, a "line of sensibility that renders some subjectivities invisible, inaudible, or unavailable to the senses" (Panagia 2014, 94-8). This threshold for what can be seen, heard or otherwise sensed permits entry to the community only for some,

to the exclusion of many others (Rancière 2004). Aesthetic and artistic practices, in the very best instances, can intervene in those boundaries of exclusion and inclusion, causing "modifications in the sensory perception of what is common to the community" (Rancière 2004, 40). This is not to say that these modifications are dramatic; no singular work of art inaugurates revolution, and differentials in power are always embedded throughout any distribution of the sensible. However, small-scale, incremental modifications to an anthropocentric sensory distribution – such as those that might take place in a classroom – can engender modest shifts in how inclusions and exclusions are unconsciously performed through our everyday sensory practices and norms. These shifts raise meaningful questions about who, and who does not, count as politically agential. Among a classroom community, arts-based methods may generate sensory experiences that have the capacity to challenge anthropocentric sensory norms and boundaries. And with sufficient intensity, these aesthetic challenges can become pedagogical.

A crucial facilitator for arts-led pedagogy, however, is *permission*. This is not only necessary on an institutional level: the teaching outcomes from arts-based methods aren't easily measurable or quantifiable, flying in the face of standardised excellence frameworks which tend to oversimplify and quantify education. When I was first asked to lead a seminar for a master's programme, a combination of staff shortages and an unusually open-minded course leader meant I was able to teach in whatever ways I wished. "Just do whatever you want", was the advice given. Daunting as this was, my own background in artistic research led me to draw on arts-based methods and the creative practices of others. After all, I knew far more about art than teaching. In addition to *institutional* permissions, however, permission also emerges from art itself. Artistic research is, by nature, an open-ended practice. "[I]n contemporary art", says artist Grada Kilomba, "there is space to raise questions, whereas in other fields you are supposed to give answers" (Cotter 2019, 381). Artistic and aesthetic practices leave room for contradictions, ambivalences and uncertainties, producing what curator Lucy Cotter describes as "non-knowledges" (193). This makes using arts-based methods quite unlike many other kinds of teaching practice.

Importantly, the 'non-knowledges' produced through sensational experience are not absent of meaning, despite their paralinguism. Rather, they meaningfully intervene in the normative sensory flows that inform "how we become subjects and form understandings of the world" (Todd 2021, 254). In the cases described above, I like to think that these 'non-knowledges' offered glimpses of something beyond an anthropocentric sensorium, perhaps even revealing the contingency of that genre of being called 'human'. Environmental humanities pedagogy, in its broadest terms, might be a case of experimenting

"with different ways of constituting subjectivity and different ways of inhabiting our corporeality" (Braidotti 2006, 134). This is as much an ethical endeavour as a pedagogical one, and arts-based methods may be helpful for the task – immersing sensing bodies deeper into their own more-than-humanness.

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Place-Based Knowledges, Water, and the Classics: Teaching the Environmental Humanities in Warsaw, Augsburg, and Ghent

Katja Sarkowsky
University of Augsburg, Germany

Marco Formisano
Ghent University, Belgium

Paweł Piszczatowski
University of Warsaw, Poland

Abstract   This contribution stems from a collaboration on a joint MA in the Environmental Humanities for the Erasmus Mundus Program. It first outlines key challenges of teaching the Environmental Humanities in Europe amid the polycrisis. Then it presents three case studies – Warsaw (situated knowledge), Augsburg (interdisciplinary teaching of 'water'), and Ghent (classics as 'unplaceable') – to discuss diverse educational frameworks and practices. These serve as a basis, in a third step, to consider the concrete transdisciplinary interventions that teaching the Environmental Humanities might present in our respective contexts.

Keywords   Place-specific teaching. Classics. Literature. Water. History. Ethics. Transdisciplinarity.

Summary   1 Introduction. – 2 Warsaw: Situated Knowledge. – 2.1 From Concept to Practice: Teaching Environmental Humanities in and with the City. – 2.2 The Białowieża Forest: Ecologies, Communities, and Borderland Realities. – 3 Augsburg: Teaching (with) 'Water'. – 3.1 The Environmental Humanities in Augsburg. – 3.2 'Blue Literary Studies'. – 4 Ghent: The Problem of the Greco-Roman Classics – A Discipline without a Place. – 5 Where from Here?

1   Introduction

Climate change, land degradation and desertification, species extinction and loss of biodiversity, to name but a few, are central to today's global polycrisis. While much of political debate around these issues in Europe remains dominated by scientific and policy discourses, the awareness of the contribution that the humanities and the arts can bring to the analysis of this crisis has made an inroad with the implementation of the transdisciplinary and methodologically heterogeneous field of the Environmental Humanities (from here on EH) and its unifying "sense of shared and open endeavor addressed toward the remediation of environmental harm, and a powerful conviction that scholarship in the field must revisit its foundational assumptions and engage with a broad constituency" (Foote, Cohen 2021, 2). Developing sophisticated and diverse methodologies to explore the cultural and historical dimensions of environmental change, the EH recognize that dealing with the complexity of the climate and ecological emergency requires crossing disciplinary boundaries. Not only as a field of research, but also of systematic teaching to rethink human and more-than-human relations, the agentic capacities of matter, and fundamental questions of local, regional, and global interdependencies, the EH have thus become even more important in this current moment of polycrisis.

But the EH are not only a methodologically and theoretically diverse field. The various discourses that shape them are themselves implicitly or at times even explicitly responding to the specific contexts of their emergence. This contribution emerges out of a collaboration in drafting a joint MA in the EH for the Erasmus Mundus Program that took seriously the insight that teaching the EH would have to reflect the context-specificity of EH discourses and pay attention to place-based circumstances and constellations – both environmental and discursive – within different European countries and locations. 'Place matters', we believe, in theory and in teaching. Thus, given the emphasis on the place-specificity of teaching the EH at our respective universities, this essay takes as its starting point the divergent foci and practices that we designed into a program – coherent, yet attentive to the particularities of place, discipline, and thematic interest. In bringing together a range of disciplines, theoretical approaches, and methodological frameworks, we sought to design a program that would integrate research-focused, creative, and activist practices in a place-based yet transnationally oriented agenda, a program, that aims at understanding the social and environmental challenges that we face in both their contemporary urgency *and* their historical trajectories.

In the 2-year joint MA, we envisioned a program – with cohorts of 30 international students who would study at least two of the partner

universities – that would draw on and seek to further develop existing practices of place-based teaching at our universities. In the following section, we will thus focus on three concrete examples – Warsaw, Augsburg, and Ghent – to discuss challenges and outline teaching practices with foci on situated knowledges (Warsaw), the interdisciplinary teaching of 'water' (Augsburg), and the questions of the Greco-Roman classics (Ghent) as case studies. These will serve as a basis for the final section, in which we will consider the concrete transdisciplinary interventions that teaching the EH presents in and across our respective contexts.[1]

2 Warsaw: Situated Knowledge

Located at the intersection of historical trauma, ecological challenges, and political transition, Warsaw offers a uniquely resonant context for the practice of the EH. As the capital of a country, the city embodies the intertwined legacies of imperial partitions, twentieth-century totalitarian regimes, and post-socialist neoliberalism. Its environmental specificity is shaped not only by its geographical anchor – the Vistula River (Wisła) – but also by the memoryscapes of destruction and reconstruction, uneven modernization, and contested narratives of nature, nationhood, and progress.

EH as a field have increasingly emphasized the importance of place-based knowledge and the need to embed ecological thinking in specific historical, cultural, and infrastructural contexts. According to Ursula Heise, the environmental imagination is shaped by the tension between global interconnectedness and a renewed longing for locality: "'sense of place' has become newly prominent in recent environmentalist discourse because of the increasing globalization of environmental problems" (Heise 2008, 7). In this light, Warsaw offers a particularly nuanced site for reflecting on how local urban ecologies mediate global environmental narratives and their pedagogical implications.

Warsaw's urban development, unlike that of most Western European capitals, was shaped by rupture, reconstruction, and contested modernities (Czepczyński 2008; Murawski 2019). The near-total destruction of the city during the Second World War, followed by socialist reconstruction under centralized planning, and then the rapid market-driven transformation after 1989, created a stratified urban landscape where environmental and social logics

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1 This article was jointly conceived by the three authors. Paweł Piszczatowski is the author of section 2; Katja Sarkowsky is the author of section 3, and Marco Formisano is the author of section 4.

often collided. This trajectory has led to a peculiar configuration of public space in Warsaw – one in which the presence of greenery, water access, and social participation is not the result of continuous policy, but rather the outcome of friction between overlapping temporal and ideological regimes.

The Vistula River running through the heart of the city exemplifies these tensions: unlike most urban rivers in Europe, the Wisła remains largely unembanked and retains much of its floodplain, allowing for relatively rich biodiversity and seasonal transformations.[2] At the same time, it has become a focus of civic activism, artistic expression, and informal recreation – making it a pedagogically rich site for exploring the intersections of ecology, memory, and urban belonging. As Heise reminds us, place-based environmental imagination is not inherently conservative or exclusionary but may serve as a node of critical reflection and translocal dialogue (Heise 2008, 25-9).

Yet the Vistula's significance in Warsaw extends far beyond its ecological distinctiveness. It is also a river inscribed with the city's political and historical fractures. The site of the 1920 'Miracle on the Vistula', when Polish forces halted the westward advance of the Red Army, the river later became a line of tragic division during the 1944 Warsaw Uprising, when Soviet troops halted their offensive on the eastern bank as the insurgent city on the west was destroyed. After the war, the Vistula marked a socio-spatial boundary between the reconstructed, largely depopulated left-bank city and the right bank, where prewar urban fabric and local communities survived. In recent decades, this polarity has again shifted, as gentrification reshapes the right-bank districts, turning the riverfront into a symbolic and material zone where social, ecological, and economic transformations meet.

Teaching the EH in Warsaw thus requires more than the application of universal frameworks; it demands a sensitivity to the city's historical stratification, its post-socialist transformations, and the contested meanings of "nature" within its borders.

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2 The Vistula (Polish: Wisła) is Poland's longest river (1,047 km) and one of the few major European rivers whose central urban section remains largely unregulated. In Warsaw, its eastern (right) bank preserves wide natural floodplains and riparian forests showing the interplay between natural fluvial processes and urban infrastructure (cf. Wierzbicki et al. 2021).

2.1 From Concept to Practice: Teaching Environmental Humanities in and with the City

While theoretical framings are crucial for grounding the EH in conceptual clarity, the specificity of place often reveals itself most fully through practice. At the University of Warsaw, one of the key pedagogical strategies has been to engage students directly with the multispecies fabric of the city. This takes the form of field seminars, urban walks, and sensory explorations facilitated by writers, scientists, and activists. In fact, the Ecopoetological Laboratory (EcoLab) at UW exemplifies this approach: through interdisciplinary encounters, workshops, and collaborative art-science projects, EcoLab fosters non-anthropocentric cultural subjectivity and cultivates student sensibilities attuned to more-than-human urban relations.[3]

A particularly rich example is the work of Michał Książek – a poet, naturalist, and essayist who combines scientific training with a literary sensibility. His recent book *Atlas dziur i szczelin. Rzecz o mieście jako schronieniu dla przyrody* (Atlas of Holes and Cracks: On the City as a Shelter for Nature, 2023) offers a polyphonic cartography of urban life forms that thrive in unexpected crevices, margins, and disturbances of the built environment. In collaboration with the Environmental Humanities Center at the University of Warsaw,[4] Książek regularly conducts field walks that expose students to unnoticed multispecies cohabitations in their immediate surroundings. His interest does not lie in seeking out remote wildernesses or spectacular post-industrial ruins; instead, he reveals how fragments of urban infrastructure – curbs, staircases, gutters, walls – are teeming with complex ecological entanglements.

His writing is attentive to the interstices and insists that nature in the city is not elsewhere, not decorative, not pristine. It is present in moss on tram stops, in the tracks of wild boars, in the silent labor of mycorrhizal fungi beneath parking lots.

Such reflections move beyond traditional categories of urban nature to foreground a poetics of encounter and embodied attention – what Ursula Heise might call a "cosmopolitan sense of place" (Heise 2008,

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3 For more information, see the Ecopoetological Laboratory website: https://nonanthro.uw.edu.pl/en/ecopoetological-laboratory/.

4 The Environmental Humanities Center (Centrum Humanistyki Środowiskowej) at the University of Warsaw is a dynamic research and teaching unit promoting non-anthropocentric approaches to human-environment relations. It operates at the intersection of posthumanism, new materialism, and decolonial thought, and serves as an interdisciplinary forum for collaboration among scholars and artists. The Center maintains international partnerships with institutions such as the University of California, Los Angeles, the University of Freiburg, and the National Autonomous University of Mexico.

56), here redefined not through abstract universality, but through patient, situated inhabitation.

This pedagogical ethos is further enriched by collaborations with local scientists, activists and artists. For instance, Professor Przemysław Chylarecki, an ornithologist at the Polish Academy of Sciences and expert on avian biodiversity in urban ecosystems, leads dawn bird-watching walks along the Vistula River.

Similarly, Stanisław Łubieński, author of *Dwanaście srok za ogon* (Twelve Jays for a Song, 2016) and co-founder of the NGO Dzika Ochota, offers critical excursions into spontaneous urban greenery, exploring the sociopolitical dynamics of plants in the city.[5] His work, situated between literary essay and grassroots activism, challenges dominant paradigms of urban aesthetics and invites participants to rethink weeds as indicators of resilience and memory. As he writes: "Nature in the city is not something added to architecture – it is an insurgency of life" (Łubieński 2022, 89).

Rather than treating the city as a neutral backdrop for environmental theory, these practices position it as a co-teacher and co-creator of ecological knowledge. They also anticipate the pedagogical ethos envisioned in the joint MA program, which seeks to integrate field-based learning, collaborative workshops, and site-specific seminars into the curriculum. Teaching EH in Warsaw thus means walking with cormorants and poplars, listening to bees on tramlines, tracing the cracks where life insists. It also means confronting infrastructural violence, air pollution, and the ghosted legacies of modernist planning – learning with and from the city itself, in ways that bridge classroom work and lived urban experience.

2.2 The Białowieża Forest: Ecologies, Communities, and Borderland Realities

The Białowieża Forest (Puszcza Białowieska), straddling the Polish-Belarusian border, holds a central place in the environmental imagination of Central Europe. Recognized as a UNESCO World Heritage Site first in 1979 (Poland) and extended in 1992 to include Belarus, the forest – totaling over 141,885 ha – remains one of the very few extensive European tracts of old-growth, primary forest preserved in its natural state. This vast woodland supports remarkable biodiversity, including at least 59 mammal species,

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5 Dzika Ochota (Wild Ochota) is a Warsaw-based grassroots environmental NGO active on the city's Ochota district, focusing on urban ecology, habitat protection, and community-led nature initiatives. Its Facebook page documents local actions such as habitat restorations, biodiversity surveys, and educational walks (see `https://www.facebook.com/DzikaOchota/?locale=pl_PL`).

over 250 bird species, and more than 12,000 invertebrate taxa, and shelters viable populations of apex predators such as wolf, lynx, and the iconic European bison.[6]

Beyond ecological value, Białowieża embodies profound cultural and symbolic significance. It is a *biosphere reserve* under UNESCO's Man and the Biosphere program since the 1970s and part of the EU's Natura 2000 network, reflecting its dual role as both a natural and cultural patrimony. Scholars note that the forest functions as a "synecdoche" for a broader European and national heritage – its meandering trails, ancient trees, and even modern art interventions evoke collective memory and identity (Klepacka & Kowalski 2024).

The forest has also become a focal point of the recent humanitarian crisis on the Polish-Belarusian border, where environmental and human rights issues intertwine – a situation brought to wider public attention through international media and cultural works such as Agnieszka Holland's *Green Border* (Zielona granica, 2023).

For EH pedagogies, this means Białowieża is more than a living laboratory; it is a thickened site of encounter where biodiversity, legal regimes, history, and local communities intersect. The contrast between its richly layered ecosystems and the adjacent militarized frontier of the EU's eastern border deepens its pedagogical intensity: students must navigate field-based ecological science alongside awareness of injustice, displacement, and geopolitics.

The Environmental Humanities Center at the University of Warsaw has developed an array of place-based learning practices in the region, grounded in long-standing collaborations with two key research institutions: the Mammal Research Institute of the Polish Academy of Sciences (IBS PAN) and the Białowieża Geobotanical Station of the University of Warsaw (BSG UW). These partnerships allow for the organization of interdisciplinary field seminars that bring together ecological monitoring, human geography, literary analysis, and local ecological knowledge. Students are encouraged to understand the forest as a living archive: a layered text – textured with species, stories, policies, and power. During these field seminars, students move beyond passive observation to active, situated learning. Activities typically combine ecological and humanistic inquiry: mornings are spent with biologists from the Mammal Research Institute conducting bird and mammal tracking or studying forest succession, while afternoon sessions involve reflective writing, collective mapping, or discussions with local residents about the socio-political dimensions of conservation.

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6 See the UNESCO World Heritage List entry for the Białowieża Forest: `https:// whc.unesco.org/en/list/33/`.

3 Augsburg: Teaching (with) 'Water'

3.1 The Environmental Humanities in Augsburg

The University of Augsburg has a long history of teaching the EH in a range of academic disciplines: in ancient, early modern, and contemporary history, literature, philosophy, theology, and geography, scholars have established a strong focus in this interdisciplinary field. In research, this led to three interrelated pillars of cultural ecology, material ecology, and political ecology and to the foundation of the transdisciplinary Environmental Science Center (Schmidt, Soentgen, Zapf 2020, 226). Since 2020, the transdisciplinary PhD program *Um(welt)denken* (Rethinking Environment) is associated with the Center. In the same year and funded by Bavaria's HighTech agenda, the university established the Centre for Climate Resilience, and even though it is more strongly focused on the sciences, economy, law, and health, it nevertheless retains the link to the EH via its inclusion of scholars from theology, history, the social sciences, and philosophy.[7] And in 2023, Simone Müller's newly established Heisenberg-professorship for Global Environmental History and Environmental Humanities added a explicitly designated EH position to Augsburg's EH infrastructure. This productive research environment has grown out of and in turn provides fertile ground for an equally rich and diverse teaching tradition of the EH; probably the most prominent and visible is the interdisciplinary MA program *Umweltethik* (Environmental Ethics) hosted by the Faculty of Catholic Theology, which includes courses from theology, philosophy, geography, history, law, education, literature, and other fields.

The strength of the EH at the University of Augsburg is not accidental but grounded to some extent in the city's urban design. Augsburg is a city shaped by waterways – particularly the rivers Lech and Wertach, but also by a network of tributaries and creeks as well as canals – and, since 2019, its Water Management System (which dates to the fourteenth century) is a World Cultural Heritage Site. Thus, one strong focus of the EH in Augsburg is 'water' and its materiality, with research projects ranging from documenting the fundamental changes of the river Lech over time to the study of wetlands and classes offered in a range of disciplines, particularly in theology, philosophy, literature, history, and geography. 'Water classes' – those

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7 For further information on these centers and their agenda, please see on the Environmental Science Center https://www.uni-augsburg.de/en/forschung/einrichtungen/institute/wzu/, on the Center for Climate Resilience https://www.uni-augsburg.de/en/forschung/einrichtungen/institute/zentrum-fur-klimaresilienz/, and on the PhD program https://rethinking-environment-idk.de/.

taught e.g. by Simone Müller, Kerstin Schlögl-Flierl, Jens Soentgen, or myself – thus tend to focus on place-based teaching, including study trips to local bodies of water and waterways to encourage students to analytically and ethically reflect on human relations to water and to connect those reflections to discipline-specific as well as transdisciplinary analyses.

3.2   'Blue Literary Studies'

Culture and the arts play a central role in the conception of the EH, in general, and this is evident in how the EH are taught in Augsburg (Schmidt, Soentgen, Zapf 2020, 225). The case study discussed in the following is from my own teaching practice in Anglophone literary studies. In the past three terms, I have consistently focused on water in BA and MA classes as well as in teachers' education, and in seminar as well as lecture formats. The theoretical backdrop of these classes were the questions asked, and concepts proposed in the 'Blue Humanities', an emerging new water discourse in the twenty-first century (De Woff, Faletti 2022, 1) that matured during the 2010s (Mentz 2024, 19) and seeks to counter the tendency towards "terracentrism" (Ryan 2022, 487), including that of the EH. Central for our literary studies classes was the insight that, as Serpil Oppermann puts it, "our perceptions of water bodies are culturally shaped" (2023, 1) and that the analysis of cultural representations of water is thus no luxury but a crucial part of rethinking a purely utilitarian relation to water as resource. The Blue Humanities can be framed as both a subfield of the EH and as a separate set of concerns: while clearly there are crucial overlaps with the questions asked in the EH e.g., about climate change, environmental justice, agentic matter, or human- and more-than-human relations (cf. Schmidt, Soentgen, Zapf 2020) as well as about the possibility of 'translating' the materialities into aesthetic forms such as narration (e.g., James, Morel 2020; Caracciolo 2021), there appears to be an even more strongly pronounced interest in materiality and its aesthetic and epistemological components in the Blue Humanities, in "water's capacity to challenge our ways of knowing" (Chen, MacLeod, Neimanis 2013, 5). A partial explanation might be the form-adaptive and form-giving capacity of water and its range of forms and aggregate conditions, "for water moves from solid to liquid to vapour with acute environmental responsiveness" (5; a concept so beautifully exemplified in Elif Shafak's 2024 novel *There are Rivers in the Sky*) that lend themselves well to metaphorization of relationalities as well as forms of thinking and knowing.

These 'affordances' (to use Caroline Levine's term, 2015) of fluidity, form-adaptation, and form-giving also seemed to appeal to and resonate with students and their sense of being in the world.

Since literary and cultural studies centrally focus on the cultural representation of water and its materiality, a starting point was provided by two interrelated questions: what do we see in literature (or any other form of cultural representation) when we look through the lens of water that we otherwise wouldn't see? And conversely, how do we look upon water differently when we look through the lens of literature? Thus, while mindful of the process of mediation in and through cultural production, the materiality of water and its material affordances nevertheless played a crucial role, and students were encouraged to think about their own relation to water in its material as well as its culturally mediated forms.

This materiality and the place-specificity of water(s) were important constants in the classes. The various textual examples we worked with – be it David Henry Thoreau's close observation along the Concord and Merrimack Rivers (1849), Amitav Ghosh's detailed description of the Sundarbans and the Venice lagoon in *Gun Island* (2019), or Natalie Diaz's multifaceted engagement with the Colorado River and its cultural significance for the O'odham Akimel people in *Postcolonial Love Poem* (2020) – tended to stress the specificity of water bodies and their entanglement with societal power structures as well as the necessity to pay attention to said specificity and the challenges it poses for artistic articulation. All class formats thus emphasized interactive student reflection of materiality and the process of artistic and theoretical 'translation'. To link the theoretical, analytical, and interpretative approach to water to its concrete experience and encounter, each of the classes also scheduled study trips to water (a local pond, lake, canal, or river) as part of the syllabus. As indicated, Augsburg is shaped by waterways of various kinds, and we connected the reading of the classes' Anglophone literary corpus to the reflective encounter with a specific local water body. Placed-based environmental imagination and engagement, as Paweł Piszczatowski has put it with Ursula Heise in the Warsaw section of this contribution, can serve "as a node of critical reflection and translocal dialogue", and this embodied encounter was central to the theoretical engagement.

Equally crucial was the connection between the analytic, theoretical, and *creative*. In their engagement with water(s) – some as part of a class trip, some assigned to be done individually – students were encouraged to creatively transform their engagement with water and to reflect on this engagement's relation to class readings, both theoretical and literary. The (non-graded) creative work that emerged out of these encounters ranged from poetry to essays to visual and video art and reflected on the links to theoretical questions we had covered in class. Students explored the possibilities and limits of water's materiality in creative processes, drew analogies between the rhythm of the sea and grieving as well as healing, or reflected on

its potential role in personal memory. Some of them described their literary and creative encounters with water as changing the way they looked at their environment.[8] As one student put it:

> Walking along the Lech now, I don't just see a river. I see a force with an agency. A shapeshifter. A record-keeper. Something that flows between times, carrying stories that aren't always ours. There's something humbling in that, even if it's unsettling too. (Isler 2025)[9]

Teaching (with) water – to riff off the title of Chen, MacLeod, and Neimanis' important book *Thinking with Water* – allows for teaching the EH as a reflective and theory-based but deeply embodied practice.

4 Ghent: The Problem of the Greco-Roman Classics – A Discipline without a Place

At Ghent University, there is a group of highly committed environmental humanists from various departments, especially in literature, history, and law, and a number of courses around the EH are regularly offered at different levels. Within this diversified constellation, the teaching of ancient Latin literature has a particular position: its status is perceived as rather marginal to what is considered the core business of ecocriticism, i.e. contemporary literature and thought. It is a fact that within current critical debates around the epistemic value of ecocriticism and its various applications, the field in which I am specialized, the study of ancient Greek and Latin literatures, does not play a significant role.[10] For no mainstream environmental critic is a classicist or shows any particular interest in the cultures and literatures of the ancient Mediterranean. Also, unlike the place-based pedagogy in Warsaw and Augsburg, the teaching of classical literatures, for a number of reasons, cannot be connected with a specific place. And yet classicists have been variously attracted by the hermeneutic possibilities offered by ecocriticism. Even scholars

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8 I would like to thank the students of the Blue Literary Studies lecture in the summer of 2025 – in particular, Raphaela Deffner, Lea Deubler, Mariella Narvaez Garcia, Isabel-Felicitas Halden, Katharina Heim, Lisa-Sophie Hoch, Bianca Huber, Samuel Isler, Christina Kling, Klara Mößnang, Josephine Ressel, Benjamin Schmid, Simon Stegmann, and David Winges – for their amazing and insightful creative work.

9 Cited with permission.

10 I am not arguing though that ecocriticism has not been adopted in Classics. On the contrary, the number of conferences, monographs, articles and co-edited volumes is constantly increasing. See for example Schliephake 2017 and 2020 as well as the series *Ancient Environments* published by Bloomsbury.

belonging to more conservative academic communities (for example, in Italy and France), which traditionally show skepticism – to say the least – towards contemporary theoretical discussions, are now enthusiastically embracing the riches of environmental criticism, which puts at the center of inquiry the environment and other more-than-human actors. And rightly so, since ancient textuality displays an astonishing array of representations of relationships among various environmental and natural elements. This fact invites readings that shed light on their materiality and their presence in the world as such and on their own terms, rather than being read as mere symbols for abstract concerns, as has been too often done in the past due to the humanistic biases that have broadly characterized the interpretation of ancient literary works. Historian of antiquity Christopher Schliephake (esp. 2017 and 2020) has, in an exemplary and clear manner, discussed why environmental criticism is relevant for Classics, but also what ancient cultures can offer to expand and, in a way, complement the goal of environmental history and thought. In what follows, I consider the peculiar status of the Greco-Roman classics within ecocriticism and environmental thought at large and shed some light on the potentialities of this discipline in didactic contexts.

Classics, i.e. the study of the literature, art, history and thought of ancient Greece and Rome, has been massively attacked in the last few years because of its perceived connection with elitism and political conservatism including their extremist tendencies, such as white suprematism and racism. Moreover, the study of Greco-Roman antiquity has historically been used as a tool of conquest and colonization.[11] By alleging their affiliation with idealized Greek and Roman cultural ancestors, European colonizers systematically used the knowledge of classical antiquity as an element in strategies of assault on the cultural traditions of colonized peoples. For this reason, the debate around this fatal intertwining has been called (especially in Europe) "decolonizing Classics", a label that suggests the need to revisit habituated methodologies that presuppose certain normative epistemic truths to be imposed on others (Umachandran, Ward 2023). From a specifically environmental perspective, the ideals shaped by classical culture correspond to principles of humanism in a broad sense, i.e. the prominent role taken up by humans – more precisely: men – in influencing and forging their environments. Along these lines, it is interesting to notice that the rise of Anthropocene, usually seen as a consequence of disruptive global events such as the "discovery" of America, the industrial revolution or the use

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11 See (also for further references) Greenwood 2022; Blouin, Akrigg 2024; Padilla Peralta 2025.

of atomic weapons, has been backdated to the introduction of agriculture (Ruddiman 2003). So, if agriculture does count as a or *the* foundational anthropocenic event, then ancient Greco-Roman culture can be included in the scope of ecocriticism since it can be considered co-responsible for the rise of this geologic era. Moreover, as has been pointed out by Schliephake,

> Mediterranean antiquity already saw phenomena like catastrophe, collapse, and regeneration – including in environmental terms. One could even say that the popular narrative of the Anthropocene, presented in countless articles and books, makes use of the generic structure of rise-and-fall narratives inspired by ancient models and elaborated in early modern historiography. (Schliephake 2020, 5; see also Graeber, Wengrow 2021)

Along these lines, classical antiquity is seen as a precursor of our current preoccupation and environmental crisis, and as such deserves to be considered within ecocritical debates. But this thought might become problematic if considered from another perspective. Namely, if we see a connection between Greeks and Romans and the early manifestation of the Anthropocene, and if we recognize, as Schliephake seems to suggest, the normative role of ancient concepts of history and temporality in shaping ecocritical discourses, then we might be surreptitiously reinstalling the paradigm of the eternal validity or normativity of ancient Greece and Rome. Paradoxically, perhaps, from this vantage point, Greco-Roman culture can be seen as characterized by the original sin of Western societies as responsible for the Anthropocene, a term in which *anthropos* might be interpreted as blaming the entire human species "for the errors of white male capitalists" (Gary Snyder in Feder 2021, 2). Moreover, on a methodological level the study of classical literatures and texts might seem not only outdated but even useless: philological acumen, reconstructions of specific contexts as well as close reading in general might appear as inadequate or incommensurable with the highly complex problems posed by the Anthropocene: what can they do for the discussion of for instance hyperobjects, differences of scale and global interconnectedness (Morton 2013; Clark 2019)? What did ancient Greeks and Romans know about the environmental issues occurring in their time?

Arguably, a definitive answer to this set of questions is impossible. And that is a good thing, since it is a valuable characteristic of the discourse of EH, and of ecocriticism in particular, to recognize the problematic quality of their subject matter and to embrace critical openness and an unbiased will to taste various possibilities without necessarily finding a solution. It is from this critical perspective that I teach, together with PhD candidate Leila Williamson, an MA

level course in Latin literary studies that is intertwined with the research project *Coming after: Late Ancient Ecopoetics*, funded by FWO, Research Foundation Flanders.[12] The course is entitled "Late antique ecopoetics: journeys, rivers, ecotones". We consider a number of late antique poems written in Latin between the fourth and the sixth centuries, such as the river-poem *Mosella* by Ausonius, the mythological epic *The Rape of Proserpina* by Claudian, the travel poem *On His Return* by Rutilius Namatianus, and various river and travel poems by Venantius Fortunatus and Ennodius. Our general starting point is the appreciation of literature in general as a fundamental actor in the shaping of environmental consciousness. More specifically, the literature of the late antique period, in the past typically marked as decadent and merely derivative, is presented as a productive paradigm of an untimely aesthetics, bearer of a "strange strangeness" (Morton 2013) that characterizes our own environmental crisis. Considered this way, late antique poetics can shed light on some inherent aspects of ecocriticism itself, which, by definition, *comes after* and is too late. As has been aptly observed by Virginia Burrus, "ecological thought comes belatedly then. It arrives only when it is too late to undo the planetary damage" (Burrus 2019, 1). Belatedness and untimeliness in our course are observed from the double perspective of the contemporary (Agamben 2010, see also Formisano 2020) and the *late* antique period, both indelibly stained by inadequacy in relation to their environment, perceived differently than in the past precisely because of the realization of the profound interconnections and elusiveness of the environment. Again Burrus:

> Ecological thought propels us forward toward a future as yet barely imaginable. Paradoxically, it may also draw us back to a past only dimly recalled. What draws us, however, is not the longing for a simpler, purer time and place. Even if such existed, it would be of little help to us now. Rather, the pursuit of a usable past here evokes a context as complex and in its own way as compromised as our own – namely, the late ancient Mediterranean. (Burrus 2019, 1)

The specific contributions of this course in shaping the ecocritical literary consciousness of the students are basically two: on the one hand, they learn to *de-classicize* ancient Latin literature, since, especially from the late antique perspective, it does not serve as a privileged repository of humanistic values and anthropocentric world views. They are introduced to a more-than-human universe that consists of various and infinite entanglements with "riverscapes, deserts, oceans, long journeys, storms, droughts, ruins, churches,

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12   See https://comingafter-ugent.be/.

cities, animals, saints, songs and sounds".[13] In other words, they learn that ancient texts are not (necessarily) subject to the epistemics shaped by Classics as a discipline in the last two centuries. Moreover, students are invited to use and make sense of the most basic and typical hermeneutic tool of Classics, close reading, in order to recognize "the connections and complexities" between things that appear as opposite, "including those that also apply to scholarship, such as form and content, content and context, coherence and contradiction, etc.", as observed by Helena Feder in *Close Reading the Anthropocene* (2021, 3). Feder also salutes the "convergence of close reading and scientific ecology", both marked "by slowing down and looking around to apprehend similarities and differences, to recognize and value interconnections" (4).

To conclude, a de-colonized and de-classicized study of Greco-Roman and, in particular, late antique literature and textuality has the potential of becoming a strong interlocutor within ecocritical debates: not because we recognize in (late) antiquity an anticipation of current anthropocenic crises, but rather because both the difficulty and the strangeness of an ancient language impose a slowdown in reading a text and perceiving environment, as well as an attention to minute details that is functional to the unveiling of material interconnections. This kind of study, which perhaps is not placeable anywhere, promises to be at one and the same time an important voice within environmental criticism, and an instrument to constantly test and push it to its limits.

5 Where from Here?

As illustrated and as to be expected, teaching the EH takes very different forms, depending on disciplinary constellations, institutional frameworks and infrastructure, individual interest, and possibilities for collaboration not only in research but also in teaching. We could not pay tribute to the full range of teaching the EH at our universities. Thus, EH in literary or performance studies at Ghent University or the two thematic clusters developed within the Environmental Humanities Center at the University of Warsaw, Art, Literature and Popular Culture in Dialogue with the Natural Sciences and Environmental Discourse and Decolonial Practices, with its special focus on Indigenous cultures of North America and translation as a mode of decolonial engagement, would have deserved more attention. Teachers' education is another field that warrants detailed discussion. Also, there are overlaps of interest and collaborations between our

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13 See https://comingafter-ugent.be/.

universities that predate our work on a joint MA (e.g., in ancient history between Augsburg's Christopher Schliephake and Ghent's Marco Formisano, or the focus on Indigenous cultures that Warsaw and Augsburg have in common). Lastly, other existing collaborations in the preparation of the application and plans for both faculty visits and joint introductory courses to the EH – e.g., with Ca'Foscari University of Venice and its focus on Environmental Anthropology, South Asian Environmental History, and Ecology and Religion – would have complemented the outline of different teaching practices and ideas of teaching cooperation.

But the examples stand for themselves, and they provided a crucial basis for our collaboration. The envisioned MA program – which, unfortunately, did not receive the funding we need and thus will not be put into practice as we had hoped – was designed to allow students from all over the world to explore the EH from both a contemporary and a historical perspective and to understand not only the place-specificity of the subject matter with which they would engage, but also the specificity of EH discourses in and across Europe with its range of languages and academic traditions. Thus, this focus was not meant as yet another reiteration of Eurocentric ideas, but it sought to draw attention to how the productive tension between the local, the regional, and the global as well as the not placeable might play out not only regarding the objects of our analyses, but also how they are framed, discussed, and connected, and how such discourses are put into a self-critical dialogue with the rich discursive traditions of e.g., the Global South – an academic "cosmopolitan sense of place", maybe, to borrow again from Heise (Heise 2008, 56).

There are other ways to pursue these objectives. As such, we see our collaboration as a transdisciplinary, translocal, and transcultural intervention into our local structures, productive as they may already be, e.g., by long-distance or on-site co-teaching, by joint workshops for MA and early-stage PhD students, by student exchange, or by implementing study-abroad elements in existing or new implementations of EH formats at our universities. Such intervention may start with teaching; but teaching and – maybe just as important – co-learning is a central tool for making the specific contribution of the humanities to the conversation about the global polycrisis, or, better, the ongoing catastrophe, heard not only in schools and universities, but also in politics, civil society, and the business world. As the Canadian poet Rita Wong puts it in her volume *undercurrent*: "let our societies be revived as watersheds" (2015, 14). We need people able to rethink and unlearn. The Environmental Humanities are not a luxury.

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Rivers and Oceans, or the Place Where the Blue Humanities Meet Lisbon

Cristina Brito, Isabel Gomes Almeida, Isabel Araújo Branco,
Ana Catarina Garcia, Nina Vieira
NOVA University of Lisbon, Portugal

Abstract   At NOVA University of Lisbon – School of Social Sciences and Humanities new avenues of research in marine environmental history, archaeology and ocean's heritage, ancient history and religion, and literary studies, are paving the way to more inclusive and interdisciplinary approaches, tackling area studies through transcultural and trans-chronological analytical strategies. Steaming from teaching, scientific projects, field work and public activities, this paper presents case-studies in teaching-learning practices. It also discusses a common framework for developing conceptual and practical approaches to the Blue Humanities.

Keywords   Higher-education. Ancient history. Environmental history and archaeology. Literary Studies. Environmental Humanities. Water Humanities.

Summary   1 Introduction: Water as Shared Ground. – 2 Water as a Subject-Matter on Arts and Humanities Courses. – 2.1 Ancient Mesopotamia. – 2.2 Archaeology. – 2.3 Marine Environmental History. – 2.4 Literary Studies. – 3 Our Very Own Take on the Blue Humanities. – 3.1 The Symbolic and Material Water. – 3.2 Water Animals as Agents. – 3.3 The Historical Water. – 3.4 Water in the Pages of Books. – 4 Discussion: Placing a Blue Thinking in the Humanities..

1 Introduction: Water as Shared Ground

In Lisbon, a two-millennia-old city that developed at the banks of the Tagus estuary, research in the Environmental Humanities focusing on water bodies has been emerging. By focusing on the water cycle and the cycles of human history, we can simultaneously tell the parts and the whole and make it understandable to and conceptualized by students and researchers of history, art history, archaeology, philosophy, literary and art studies. Different human contexts and temporalities can be considered and used, making it possible to perform a journey, in the classroom and out in the open, from the water drop to the water cycle.

The hydrological cycle that constitutes life on the planet as we know it makes possible the movement of water in its various forms between states, physical spaces and bodies, and cultural constructs. In addition to the areas of scientific knowledge that study the water cycle (Karterakis et al. 2007), an entire body of knowledge in the humanities adds layers of understanding about the system and its relationship with all living beings on the planet (e.g. DeLoughrey 2017; 2019; Gumbs 2020; Simpson 2025). Home to different ecosystems and plentiful resources, the waters of the world are places where sources of food were found and exploited, cities and ports were established and developed, different ways of communicating as well as transferring people, products and knowledge were devised and tested. Watery and wet spaces have always been a realm for valuable trading and misfortunes, encounters and confrontation, practices of sharing and of violent appropriation, as well as spaces for the construction of stories and legends and for the creation of myths as well as imaginary geographies and/or metaphysical domains.

Grasping, localising or even 'domesticating' water – physical and conceptual – at a given moment in time and space, associating it with protagonists and events, requires the use of varied teaching-learning strategies and tools which will concur for the development of water studies. That is, to zoom in on a shore that is reached, a beach where people stand looking at the sea and at those viewed as outsiders, a river that connects distant geographies and times, a spring on top of a mountain or a well of drinkable water, or on raining water (from the sky) or running water (from the hoses) that irrigates a crop, on water that is boiled to melt fat and that evaporates from melting pots, on water within the body of an animal, or a being that lives in the water.

Rivers, as well other elements of the natural landscape – islands, waterfalls (e.g. Almeida, Kater 2017), shorelines, mountains, forests (e.g. Vadjunec et al. 2012) –, typically constitute spatial crossroads where contact nodes for (hi)stories can emerge. They are the connectors of small springs and creeks and the vast open ocean while painting on the surface of the Earth a "visual mapping

of a watery network" (Simpson 2025, 154). But it is precisely their vastness and connectivity, partnered with its fluidity and liminality, that make water an ideal yet challenging subject for teaching. Which dimensions to consider, which water bodies should be picked to work as a case-study? A small creek that feeds main water courses and crosses temperate forests, the mighty Amazonia, or the full water cycle? How should they be used as elements for the teaching-learning discussions about more-than-biological systems? Could the nearby Tagus River, home to vast and rich natural habitats as well as a millenary *urbs* be such a case? In fact, riverine waters that are home to multiple species have been appropriate in numerous cultural formats, have encompassed multiple meanings, and are present in countless narratives, poems, plays, and song lyrics, as we will see ahead.

In Portugal, there were no teaching programmes that explicitly use the terminology of Environmental Humanities, let alone Blue Humanities (hereafter EH and BH, respectively), until the current academic year (2025/2026). We are contributing to it by developing collaborative and integrative approaches that deeply intertwine the up-to-date research in these areas with our teaching-learning practices, much inspired by previous groundbreaking projects and recent networks.[1] Our goal is to showcase, in the following pages, our separate experiences as faculty members teaching in different departments, and our efforts to include current scholarship of the EH and BH in the Portuguese higher-education curricula.

2 Water as a Subject-Matter on Arts and Humanities Courses

NOVA FCSH (NOVA University of Lisbon – School of Social Sciences and Humanities) is a hub of national and international reference much driven by traditional strands, departments and courses, such as history, archaeology, literature, philosophy, sociology, anthropology. Based at CHAM (Centre for the Humanities), we have been slowly but steadily developing research lines and teaching-learning processes that, emerging from different backgrounds, revolve around water and aquatic environments and animals. We are literally sitting beside the water **[fig. 1]**. Nearby NOVA FCSH campus, stands the Águas Livres Aqueduct, a historic site that has served to carry drinking water to

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1 Such as the Oceans Past Initiative (https://oceanspast.org/) and the EUTOPIA Connected Community on Environmental Humanities (https://eutopia-university.eu/english-version/integrated-connected-communities/environmental-humanities-1).

Lisbon since the eighteenth century. As a work of art, a human-made structure, it is a link between the spring, the city, and the Tagus estuary. Today, as a national monument open to visitors, it allows us to explore in the field the interconnections between elements of a more-than-human reality. The Tagus is not just the recognizable backdrop of Lisbon but an eco-cultural system where countless events have taken place, and from which multiple narratives can be told and discussed.

Figure 1   Lisbon is a city of water. 2025. This is a postcard view of the NOVA FCSH campus in the Campolide neighbourhood, with the Aqueductin the background (centre and right side) and Lisbon by the Tagus estuary (left side). Photos by the Authors

Recent advances in marine environmental history and ocean's natural and cultural heritage studies have fostered more inclusive, interdisciplinary, and cross-cultural approaches that link different regions and historical periods. At NOVA FCSH we have been focused not only in assessing extractions of aquatic mammals – mainly megafauna, such as whales, sea cows, pinnipeds, sea turtles, tuna and sharks – but also in including them as historical actors, co-constructors of social, political, cultural and ecological processes. These activities of extracting and transforming animal bodies into valuable commodities have led to the construction of toxic ecologies and a set of narratives and relationships of waste, in line with the concept of the "Wasteocene" coined by Armiero (2021). In this context, waste is based on social relationships that reproduce power inequalities, "entering the bodies and ecologies of humans and non-humans" (Armiero 2021, 12) – as is the case with European

domination over enslaved Africans and human domination over marine animals. Coming from a more traditional maritime scholarship, we are opening to critical water studies and investing in cross-fertilization among subjects and methods. Concepts associated with water bodies as running waters and interface spaces, biogeophysical and ecological structures are being used, but also water as a metaphysical concept and an element of symbolic-ritualistic discourses, as well as a protagonist and agent of histories.

BA and MA programmes are under restructuring at NOVA FCSH, which creates an excellent opportunity to consolidate research synergies by applying them to teaching-learning strategies. The five scholars and authors of this paper started outlining a framework of possible approaches and case studies to work together on several BA and MA courses by taking advantage of a common ground in the Humanities and their shared interest in water bodies. As such, it has been possible to start laying the foundations for the EH and more specifically the BH or the Water Humanities **[tab. 1]** For us, EH is an interdisciplinary field that applies analytical approaches from the humanities to address contemporary environmental challenges from cultural, philosophical, social, and biological perspectives. The field of EH brings the humanities, the social sciences, and the natural sciences together to address questions of meaning, value and ethics, and acknowledging that the traditional separation between nature and culture has led to fragmented responses to environmental dilemmas (Oppermann, Iovino 2017; O'Gorman et al. 2019). From our own research and the recent literature on the field, we know that "human preferences, practices and actions are the main drivers of planetary change in the twenty-first century. The academic disciplines of the humanities are largely concerned with how humans perceive, articulate and behave as a species" (Holm, Brennan 2018, 10). It is possible, however, combining efforts from the human, social and natural sciences, to develop a humanities paradigm for the aquatic environment[2] and by doing so to address ways in which humanistic disciplines may help us understand and engage with global environmental problems.

The BH is grounded on the concepts and ideas proposed by John R. Gillis (2011),[3] Steve Mentz (2022)[4] and Serpil Oppermann (2023), among others. Water is constructed as a fluid and embodied place

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2 A brief review of environmental history can be found in Holm, Winiwarter 2017. According to the authors, the 'humanities paradigm' refers to the "collaboration between the natural and human historical disciplines to address questions of the interaction of humans and nature over the long term" (Holm, Winiwarter 2017, 116).

3 See also https://www.neh.gov/humanities/2013/mayjune/feature/the-blue-humanities.

4 See also https://stevementz.com/blue-humanities/.

of (historical) narratives with multiple agents – aquatic life forms and human life – thus revealing that its study by the humanities is not only possible but vital. Some say we live in the Age of Water, and a cultural turn towards water is central (Bailey-Charteris 2024). This approach addresses water, the water cycle and water-related practices as embodied in the cultural and historical dimensions of human life on the planet (Karterakis et al. 2007).

Following Mentz (2022, 2024) and Gillis (2013), we deal with the human engagement with water, using literary, cultural, historical, and theoretical connections and ecologies aiming to introduce students to the history and theories of water-centric thinking. Together or separately, we reflect about environmental history and archaeology, history of religions and worldviews, art and literary narratives and animal studies (e.g. Panagiotakopulu, Garcia 2023; Pires et al. 2024; Satiro et al. 2024; Robin et al. 2025). Water is thus the motivation for practices about the historical and current relationships between peoples and natural elements that are discussed here.

Dissolving lines between land and water and focusing on the interconnections and interactions between humans and non-humans is one of our main objectives. This will also allow us – (environmental) historians, (maritime) archaeologists, ecofeminists and water-critics – to have a say in current issues that concern different societies around the world in different ways or a say in issues that represent common problems for humans on this planet. Immersing ourselves in the liquid, fluid, aquatic environments, through a panoply of methodologies and theoretical approaches, will make room for new perspectives and to critically learn about and address current societal and environmental issues.

Table 1 An overview of the areas of research-based teaching at NOVA FCSH to which the authors are dedicated to in connection with Blue Humanities approaches

Areas (Graduation Degrees NOVA FCSH)	Ancient History (BA and MA History; BA Archaeology)	Early Modern History & Archaeology (BA and MA History and Archaeology)	Marine Environmental History (BA History and BA Ocean Studies)	Literary Studies (BA Languages, Literatures, Cultures; MA Literature, Arts and Cultures)
Main topics	Mesopotamian history (fourth–first millennia BCE).	History and archaeology of European Expansion, Discoveries and Globalisation.	Oceans History, Environmental History, Communities and Environment, and Oceans & Arts.	Portuguese, Spanish, Hispano-American Literature, Comparative Studies, Women Literature, Ecofeminist literary theory.
BH approaches	Multiple daily impacts of water bodies, metaphysical water use, actor-network theory.	Material culture, port cities, seventeenth and eighteenth-century urban development, urban and harbour waste.	Oceans and environmental history, colonialism, (aquatic) animal history, biodiversity.	Water and landscape in literature, feminist and decolonial narratives.
Research & Networks	WATERS exploratory project.	DUST exploratory project, UNESCO Chair The Ocean's Cultural Heritage.	MSCA CONCHA, ERC Synergy Grant 4-OCEANS, FCT project ANIMALx, UNESCO Chair The Ocean's Cultural Heritage.	MSCA SE EDGES – Indigenous knowledge and academic integration.
Engagement with students	Interdisciplinary analysis of data, integrated approaches to the multiple uses of aquatic environments.	Fieldwork and lab analysis of organic materials, speculative questions, experimental archaeology.	Interdisciplinary classes, fieldwork in coastal areas and museum visits, marine megafauna focus.	Interdisciplinary seminars, Portuguese and Spanish and Hispanic American authors.
Engagement beyond the academia	Environmental-cultural changes, political and religious discourses.	Pollution and waste in the long chronology, historical changes in the shoreline, erosion.	Extinction, biodiversity loss, water and food security, energy transition, wasting relationships.	Environmental-cultural changes, gender-related issues, ethnic minorities, political issues.

2.1   Ancient Mesopotamia

A first year mandatory course of each of the above-mentioned BA's aims at covering the main historical processes of the contexts traditionally designated as Ancient Near East (ANE),[5] covering a wide time frame that spans roughly between the fourth and the first millennia BCE. This is a highly demanding task since it requires a great deal of synthesis for what turns out to be a course of 27/28 sessions (of less than two hours each), while also having to overcome two major interrelated challenges: a) most first-year undergraduate students are in the process of adapting to the teaching-learning methodologies associated with enrolling in university – which often includes moving away from their families and homes and living alone for the first time; and b) the lack of previous knowledge about these ancient contexts.

In the following semesters, students can then enrol in other optional BA courses, more specifically focused on ancient Mesopotamian cultural framework and religious system. It is in these courses that we can go deep in the analysis of the impact of different bodies of water on political-religious discourses as well as cultural-artistic expressions. Nevertheless, within the mandatory courses, our initial approach is already EH-oriented, by conducting discussions that aim at highlighting how the geographical particularities of this context impacted not only the development of the historical processes within the above-mentioned time frame, but also their impact on the academic analyses, from the mid-nineteenth century onwards.

These EH-oriented teaching-learning goals were solidified in recent years, as the work between the authors of present paper became stronger, namely with the development of the interdisciplinary research project WATERS: *Amidst 'Ever-flowing Water' – Tracing Aquatic Symbols and Metaphors in Lower Mesopotamia Religion (c. 3300-1800 BCE)*. From a History of Religions perspective, Latour's seminal proposal of actor-network theory seemed extremely fitted to be applied to the study of the ancient Mesopotamian religion system. As such, WATERS's foundations intertwine the postulates of Religions Studies (namely the historical-archaeological ones) with the ones of EH (e.g. Latour 1991; Simmons 1993; Oestigaard 2005). In its training component, WATERS already integrated BA and MA students in the project *Humanities for the Environment and Heritage* developed

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5   ANE is a designation that stems from a nineteenth-century Eurocentric and deeply Orientalist historical and archaeological 'discovery' of the ancient contexts roughly within the Eastern Mediterranean to the wide region of present-day Iran. Decolonial reflections have led academics, in recent years, to prefer the use of geographical-oriented designations, such as West Asia and North Africa (see for instance the change of the University of Chicago-based Institute that promotes research on these past contexts https://isac.uchicago.edu/about/name-change-information).

by CHAM within the programme Summer with Science funded by FCT, the Portuguese Foundation for Science and Technology, in 2022. Additionally, a BA course based on the preliminary results of WATERS, entitled Religion and Environment in Ancient Lower Mesopotamia (fourth-third millennium BC) has been proposed and approved by the Scientific Council of NOVA FCSH to be part of a curriculum which allows students to participate in research projects, for the 2025/26 academic year.

2.2 Archaeology

During the intervention that occurred in Lisbon between 2016 and 2017, in an area known as *Campo das Cebolas*, human interactions with and on the riverbanks of the Tagus were revealed in all observed realities and data was recorded and collected, serving as memories for the future. In this exercise of thinking on the teaching of BH in Portugal, one can address the case study resulting from this intervention: the study of leather and cork remnants collected during the excavation at *Campo das Cebolas*, which we are conducting at NOVA FCSH as part of the training of archaeology BA and MA students.

Within this experience, the project DUST – *Discards and Debris in the Port Cities of Early Modern Era: Contributions to Marine Environmental History* was proposed to be integrated into NOVA FCSH Archaeology training curricula.[6] In those lab sessions we practise different approaches to the materiality under study, giving students the opportunity to engage with soaked artifacts that are usually inaccessible, such as organic materials – that is, objects and remains found in humid environments. Beyond the archaeological practice of recording, inventorying, observing, and identifying shapes and functions, eventually animal skin used to make shoes, archaeology students and their teacher pose daily hypotheses about everyday riverine life in Lisbon during the seventeenth and eighteenth centuries.

These organic elements, deposited over centuries in this area of the city as waste from urban life in seventeenth-century Lisbon, helped to compact landfills that allowed the city to gain new space, a wider margin for its riverside activities. Or simply fashionable footwear from the early modern period that was lost because it was no longer useful or because it got stuck in the mud on the Lisbon riverfront on a rainy day.

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6 Also leveraged by the individual research project of one of the authors TRASH – *Human Waste and Marine Debris During the First Globalization: Past and Future Perspectives on Ocean* funded by FCT.

2.3   Marine Environmental History

Environmental History and History of the Oceans are two new disciplines in the course of History offered by NOVA FCSH. In addition, Oceans, Heritage, and Art in the BA in Ocean Studies, and Communities, Spaces and Environment in the MA in History are also new offers. This novelty represents an important milestone at a national level in curricula renovation, one that results from research and mentoring work conducted in marine environmental history in the last years. These include specific seminars on early modern ecological globalisations, on sociocultural and ecological interactions, and on history of aquatic animals and maritime societies (MA History; e-learning MA History of the Portuguese Empire). Additionally, a Massive Open Online Course (MOOC) dedicated to whaling history has been designed for students in higher education, researchers and professionals of the cultural and creatives.[7]

MSCA-RISE CONCHA[8] and the ERC Synergy Grant 4-OCEANS[9] have set the ground to an array of themes in MA and PhD levels, related to the exploitation of aquatic environments and animals, the construction of littoral spaces, biodiversity loss and waste, changing perspectives towards marine fauna, or the construction of knowledge about aquatic species. We have been proposing entangled approaches on colonial history with that of aquatic animals, exploring how imperial contexts of extractivism were shaped by more-than-human agents.[10] Using what we consider to be paradigmatic taxonomic groups allows to discuss economic and social impacts of such interactions over time, but also the symbolic and cultural values of animals that are more-than-ecological. Whales and manatees are kaleidoscopic and all-encompassing entities; they speak as much about themselves as about us, humans (Brito 2023; Brito, Vieira 2022; Morais et al. 2024).

[7]   This MOOC was developed in 2022 in a collaboration between the ROSSIO Platform and the UNESCO Chair *The Ocean's Cultural Heritage* https://www.nau.edu.pt/pt/curso/a-caca-da-baleia-e-os-portugueses/.

[8]   CONCHA – *The Construction of Early Modern Global Cities and Oceanic Networks in the Atlantic: An approach via Ocean's Cultural Heritage* (EU H2020-MSCA-RISE-2017; https://cham.fcsh.unl.pt/CONCHA/index.html).

[9]   4-OCEANS – *Human History of Marine Life: Extraction, Knowledge, Drivers & Consumption of Marine Resources, c.100 BCE to c.1860 CE* (H2020-EU – Excellent Science – European Research Council; https://www.tcd.ie/tceh/4-oceans/).

[10]   An example of our approach to the topic is the Masterclass Ripple Effect. Historical and Eco-cultural Narratives about Whales given at the ANIMALIA Summer School Studying animals in the Social Sciences and Humanities in Portugal. This masterclass is available at https://youtu.be/l3TNFmPuxng?si=UWr6QOlSE30aW7V2. The ANIMALIA Summer School was attended by 30 participants, including master's and doctoral students.

In their biological bodies, several species, times and geographies coexist. They are worlds.

We try to "get out of doors altogether" as Donald Worster (1988, 289) urged. We offer one class in the campus courtyard, often at the end of the day and feeling the autumn wind on our faces and running out of daylight while discussing the use of energy in premodern times. We organise study visits to museums and collections, but also to natural areas and seascapes. Learning about the environment from the viewpoint of the humanities is made by exploring the archives as much as in boat and field work. The past and current habitats of historicised aquatic animals are ideal laboratories for students interested in ecocultural entanglements.

2.4 Literary Studies

The approach from comparative literary studies is ideal to address water and related topics, allowing to deconstruct thought and worldviews, to position people in their relation to their surroundings, both cultural and natural, and to write (and read) alternative narratives. Fiction, poetry and other literary forms redirect action and to foster possibilities – past, present and future. Studying it presents students multiple possibilities and we use Portuguese and Spanish and Hispanic American authors to give meaning to a shared world that is told through multiple voices. We teach Literary Translation (Spanish Portuguese), Hispanic American Literature: From the Colonial Period to the Independence Processes, Hispanic American Literature: From Modernism to the Present Day, and Contemporary Spanish Literature (BA in Literature Studies), Feminist Theory and Literary Experience and 'Landscapes and Borders' (MA seminars).

Another approach consists of participating in research projects and networks that take our topics of interest and joint research beyond the academic sphere, involving and engaging multiple stakeholders and knowledge holders. The MSCA Staff Exchanges EDGES – *Entangling Indigenous Knowledge at Universities*, coordinated by CHAM at NOVA FCSH, is a networking project that aims to contribute to a pluralist and multi-scale approach to knowledge production, research and dissemination,[11] where different voices using different languages – oral and written – offer their understanding of natural and watery worlds, among many other aspects.

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11 https://edges.fcsh.unl.pt/.

3 Our Very Own Take on the Blue Humanities

Scholars can have multiple approaches to the scientific challenges and, in our fluid field of research, deal with topics ranging from contemporary maritime cultures, colonial maritime power, migrations, cross-cultural encounters and exchanges, iconography and representations of the aquatic realm and oceanic phenomena, perceptions and myths (across different chronologies). All the way to animals, environments and resource exploitation, and to underwater archaeology, shipwrecks, seaports, maritime culture and heritage, studies of literature, poetry and other cultural products, to the production of art itself. Working within the framework of the BH, or the water humanities, or the fluid humanities (Bailey-Charteris 2024), help us to explore aspects of contact and liminality, and represents a step forward, in the sense of dissolving the lines between land and sea, humans and other animals, nature and culture.

3.1 The Symbolic and Material Water

Multiple water bodies (natural and artificial) had a crucial impact on ancient Mesopotamian human populations. After all, as ancient Greeks noted, this was the "land between the rivers"[12] (Pollock 2001, 1). But which rivers? Only the traditional and paradise biblical-related Tigris and Euphrates? Deconstructing this *stricto sensu* meaning calls for a change in the critical inquiry related to all the subsidiary rivers, highlighting the impact of the whole hydrographic basin on historical processes. Also, the crucial diachronic importance of the southern marshes, nowadays menaced by the climate changes,[13] as well as the fundamental role of the artificial channels and dams' network had a role in transforming the landscape of the territory (e.g. Wilkinson et al. 2015; Altaweel et al. 2019). Thus, this is one of the first discussions that we conduct in the above-mentioned mandatory BA courses on ancient Mesopotamia.

Though famously known from biblical references (as the mighty and 'all too proud' city and tower of Babylon), and other often simplified and/or misleading headlines about first inventions (like

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12 From the etymological origin of "mesopotamia".

13 See, for instance, "Iraq's Marshes Are Dying, and so Is a Civilization Climate Crisis". *Al Jazeera*, 11 November 2023. https://www.aljazeera.com/gallery/2023/12/11/photos-iraqs-marshes-are-dying-and-so-is-a-civilization; Al-Ruabie, Azhar. "'We're Just like Fish: No Water, No Life': Drought and Dams Push Iraq's Marshes to the Edge of Extinction". *The Telegraph*, 3 January 2025. https://www.telegraph.co.uk/global-health/climate-and-people/iraqs-marshes-drought-climate-change-water-wars-middle-east/.

the 'history that begun in Sumer' or the supposedly first 'legal code' of Hammurabi), not much more is known by 1st year students about ancient Mesopotamia, as it is not a context fully addressed during the compulsory education (apart for the importance of the rivers and the invention of the cuneiform writing).

The study of material and iconographic data has proven to be very useful to overcome this challenge. As we have been paying particular attention to the Uruk Vase in our research,[14] we decided to transport it to the classrooms of both mandatory and optional BA courses. In fact, the Uruk Vase, a cultic artifact dated to 3200-3000 BCE and its symbolic-metaphorical uses of the aquatic and watery elements depicted and evoked allows us to explore the diachronic Mesopotamian metaphysical conceptions intrinsically related to water. The wavy lines depicted at the bottom of the Vase, which are traditionally seen as the fertile aquatic natural environment, can also be interpreted as evoking the cosmic domain of subterranean sweet waters (Sumerian: *abzu*; Akkadian: *apsû*) from which all rivers, lagoons and marshes were believed to have come from. From here, the joint analysis can move on to 3rd and 2nd millennia BCE literary compositions that tells us how the *abzu/apsû* was controlled by aquatic deities,[15] such as *Namma*, the primordial ocean, mother of all other deities; and *Enki/Ea*, a god traditionally depicted with streams sprouting from his shoulders, with fishes swimming on it.

On another level, and besides the practical function as a cultic container, we can also envision a profoundly symbolic significance embedded in this artifact – a vase which alludes to the possibility of restraining cosmic waters. This allows us to go deep on the Mesopotamian diluvian accounts, analysing this cosmic aquatic destruction as an event that signifies destruction/chaos while also marking a recreation and the beginning of a new order. Hence, the joint analysis of all these topics that stem from a single object allows to achieve deeper understandings of ancient Mesopotamian cultural, religious, and mythic uses of water, as well as stimulates within students historical-archaeological 'readings' of artifacts from several standpoints.

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14   On the following interpretations about the watery elements on this artifact, see Gomes, Rosa 2023.

15   On the Mesopotamian conceptions about the divine primordial oceans, see Gomes de Almeida 2021.

3.2 Water Animals as Agents

EH offer a wide range of topics for study, assembling knowledge from different fields of research and thereby stimulating the reconfiguration of concepts of nature, agency and materiality, and enabling the formulation of new theoretical models that bring together human and non-human ecologies (Robin et al. 2025). Both environmental and animal history share the interest of decentring humans as the driving force of history, and scholarship on both fields has been feeding the other to understand the complexity of long term, radical shifts of the biosphere (Wöbse 2021). Throughout time and geographies, by exploring the hydrological systems, humans have produced new technical competencies, new political and social strategies, new systems of exchange and circulation, new cultures and ways of living, and new worldviews. In doing so, aquatic animals have been consumed, traded, and energetically transformed for food, clothing, energy, health, and adornment in very different ways.

In recent decades, we have witnessed new developments in the so-called 'animal turn' (Roscher et al. 2021). The ubiquity of animals in human living experience means that human history has largely depended, and in diverse ways, both materially and culturally, on the existence and contribution of various species, namely aquatic ones. We have been directly addressing pressing questions on the Human Oceans Past research agenda about how marine fauna played an important yet underestimated role in societal development (Holm et al. 2022). As biological beings and as commodities, freshwater, estuarine and marine animals have been socially metabolised by different societies to become marine wealth and have been pivotal for human trajectories and culture. When addressing European expansions and colonisation of extra-European territories, peoples and ecologies, it has been possible to use practical examples, as well as water metaphors, to teach the so-called first globalisation, or wet globalisation (Mentz 2020) supported by the water that connects history, spaces and agents. The study of aquatic animals' history reveals ecological teleconnections and long-distance transfer of energy, since several by-products (such as whale oil) became one of many 'cheap nature' products of European imperialism, reshaping food, energy and labour relations (Moore 2016, 89-90; Demuth 2019, 34; Vieira 2023, 40). In this attempt to give voice to silent (or silenced) historical players, it is necessary to pay attention to indigenous and colonial societies in modern America, as well as to enslaved Africans whose forced labour, for instance, on sugar plantations and whaling stations, was central (e.g. Brito 2023, 150-3; Vieira 2024, 14-16). Also, the construction of toxic ecologies based on appropriation, domination and dehumanisation need to be considered. This panoply of historical, cultural and natural models allows us to grasp and

analyse more-than-ecological interactions in varied perspectives, ranging from westernized and indigenous worldviews to multispecies studies. Within this multilayered approach, the water within and the water outside are becoming places of history as well.

3.3 The Historical Water

For maritime archaeologists, their professional life is connected to the issues that link human history with water. Whether through human experiences and interactions with aquatic environments or through the memories left in contexts that have been positioned near water. Many times, their perspective on the historical and archaeological interpretation of abandoned artifacts tends to combine, as coherently as possible, the ecological space in which these experiences occurred (e.g. Garcia 2017). By reading between the lines of materiality it is possible to understand how the aquatic space attracted, repelled, sustained, was cared for, watched over, or even discarded over time (Garcia 2020). Within the framework of BH, through underwater archaeology and maritime history studies we problematise how aquatic elements have influenced or shaped particular and major political and economic decisions, (re)actions that impacted the historical processes.

The influence of aquatic spaces is evident in port cities, as it is the case of the port of Angra do Heroísmo, Azores, an extremely important region in the history of Portuguese expansion and in the history of the Atlantic itself. This port city was known at the time simply as Angra, meaning a protected bay, functioned for almost two centuries as a sign of 'salvation' for many lives – Angra represented the last port where assistance could be obtained after the long transatlantic voyages of the fifteenth and sixteenth centuries. The sea was the beneficial element which, in its oceanographic dynamics combining wind and currents, led ships into the bay. However, it was also the ocean conditions that caused numerous accidents and shipwrecks. It was because of the sea, which caused misfortune for many, that from the mid-seventeenth century the port of Angra ceased to be the favourite port of the Portuguese rulers, who changed course to other Azorean shelters, such as the port of Horta on the island of Faial (Silva 2020).

Through this approach, we acknowledge and discuss the value of aquatic elements as hubs and connectors for daily lives (either on the Azores Island or by the Tagus River in Lisbon) while preserving the material memories that allows us to better understand the past. As such, the transformative nature of the aquatic state that defines the oceans (or other aquatic environments) may in fact be an agent of many (hi)stories and events that we often tend to underestimate and simplify. Water allows us to address complexity and, at the same time, to deconstruct it.

3.4 Water in the Pages of Books

On the banks of the Tagus the 'Velho do Restelo' – a mythical figure in Luís de Camões' *Os Lusíadas* (1572) – warns of the dangers of maritime expansion and the fever of ambition. It is from these shores that Fernão Mendes Pinto sets off on his *Peregrinação* (1614), an adventure told in the first person in the manner of the picaresque and taking place mainly in the Far East. Examples multiply over the centuries, and the choices of the texts to be studied reflect the approach in each class. For this discussion, and to get Literary Studies students involved in the BH, we opt to go with José Saramago's *As Pequenas Memórias* (2006), mainly due to two factors. On the one hand, Saramago is one of the contemporary writers with the most national and international recognition, having received the Nobel Prize for Literature in 1998, and being studied in Portuguese in the 12th grade. On the other, several of our students live in areas of Ribatejo or Estremadura bathed by the Tagus and its tributaries, which provides a more immediate involvement with the text.

It is an autobiography by Saramago, which begins with a reference to Azinhaga, the village where he was born, a year before he moved with his family to Lisbon. We read in the first lines that, of the original village (which had existed since the beginning of the nation), only the river survives. The river is therefore presented from the beginning as the essence that resists the passage of time, the river that has always existed (Saramago 2006, 11) before the village was founded. It is therefore an unchanging, perennial river, the constancy of that territory. Thus, the river is the essence of space, a human territory, although its permanent essence is water, nature. However, the immutable is simultaneously mutable. It infinitely overflows its banks (Saramago 2006, 11), it metamorphoses in floods and, as if it had a life of its own, it goes beyond its apparent limits and advances towards land, like a living being that transforms itself, that doesn't depend on humans to develop its changing existence.

The name of the river only appears after all this information, on line 10, because the name is secondary. The important thing is not that it's called Almonda, but its aquatic and essential character. Almonda "met Tagus to which (or to whom, if I may say so), gave help" (Saramago 2006, 11): the narrator opts for clear personifications of the rivers, in a gesture of appreciation, closeness, and familiarity. In a rhetorical gesture, the narrator corrects himself and opts for a relative pronoun typical of humans. The two rivers that shaped the character of the village and with whom the population has learned to deal (Saramago 2006, 12) are living entities that listen, evaluate, and respond to humans. It is assumed that these characteristics are typical of humans, so there is a rapprochement between nature and

humans.[16] What's more, there is a dynamic that belies a vision that goes beyond a dichotomization between environment and people. The rivers define the village's character, shaping both its physical landscape and its symbolic identity; the town's essence is directly influenced by the water courses. They symbolize relationships and coexistence that are not idyllic, embodying asymmetry, harm, and destruction, particularly during floods, which constitute violent disruptions to both the physical environment and the lives of inhabitants that profoundly shape individual and collective existence and imaginary. Memory and kinships are central; interconnectedness is the main key of the discussion with our students.

In Saramago's fiction, water symbolizes the fluidity of humanity, historical continuity, and the instability of truth, a symbolism mirrored in his flowing, unpunctuated prose whose shifting perspectives and recursive rhythms can evoke the continuous, undulating movement of water itself. Inherent to human existence and even dependent on it, is a negotiable harmonization of those who coexist and interdepend on one another (Branco 2021). Humans are also water. Humans are also rivers.

4 Discussion: Placing a Blue Thinking in the Humanities

Water, Aquatic or Blue Humanities invite a plurality of artistic, theoretical and narrative strategies to represent contemporary emergencies in regards the relationships between humans and water environments (and living beings) and the complexities of an Anthropocene affecting waterscapes both conceptually and in their material reality.

We follow the swimming strokes and the wet words of scholars and thinkers such as Elizabeth DeLourghey, Steve Mentz, Leanne Betasamosake Simpson, among many others, while conducting place- and context-based theoretical and empirical research, that embodies tangible ecological and cultural networks. We acknowledge that human practices *in* and *with* riverine, coastal and oceanic spaces have been shaped by specific ecological characteristics set in complex material and symbolic backgrounds. They *are* the relationships between people and the environment in an interconnected terrestrial and maritime space (Gillis 2012; Richter 2015). Even if conducting our teaching based on traditional departments focused on disciplinary

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16 This is also visible outside of the literary text, namely in initiatives organized by the José Saramago Foundation, such as the project *Rivers in the Almonda*, in which, along 500 meters of the Almonda River, various data are collected with the aim of implementing the experimental scientific method, improving the site and raising awareness in society about the problems of protecting and valuing riverside ecosystems.

methods (History; Archaeology; Literary Studies), we add a layer of discussion when we use water as support and structure as much as an entity. We understand water as a living body and a fluid and liminal reality. Confluences of land and sea, the tangible and the intangible, of human and non-human animals, can be thought of and taught as waterscapes that intertwin physical, biological, cultural and emotional aspects (Bentley et al. 2007; Vieira et al. 2020).

This is where we stand, as researchers and teachers, both physically and intellectually. We live on and in between the two banks of the Tagus River, historicising and critically analysing cultural productions of water in the light of current westernised discourses such as globalisation, postcolonialism, ecofeminism, or environmentalism. Whether a creek or the ocean, the physical waters or the metaphysical, their remains, history, heritage or memories, water is a key element for part of our science-based pedagogical strategies. Steaming from conceptual frameworks, shared projects, field work and public activities, we are jointly working towards a common framework for developing strategies to introduce and anchor the Humanities for the Environment at NOVA FCSH and in the Portuguese higher-education system. We need all the collaboration we can get from within and from the outside.

Each new academic year, two fundamental questions guide us: what is fundamental for the students' future academic path to know about this distant past? What can further enrich their critical thinking as well as foster their skills to work in multi-, inter- and transdisciplinary perspectives? Interestingly, in a very organic and natural way, 'water' became one of the main elements that have contributed to (re)shape strategies to answer these questions. The teaching-learning processes that use water as a subject and as an agent, and the intricacies of its history and of human appropriation, are as fluid and permeable as the very element at the core of such practices of lecturing and storytelling. We also teach our students to have an active voice and a participatory attitude, and we set an example through direct actions to demonstrate the importance and role of blue humanities to policy- and decision-makers. At the United Nations Ocean Conference in 2020, the *Manifesto: Humanities 4 the Ocean*[17] was presented. This manifesto highlights the fact that scientific research into the past of the oceans reveals intense and continuous exploitation of marine ecosystems, with profound societal and environmental impacts. It argues that the Humanities should be recognised for their central role in advancing science and promoting

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[17] https://www.fcsh.unl.pt/static/documentos/media_e_eventos/Comunicados Imprensa/Manifesto_Humanities_4_the_Ocean.pdf.

a global, inclusive and equitable understanding of integrated nature-culture oceanic systems.

Water is the element of connection and circularity par excellence, both in its hydrogeological reality and, in our own understanding of it, in the cultural and interpretative dimensions that people attribute to it. Shapeless, while assuming the shape of each container; tasteless, while taking the flavours of salt and tears; neutral, while eroding and shaping all its surrounds; the fluid and flexible water is truly central. To teach a new generation of scholars and thinkers in the Environmental Humanities, we must immerse ourselves in the aquatic-cultural dynamics that sustain us, abandoning our fear of the dark-blue waters and the strangeness of being out of one's depth in our ancestral element.

Acknowledgements

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Speculative Futures: Digital Eco-Stories from an Environmental Humanities Teacher Training Program in Europe

Eva Katharina Bauer
University of Graz, Austria

Fabiana Fazzi
Ca' Foscari University of Venice, Italy

Nicole Haring
University of Graz, Austria

Abstract   Amitav Ghosh's declaration of 'a crisis of the imagination' with regard to the current period on our planet is the venture point for our paper to present digital Eco-Storytelling as a speculative participatory approach useful for stimulating cultural imaginations of futurities and hence counteracting this crisis. Guided by ecopedagogy, which aims at constructing learning towards increased social and environmental justices, we will present and analyze findings from the EcoStories International Teacher Training Program carried out in 2025 with students from the University of Malaga, Ca' Foscari University of Venice, and University of Graz.

Keywords   Ecopedagogy. Digital storytelling. International teaching. Creativity. Futurities.

Summary   1 Introduction. – 2 Ecopedagogy: Literacy Education and Climate-Justice. – 3 The EcoStories International Teacher Training Program. – 4 Eco-Storytelling: Towards Speculative Futures. – 5 Digital Eco-Stories as Speculative Futures: A Critical Narrative Analysis of *Living Lichen*. – 6 Conclusion.

1   Introduction

When Amitav Ghosh (2016, 9) declared the climate crisis as "a crisis of the imagination", he pointed towards the limitation of political, artistic and societal discourse on how to imagine a climate-just future that does not rely on extensive use of fossil fuels, mass exploitation of the most vulnerable (humans and nonhumans alike), and continuous unequal power regimes. Ghosh's analysis resonates with aspects that have been prominent in scholarly debates, and specifically in critical theory since its inception, namely the question of how societal forces limit cultural imaginings. Adorno and Horkheimer, for example, discuss in the *Dialectic of Enlightenment* (2002) the way in which instrumental reason leads to a reductive perception of the world. Already in 1944, they established a connection between this reductive form of thinking – which is defined by its need to identify – and the domination of nature. Today, this issue of how a limited imagination and thinking is intertwined with the material domination and destruction of natural environments has been invested with new urgency because of the ongoing climate crisis. When Ghosh links the current impoverished state of our future-orientated imaginaries to the climate crisis, he provides a framework for how we can discuss this connection between discursive limits and the ecological crisis in a contemporary context.[1]

The discursive conception of our current age of climate crisis aides in the search for new ways of representing environmental entanglements through narratives (Heise 2019). As a result, Ursula Heise, ecocritical literary critic, concludes that it "forces us to consider human society and the conditions that have enabled its survival in the past over long time spans, as well as to assess impacts that may last hundreds, thousands, or even tens of thousands of years into the future" (Heise 2019, 277). The impacts that are talked about here remain, however, often difficult to identify and grasp (Morton 2013). With the climate crisis, we see and understand, for instance, the increased melting of glaciers and abnormal weather occurrences, however grasping the entirety of the climate crisis remains nearly impossible. As this current period on Earth is marked by the complexities of individual phenomena and their interrelatedness, it is not easily understandable as a whole and thus relies on the ever-expanding development and experiments of new approaches and narratives.

To contribute to the ongoing scholarly and activist debate on how to tackle this "crisis of the imagination" (Ghosh 2016, 9), we argue

that speculative approaches on how to envision the future are of utmost importance. Thus, we propose speculative Eco-Storytelling as a method grounded in ecopedagogy to encourage a creative engagement with futuristic scenarios within the classrooms of Environmental Humanities. As our terrain for speculative futures are the institutions of higher education in Europe, we think in our conceptualization of Eco-Storytelling with Bayne and Ross' (2024) proposal to view higher education as sites for speculations and creative world making, well aware of the residing limitations and power dynamics at play there. Framing higher education within the contradictory nexus of reproduction and resistance of normativity (Haring 2025), we agree with Bayne and Ross (2024, 2) to see higher education "as a space for openness within which we retain the freedom to speculate, to work with the limitlessness of imagination, to acknowledge the unknowability of and to creatively experiment with what does not yet seem possible".

When we talk about speculative futures in our paper, we rely on the extensive scholarship and activist work on speculative methods, creative approaches, and participatory engagements with communities across the globe in how to create narratives and stories of potential futures. Having its origin in Black feminist thought and speculative writings,[2] most of the recent scholarship on speculative futures addresses technological advancements and its proliferating dangerous consequences for societies at large. Numerous creative workshops in recent years have explored how to imagine alternatives to our current system (e.g., *The Making Futures* workshop 2012, *World Machines* workshops 2015-17, see Light, Brereton, Roe 2015, 289-93). These predominantly draw on conceptualization by contemporary speculative thinkers, such as Donna Haraway, who rely on science fiction's popular prompt of 'What if?' scenarios to imagine possible trajectories of relationships, social formations, and entities (Markham 2021, 389). Yet, the goal here is not to try to predict what will happen in the future, but rather to encourage the imaginative process to unsettle assumed futures and attempt to imagine new ones (Bayne, Ross 2024, 4).

Guided by these principles, the paper presents and analyzes findings from the *EcoStories*[3] International Teacher Training Program carried

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2 Most notably here are speculative writings by Octavia Butler, Nalo Hopkins, and Nnedi Okorafor (to name a few). Black feminist scholarship by bell hooks, Audre Lorde, and Patricia Hill Collins (among others) have addressed the questions of livable and just futures, and thus can be seen as academic contributions to speculative futures and are worth mentioning here as well, aware of the slightly different context.

3 The *EcoStories Project* is a three year Erasmus+ project co-funded by the European Union with six project partners in Austria, Italy, and Spain. The project website can be found here: https://ecostories.org/.

out in 2025 with students from the University of Malaga (Spain), Ca'
Foscari University of Venice (Italy), and University of Graz (Austria).
Firstly, the paper presents ecopedagogy as a critical intervention
for teaching Environmental Humanities. Secondly, it discusses the
method of digital Eco-Storytelling within the international teaching
training program as a speculative approach for envisioning futurities.
Finally, a critical analysis of a sample of the created digital stories is
carried out to interpret how speculative creations present notions of
futurities in times of climate crisis.

2 Ecopedagogy: Literacy Education and Climate-Justice

Gutierrez and Prado (1999) pose the fundamental question of "How
can we, as citizens of the planet, participate in the creation of a
world that we want instead of simply observing how those who
are profiting off of extraction and exploitation create our world for
us?" This is a question that also lies at the heart of ecopedagogy,
a pedagogical model that centers around the idea of creating
knowledge about the relationships between human actions of
ecological violence and societal violence that lead to injustices and
unsustainability (Misiaszek 2020, 1). For Misiaszek (2020), in order
to achieve planetary sustainability, it is essential to incorporate
the understanding of social dimensions of environmental issues
in teaching. It is argued that this is possible particularly through
inter-disciplinary approaches, as "ecopedagogy represents the
confluence of multiple and transdisciplinary educational traditions
and methods and aims at several different outcomes" (Misiaszek
2020, 10). Tracing its origins to Brazilian thinker and educator Paulo
Freire (1968), ecopedagogy is grounded in critically engaging with
systems of extraction and oppression while simultaneously focusing
on fostering agency among learners. It centers on exploring how we
relate to the world – how humans coexist with nature – and calls for
a critical understanding of the climate crisis and its complexities as
a guiding framework for education. It invites teachers and educators
to begin by reflecting on their own practices and to translate this
awareness into the methods they use and the ways they teach.

    Kahn (2009) argues for a blending of environmental education
and critical pedagogy, suggesting that such an integration would
allow each field to overcome their limitations by envisioning a more
inclusive, critical, and transformative form of ecopedagogy to better
address current environmental and social challenges. This also aligns
with the recognition of environmental and social violence, positioning
the self as the starting point for pedagogical engagement. From this
place of personal reflection, teaching expands outward – locally,
regionally, nationally, and globally – to help learners navigate the

complex interdependencies of the world. Hence, it can be seen as a constant juxtaposition of the individual with the collective where the universal exploitative systems are challenged through pedagogical practices.

Thus, the concept of ecopedagogy provides us with the approaches, tools and essential questions of how we can negotiate environmental education, which was also applied in the development of the EcoStories project. The project follows the prominent definition by Misiaszek (2015) which can also be found in the developed glossary[4] for key terms, as following:

> Ecopedagogy represents the confluence of multiple and transdisciplinary educational traditions and methods and aims to:
> i.   promote affection, care, and respect for the natural and animal world through facilitating direct and sensorial experiences with place and engaging with fiction and art;
> ii. build upon students' local knowledge and values and acknowledge culturally diverse forms of knowledge, socio-environmental perspectives, and ways of being;
> iii. foster the affective, social, aesthetic, and ethical dimensions of the human being, necessary for developing environmental just societies, through creative, arts-based, and collaborative practices;
> iv. reveal the connections between human acts of environmental harm and social injustices (socio-environmental connections) and how they limit the possibilities for human and non-human others through critical frameworks;
> v.   promote social, ecological, and climate justice through imaginative practices and collective action. These methods include place-based and slow pedagogy, outdoor education, ecojustice, critical pedagogy, and arts-based education.

As a result, the backbone of the project lies in a critical pedagogy that engages with pressing, timely questions to which students can relate and through which they can perceive the interdependencies of the world.

Another critical dimension that adds to the ecopedagogical framework is the concept of Intersectional Environmentalism, introduced by Leah Thomas (2022). She defines this approach as one that recognizes that "social and environmental justice are

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4   One key objective was to develop an Eco-Storytelling Competency Framework. In the course of this, a glossary for the key terms used in the framework and the overall project was created to make the educational materials more accessible and clearer for educators and students alike. Ecopedagogy is a key term within this glossary and can be found here together with the framework: https://ecostories.org/competency-framework/.

intertwined" (2022, 39), highlighting the inseparability of ecological issues from structures of inequality such as race, gender, class, and colonial histories. Intersectional environmentalism builds on the long academic and activist legacies of Chicanx and Black environmentalism, which, since the 1960s, has urged us to view ecological violence through a multi-dimensional lens to unravel the colonial legacies and its unequal exploitation structures. As this period was marked by presenting a sharp distinction between human and nonhuman beings on the planet in the climate discourse, alternative approaches highlighted the importance of collective narratives of being in this world. This was also a reaction to the popular attempt of "zero population growth" which accused especially poor communities of color of causing ecological degradation. These limited perceptions caused rebellion to highlight how overconsuming elites benefit from the exploitation of the most vulnerable, who, in return, then suffer greatly from the caused climate crisis (Ontiveros 2013, 87-8). Hence, these voices have early on highlighted the intersecting dimensions of the climate crisis and formulated a distinct critique to viewing these power dynamics through an intersectional lens in order to move towards more just futures.

As a result, viewing the climate crisis through an intersectional lens, we move away from one-dimensional narratives and begin to understand how different communities are unevenly impacted by environmental degradation and exclusionary practices. This perspective urges educators to address not only ecological concerns but also the systemic injustices that shape how individuals and groups experience our current period of climate crisis. Thus, integrating intersectional environmentalism into pedagogical approaches helps teachers' commitment to inclusive, and critically engaged, education. Our proposed speculative Eco-Storytelling method aims at aligning and critically engaging with these principles.

3   The EcoStories International Teacher Training Program

At the beginning of 2025, our EcoStories team devised a teacher training program to introduce English teachers, pre-service teachers and interested university students at the partner institutions to the principles of ecopedagogy. Our aim was to create a community of practice keen on exploring the possibilities offered by climate fiction and digital eco-storytelling as critical ecopedagogical tools. The course was delivered in an online setting and engaged 37 participants in both synchronous activities (webinars) via Zoom and asynchronous activities (e.g., readings, forum discussions, reflective and creative activities) on Moodle. As a starting point,

these learning moments took the EcoStories competency framework[5] developed within the project. Developed as an interdisciplinary tool that outlines the values, attitudes, knowledge, and skills that educators should possess when integrating ecological principles into their classroom, the framework is far from being prescriptive. It combines principles from the Environmental Humanities, Literary Studies, Educational Linguistics, and Multilingual Education, and offers educators the opportunity to reflect on their beliefs and practice and identify possible areas of improvement. In designing the course, the framework allowed us to select both the contents and the learning structure necessary for creating a space of critical reflection and collegiality.

As for the contents, the course consisted of three modules. The first gave an introduction to ecopedagogy and critical literacy, highlighting the power of utopian and dystopian literature to discuss environmental issues. The students were introduced to concepts from literary and cultural studies on how to read climate fiction and carried out close readings of the short story "The Lighthouse Keeper" by Andrew Dana Hudson (2018) and designated chapters from the novel *The Marrow Thieves* by Chérie Dimaline (2017). The second module focused on CLIL (Content and Language Integrated Learning) methodology, showing participants how to simultaneously develop subject and language learning through diverse types of learning activities and strategies. Finally, the third and last module familiarised participants with the principles and process of Digital Storytelling as a method to imagine alternative eco-futures.

All three modules followed the same learning structure: readings and discussions thereof on Moodle (first week), followed by a synchronous webinar with a plenary presentation and group discussions and activities in the breakout rooms on Zoom (second week), and the completion and upload of the group activities on Moodle (third week). This variety of activities aimed at creating moments of connectivity, critical reflection, and dialogue possibly leading to a critical engagement with the intersecting dimensions of the climate crisis. In line with critical pedagogies, we used the alternation of readings, plenary lessons, and group/reflection/creative activities as an opportunity to discuss different perspectives and understandings, challenge existing knowledge, and critically analyse reality as regards to the entanglements between environmental and social injustices. In this way, we invited the participants to engage with

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[5] The EcoStories Competency Framework outlines the key competencies that English eco-teachers should possess and serves as a reflective tool for educators seeking to integrate ecological principles into their teaching practices and can be accessed here: www.ecostories.org/competency-framework/.

liberating and transgressive educational practices when addressing the climate crisis and to speculate about possible eco-futures through digital Eco-Storytelling.

4   Eco-Storytelling: Towards Speculative Futures

Following the principles of ecopedagogy, we propose Eco-Storytelling as a participatory experimental method for environmental humanities' classrooms (and beyond) to contribute digital stories to the climate change discourse. Eco-Storytelling combines the philosophies of digital storytelling and ecopedagogy. The digital storytelling movement, founded by Joe Lambert and Dana Atchely in the 1990s in San Francisco, is "rooted fundamentally in the notion of a democratized culture" (Lambert 2013, 26) with a focus on media justice and activism. Guided by "a strong belief in the power of shared stories" (Macleroy 2024, 134), digital storytelling is a narrative approach aimed at providing ordinary people with a platform to share their stories. Through their own narration and by using digital elements, such as photos and film clips, short multimedia clips are created (Poletti 2013; Macleroy, Shamsad 2020; Haring 2024). As a versatile method, digital storytelling provides the ideal terrain for our endeavour. It allowed us to create narratives of environmental entanglements and the climate crisis, which represents how Willox et al. (2012) have described digital storytelling located on the "nexus of research, community engagement, and narrative" (130).

Many recent digital storytelling projects have created stories about the environment and the climate crisis to which we would like to add our contributions as well, in the ongoing and so important discussions on how to imagine our being on this planet. Based on transformative pedagogies beyond strict curricula, disciplinary boundaries, institutional requirements, and even nation-state borders, digital storytelling provided the ideal outlet for our project to speculate how university students from three different cultural contexts envision the future. Ideally, digital storytelling invites the participants to present cross-disciplinary insights into how they view the climate crisis and the potential future scenarios for our planet.

Agreeing with Macleroy (2024, 135) that digital storytelling has the potential power to "expose hard truths and seek out solutions" for young adults by granting them the agency to be creative, use their voices, and create something in a specific moment in time, we are also aware of the limitations of the method. Evidently, there are the potential individualistic trajectories displaying romanticized and homogenous contributions to complex topics such as the climate crisis. Moreover, the creation of digital stories is always bound to the environment of the workshop and in relation to the input and

strategies proposed by the leaders of such workshops, which may result in a specific portrayal of reality triggered by the input the participants have received (Poletti 2011). Although our setting was above institutional and curricula boundaries, the participants were nevertheless university students and teachers, and the project was bound to these institutional settings and guided by the objectives proposed within our European research and educational project. Moreover, the limited time of engaging with the participants and the online setting further influenced the process and the outcome of the Eco-Storytelling workshop visible in the stories. Acknowledging these limitations does not entail that our approach failed ecopedagogical principles or transformative pedagogies, but rather strengthens our argument by reflecting on potential stimuli that led the students to their creations of speculative futures.

Markham (2021, 385) further explains that "although the capacity for imagining something new or different resides in all of us, the available material for any imaginative act is greatly influenced by prior imaginations". All of this relies on the understanding of a "social imaginary", which is carried "in images, stories, and legends" and which is shared by large cohorts of people resulting in the creation of a "common understanding which enables us to carry out the collective practices that make up our social life" (Markham 2021, 385. This social imaginary has the great potential to limit us in our imaginaries, as we are constantly facing the limits of our own experiences and realities (Bayne, Ross 2024). Markham has defined this as "discursive closure" which she outlines as following:

> Discursive closure focuses on how certain patterns of thought, talk, actions, or interactions tend to function like negative feedback loops in social ecologies, discouraging evolution and change. Focusing on how discourses are normalized or locked into repetitive loops helps specify how hegemony works in everyday practices. In systems of highly effective oppression or, what Gramsci labeled "control through consent", people shut down alternatives themselves, naturalizing problems as "just the way things are". (2021, 392)

Attempting to counteract these "discursive closures", creative speculative approaches may open up the possibilities to envision alternative scenarios that may or may not lay outside of our social hegemony. Acknowledging our collective limitation of imagination, prompts to stimulate our envisions of possible futures can be helpful tools.

Digital Eco-Storytelling was integrated in the final module of the teacher training program following the theoretical introduction of ecopedagogy, the literary engagement with two climate fictions, and

the CLIL methodology. Designed as an interdisciplinary training program in the broader field of the Environmental Humanities, the participants engaged with a variety of approaches in the weeks leading up to introduction of digital Eco-Storytelling. It can be viewed here as a distinct method for the participants to share their knowledge gained through the training program in a creative outlet. Additionally, the students read scholarly articles on digital storytelling which explained not only the technicalities of the method, but also the advantages and pitfalls it can entail. Within the online sessions then, the participants were formally introduced to the key factors of the method, its scholarly reception, and had the opportunity to collectively reflect on the acquired knowledge of the method. They also had time to brainstorm together to come up with topics for their individual eco-stories and also previously created digital eco-stories were shown to them to showcase how the format of the StoryCenter's digital storytelling looks like. Eventually, the participants received four different options for the content of their digital story to choose from.

Option 1 was to base their digital story on any climate fiction that the participants have read prior. They were invited to create a 2-4 minutes digital eco-story as a creative response to their reading by using their own narrative voice combined with personal photos/videos to bring their interpretation of the text to life.

Option 2 was to use one of the following prompts to create a 2-4 minutes digital eco-story which creatively explores life in an imagined future by also using personal photos/videos. Adapted from Andrea Richie's prompt in her book Practicing *New Worlds: Abolition and Emergent Strategies* (2023), we created the following two prompts:

1. Prompt
Imagine it's fifty years in the future, and climate justice movements have continued winning and advancing liberation and stopped the climate crisis. What would your life be like? What would your everyday routine be? You could write out your daily schedule, you could write a journal entry from the year 2074. You could write a letter to a loved one talking about the changes that have occurred over your life. You can be as creative as you like and feel free to use any of your languages.

2. Prompt
Imagine nothing changes in terms of a climate-just future. Big cooperates keep destroying the planet and exploiting marginalized groups, border regimes keep growing, political parties keep denying the climate crisis, inequalities keep growing, and biocultural diversity keeps dying. How would our world look like in 50 years? What would your life be like? What would your everyday

routine be? You could write out your daily schedule, you could write a journal entry from the year 2074. You could write a letter to a loved one talking about the changes that have occurred over your life. You can be as creative as you like and feel free to use any of your languages.

The two prompts play with the popular binary envisioning of utopian and dystopian futures. This was purposefully chosen to rely on societal strategies of oppositional thinking that enables the participants to follow a distinct pattern at the beginning of their creative process which eventually may lead to a final product that blurs the lines of these dichotomies and allows an interpretation of the ambivalent notions within their speculative futures.

Option 3 was an invitation for the future teachers in the program to create a 2-4 minutes digital eco-story useful for a future ecopedagogical classroom setting where they could introduce, explain, or explore any environmental topic in an engaging and transgressive way for a CLIL or environmental educational context. Here the focus was on including accurate content, clear language paired with a personal creative touch by using their own voice and visual elements, such as images, videos, or drawings.

Lastly, option 4 invited the participants to freely follow their own ideas in the creation of their digital eco-story as a means to overthrow any restrictive instructions for the ones who like to creatively explore this method.

As our digital Eco-Storytelling method enables a flow of creativity, these options are seen solely as a guidance that may help some to start their creative process, whereas others do not need it at all. Thus, this follows transgressive pedagogical principles of aiming at offering an array of methods to cater to the diverse needs of the people involved in the educational process. The digital stories were created independently and individually in the upcoming week; and eventually, the stories were shared with the group and watched in a community online event at the end of the project to collectively enjoy the produced stories. Consistent with our approach, the majority of the created stories used the two fictional prompts as a starting point in their brainstorming part for the digital story but then relied more on sharing personal experiences; and by doing so, creating their own blur of dystopian and utopian futures.

5 Digital Eco-Stories as Speculative Futures: A Critical Narrative Analysis of *Living Lichen*

The international teacher training program resulted in the creation of 28 digital Eco-Stories. The stories featured the participants' personal narrations in the form of voiceovers combined with personal photos, (stock) images, short videoclips, and, in some cases, music, resulting in 2-5 minutes multimedia clips following the principles of digital storytelling from the StoryCenter (Lambert 2013). The content of the stories differed vastly and presented a variety of topics and themes widely related to the overall questions of environmental entanglements and climate crisis. Purposefully, the instructions and the overall topic for the creation of the digital stories was kept open for the participants to choose for themselves and to see the input of the teacher training program prior to the storytelling as stimuli. This was a conscious methodological decision based on principles of the StoryCenter's digital storytelling approach and to remain faithful to the aim of creative speculations. As a result, some stories focused on the participants' personal entanglements with the environment, such as sharing experiences with environmental pollution and its consequences on the natural world, and their encounters with climate degradation in their everyday lives that made them critically re-think personal practices and systemic structures. Other stories engaged with general questions such as 'Where does a plastic bottle end up when it's thrown out?'. Again, other stories were more creative attempts where the narrators switched their viewpoints to the perspectives of animals to imagine how they see the world. Finally, some participants followed the creative prompts more closely and shared their vision of the future.

Arguably, all digital stories aim at negotiating different futures both on the individual and collective level by challenging not only personal behaviours but also structural circumstances that enable the current vast anthropocentric exploitation of the planet. Different temporalities are negotiated through personal experiences in various spaces and places that highlight also the international character of the project's participants whilst at the same time viewing a shared Europeanness. However, specifically these shared ideals can be interpreted as being built on a set of assumptions when it comes to the future, which predominantly focus on *personal* behavioural changes rather than on radical systemic changes. This again represents how human interaction with nonhumans and the planet as a whole relies heavily on capitalist mindsets which limit radical and transgressive futures built on true equality and social justice; a typical trait of late-modernity mindsets in Europe and the rest of the so-called Western world (Vergés 2024). Additionally, the method of digital storytelling encourages an individualistic engagement with topics

as the focus lies on connecting personal experiences and memories with general topics. On the one hand, this aspect of the method can be seen as an advantage to juxtapose individual stories with collective narratives. On the other hand, the danger remains to use yet another method in educational settings that overlooks the greater picture and opts for personal and individual solutions to global problems.

Keeping these ambivalent trajectories of digital Eco-Storytelling in mind, we will engage with one digital story here to unravel the speculative futures the method invites. To do so, we follow Haring's (2025) critical narrative analysis approach which was developed for reading digital stories as texts. Crucial for this reading is the awareness that digital stories are produced in a certain moment in time bound to the environment and setting where the workshop was carried out. As a result, "a critical narrative analysis juxtaposes the individual with the collective [...] whilst acknowledging the time and place where the stories were created to engage critically with cultural narratives that accompanied this creation" (Haring 2025, 146-74). Hence, for our specific context of the digital eco-story production, the common European focus on human interaction on the planet, personal behavioral changes, as well as the limited ability to imagine anything beyond our petro-bound being, are central narratives influencing the process and further "discursive closures" (Markham 2021). Yet, through a critical narrative analysis of digital eco-stories we hope to unravel potentials for radical imagination and speculative futures to also resist reading the stories superficially but look for the contradictions within them to highlight the potential of speculating about eco-futures.

The digital eco-story called *Living Lichen*[6] by Sophie Le Bihan Daubigney is a prime example for our endeavour as it encourages viewers to imagine ecological and social futures by learning from lichens found in Venice, a non-human life form which is "a fusion of both algae and fungi" (0:01′05″-0:01′07″). We see this particular digital story as a successful experiment of transcending the possible individualistic limitations of digital storytelling pointing towards unthought narratives of environmental entanglements by using lichen in Venice as the main actor in the story. Set on a rocky boat, the story takes the reader on a ride through the waters of the Venice canal **[fig. 1]**, "a symbolic site of fusion between land and water, fresh waters and salt waters" (0:00′9″-0:00′14″), where lichen live. The listeners are virtually taking on this ride by the use of moving images and experiencing the movement of the boat in order to explore how

6 The digital story *Living Lichen* (2025) by Sophie Le Bihan Daubigney can be viewed here: https://www.youtube.com/watch?v=g9LBdp_ZWpU&feature=youtu.be.

these organisms can represent a blurring of "what it means to be an individual" (0:01′00″-0:01′03″).

Figure 1   Screenshot of the digital story *Living Lichen* (2025) by Sophie Le Bihan Daubigney

The narrator invites us on a journey of blurring ecological knowledge with their imaginative attempt of showing how lichen may represent an entity from which anthropocentric approaches to the climate crisis can learn from, when they explain that the fusion lichen consists of is called a "mutualistic symbiosis where both parties contribute to keeping the other alive" (0:01′14″-0:01′18″). To show their scientific knowledge about this organism and at the same time guiding us towards the overall meaning of lichen in the story, a detailed explanation of how the two organisms, algae and fungus, work independently and eventually contribute to each other to create lichen, is given:

> The algae partner is a collection of single cells and is a primary producer, or what is known as an autotroph, meaning that it can make its own food through photosynthesis. However, algae can only photosynthesize when it is moist and has no way of protecting itself from drying out. Fungus, on the other hand, is a heterotroph, which means that it cannot make its own food, unlike algae. But fungus can subsist on carbon harvested by others, dissolving matters and liberating its minerals. Fungus then relies on algae for sugars from photosynthesis, while algae rely on the fungus to maintain moisture levels in order to stay alive. (0:01′19″-0:02′04″)

As a metaphor for collaboration and collectivity, the author claims that lichen can be seen as prime examples of "how to relate to people,

problems, and places as we face the prospect of climate change" (0:00′32″-0:00′36″). Thus, lichen **[fig. 2]** is thought of as an amplifier for future temporalities from which humans can learn to highlight the interconnectedness between all organisms.

Figure 2   Screenshot of the digital story *Living Lichen* (2025) by Sophie Le Bihan Daubigney

By scientifically explaining its components and the roles thereof, the narrator shows how different contributions can create an alternative whole by relying on each other's potentialities and strengths; or as the author of the digital story states:

> Lichen shows us that there is a way to find variety in alternatives, alternative relationships that are based on reciprocity and not extractivism. Lichens show us that this bond is more long-lasting, more meaningful, more creative than any quick techno-fix could be ever guaranteed. (00:02′18″-0:02′42″)

Thus, the story highlights that ecological understanding cannot be separated from societal structures and collective human-nonhuman interdependencies. As a result, anthropocentric and extractive approaches to social and environmental relationships are challenged. Through its narrative, the digital eco-story engages viewers in speculating about possible futures by illustrating how humans might learn from other life forms and possibly rethink current rather strict divides of humans and nonhumans. This attempt also shows how ecological imagination can inspire alternative ways of relating and coexisting in this world by highlighting reciprocity and resistance. Finally, it attempts to challenge our collective "discursive closures" (Markham 2021) by reading this fusion organism within the broader

context of the environmental crisis and metaphorically uses it to guide the listeners towards challenging their own anthropocentric perception of our future on the planet. Shifting the focus of only learning from humans on how to save the planet, to look to nonhumans for solutions, aligns with what Donna Haraway calls "multi-species storytelling" (2016) as a promising opportunity to change the direction in the climate crisis. Thus, the story can be read as a potential invitation to speculate about the future by not only changing our human-centered viewpoints, but to attempt to learn from more-than-humans and translate their strategies and processes into solutions for all beings.

6 Conclusion

Digital Eco-Storytelling aims to follow Hill's (2010) urge to view digital storytelling as a media making process resulting in a production of a text which always demands an investigation of the power dynamics, as well as historical, cultural and social contexts. As Poletti (2011, 77) has rightly pointed out, "stories are often told in the service of relationships" where our role as workshop leaders and the context of the presented teacher training program here play significant roles in how the storytelling process unfolds. Being aware that digital storytelling is also not an "unmediated and direct window on life experiences" (Davis 2011, 528) as it is always influenced by negotiations of technology, institutional and cross-cultural mediation, we view the process of Eco-Storytelling and its outcomes in the form of digital stories as yet another optimistic but flawed approach of doing participatory research in light of current global crisis. However, following feminist media studies and transgressive pedagogies, we believe that the acknowledgement and the awareness of these limitations can also be seen as the potential of our proposed method and an invitation to continuously reflect on our positionality to challenge our own research principles, pedagogies, and personal engagements within the classroom and with our communities at large. It is our constant attempt to contribute to the great urge of creating scholarship that, as Byne and Ross (2024, 16) have adequately put it, "connects our desire for better futures to the colonising, extractive, oppressive and ecocidal models of social organisation that constitute our past".

The case study of the created digital eco-story *Living Lichen* shows a successful experiment of how digital storytelling can provide the tools to speculate about alternative futures where human and nonhuman boundaries are blurred, mainstream knowledge production is challenged, and hopeful scenarios of our being on the planet are created. Linking scientific knowledge with personal

encounters, *Living Lichen* has proven to be a speculative eco-story representing the potential of the method for any Environmental Humanities classroom in Europe. Hence, Eco-Storytelling can be viewed as an imperfect but ambitious approach to tackling "the crisis of the imagination" (Ghosh 2016) and "discursive closures" (Markham 2021). It allows to create "stories, visions, and actions that work quietly towards a more hopeful future" (Mauch 2019, 20), which are necessary for bringing about change.

Acknowledgements

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Relations and Difference: Teaching the Human and More-than-Human Ecologies in Germany

Pooja Nayak
Ludwig Maximilian University of Munich, Germany

Abstract   When the world churns with injustices, what possibilities emerge in thinking across multispecies relations? Grounded in multidisciplinary encounters with ice, octopuses, and farmers who graze goats in lethal landscapes, among others, this article draws on my experiences of teaching the Human and More-than-Human Ecologies course at the Ludwig-Maximilians-University in Munich. The article proposes that engaging with irreducible lifeworlds in the thickness of their structural inequalities might 1) help build the interpretive skills to assess dominant environmentalisms, and 2) cultivate an open orientation towards the world in all its horror and wonder.

Keywords   Humans. More-than-human ecologies. Action. Ambivalence. Ethnography. Relations. Difference. Ethics. Wonder. Liberal environmentalisms.

Summary   1 Introduction: Three Moments. – 2 Trajectory. – 3 Contexts and Goals. – 4 Engagement. – 5 Conclusions: Thinking with Relations and Difference.

1 Introduction: Three Moments

August 2023. I decided to begin the new course with one of my favourite essays: the philosopher Amia Srinivasan's book review essay on octopus cognition and embodiment. "Like humans", Srinivasan (2017) writes, "they [octopuses] have a centralised nervous system, but in their case, there is no clear distinction between the brain and body". A few lines in we learn that "an octopus's neurons are dispersed all over its body". Throughout, Srinivasan's essay conveys tantalising, existential asides about octopus preferences, that they "can recognise individual humans", or that an individual octopus disliked being given squid as food. These observations, in the vein of Thomas Nagel's (1974) meditations on bats, push us to imagine "what it's like to be…" a creature whose wilful subjectivity – from pelting enemies with jets of water to escaping tanks and being capable of deception – abounds in its popular encounters with human observers?

September 2023. On my way to Munich for the first time, bioluminescent waves and fantastical anemones swirled on HD screens during a stop-over in Qatar airport. I whipped out my phone to record the slow pulsing of the ocean and sounds of birdsong as jet-lagged travellers stretched out on the fake grass in the airconditioned cool. On descent and take-off, a desiccated landscape was visible in the distance. I made a note to ask my future students: was this setting a more-than-human ecology?

October 2023. A week into the start of the first semester, another phase in Israel's destruction of Gaza began following the attack by Hamas. The period since has been characterized by orchestrated famines, targeted violence, and the widescale displacement of people, and loss of lives. The United States and Germany have been two of the biggest arms exporters to Israel since October 2023 (Blackburn 2025).

As I write in November 2025, I often wonder what it means to teach the environmental humanities and to encourage intellectual enquiry when the world continues to churn with ever-proliferating injustices, and when universities in Europe and elsewhere are sites of struggles for critical thought and human rights. The global power relations embedded in racism and in the logics of capitalism continue to show how environments are not a neutral site nor an accidental casualty (Braverman 2021). They are the very site of violence against humans and more-than-humans, whether in the form of Gaza's war rubble that might take more than fifteen years to clear (Burke 2024), in the militarized attacks on key ecosystems in Ukraine (Richardson 2023) and in Sudan where a civil war, supported by the United Arab Emirates' interest in the country's natural resources, has been raging since April 2023 (Wintour 2025; Conflict and Environment Observatory 2025).

Amid these such difficult global circumstances, might reckoning with (other) humans and more-than-humans offer possibilities for challenging depoliticised and seemingly neutral environmental frameworks and discourses? Reflecting on the epistemological goals of the Human and More-than-Human Ecologies core course, I suggest sustained critical reflections are crucial for recognizing forms of insidious, liberal, and heartening environmentalisms, and to foster spaces committed to informed dialogue and thought experiments. Taught as part of the module on Critical Perspectives in the M.A. in Environment and Society programme at the Rachel Carson Center, Ludwig-Maximilians-Universität (LMU) Munich in Germany, the course draws on ethnography, history, critical theory, fiction, essays, and audiovisual materials to engage with environmental topics as they intersect with varied spaces, senses, relations, ethics, and futures.

2 Trajectory

The origin story of the environmental humanities as a field marked by cross-disciplinary conversations and methods is well-rehearsed. As twenty-one scholars across disciplines co-authored in their piece on teaching the environmental humanities, the impetus was to craft diverse ways of knowing and thinking about environment and society outside the "atomised science-based responses to environmental dilemmas" (O'Gorman et al. 2019, 429). In a broad sense then, scholars working in the environmental humanities have sought to eschew the normative separations between 'nature' and 'culture' by refracting the 'environment' discursively through humanistic, historical, and social science lenses.

In their expansive review on the rise of more-than-human discourses in the past decade, Emily O'Gorman and Andrea Gaynor (2020, 713) argue that such analyses are increasingly concerned with the co-constitution of relations, attending to diverse species/voices, and grappling with situated politics and ethics. If earlier accounts of multispecies encounters focused on troubling Enlightenment-led categorizations of the world (nature/culture, animal/human/plant/machine), and delineated accounts which challenged human mastery (Haraway 2008; Mitchell 2002), contemporary writings have sought to destabilise the very grounds on which questions of how to live and who can live are asked and answered.

The latter approach has taken the form of, for instance, focus on the "links between species, race, and transnational power structures" via postcolonial studies (Ahuja 2009); shown how humans have been racialised and excluded from Enlightenment's construction of reason in the first place via critical race studies (Jackson 2013); rearticulated

human-animal relationships, despite dehumanising structures, in terms of Black ecologies (Bennett 2020); called for rethinking aspects of subjectivity and agency in relation to plants, animals, and organisms such as microbes and fungi (Kirksey, Helmreich 2010); and foregrounded the disturbing extinctions of biodiverse lifeforms and biocultures (Rose, Van Dooren, Chrulew 2017, 7). Scholars have also observed how animals, such as meerkats, produce their own intra-species differences (Candea 2010); analysed relations, emotions, landscapes, and more-than-human beings in the context of late industrial formations (Tsing 2015; Blanchette 2020; Chao 2022); envisioned an expansive sense of ethics and justice related to water bodies, plants, and animals (Todd 2014; Chao, Bolender, Kirksey 2022); and highlighted the interrelations of alt-right meme cultures and "sex panics" (Boast 2022). More recently, scholars have reflected on anti-colonial research and knowledge practices to reframe accounts of pollution within ecologies (Liboiron 2021) and reckoned with how eco-fascist and settler-colonial discourses (re)produce harms when landscapes and more-than-humans are valorised at the expense of vulnerable humans (Bhan, Govindrajan 2024).

Human and more-than-human discourses also permeate the contemporary geopolitical moment. In a blog post titled "Animals, STS, and the problem of humanity in Gaza", the STS scholar Sophia Stamatoupolous-Robbins (2024) emphasizes that thinking about the non-human or more-than-human agency "is not essentially redemptive". Specifically, she argues, non-human discourse often centres "the environment" to evade politics which ignore the extent of dehumanisation despite the "Israeli state policies that kill and maim Palestinians, that destroy Palestinian infrastructures and that displace and dispossess them".[1]

Against this backdrop, the discourses and concerns which animate the human and more-than-human ecologies become salient for wider conversations on how seemingly neutral concepts and terminology serve to obfuscate violent relations. Attending to the specifics of human and more-than-human ecologies offers opportunities for a cross-cultural education beyond relativism and challenges liberal forms of environmentalisms to counter the dehumanisation of people and cultures.

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[1] Further, specifically in reference to discourses around Palestine in Germany, scholars have also called attention to how the school system, media, and political and administrative class punishes and censors solidarity with Palestine even as these systems promotes liberal ideals of academic freedom (Younes, Al-Taher 2024; Thompson, Tuzcu 2024).

3   Contexts and Goals

The M.A. in Environment and Society programme is listed as an interdisciplinary course in the university's course offerings on sustainability. In their applications to the programme, students often reference Germany as a 'leader' in the field of climate and sustainable policy, and as one of the reasons they are drawn to doing the programme in the country. This reputation is mirrored in writings by political scientists and analysts who attribute Germany's position as a 'trendsetter' in climate governance in the European Union to numerous structural, political, and economic factors since the late 1990s.

Some reasons cited are the presence of a strong Green Party in the country, the consensus across different coalition governments to promote policies of 'ecological modernization' and 'ecological industrial policy', and a shift in the country's energy policy from nuclear energy to renewables which resulted in Germany exceeding its Kyoto target of 21% reduction in Greenhouse gases in 2007 (Jänicke 2011, 129). Others argue that despite the shift in the country's energy policy from nuclear fuels to renewables, and a federal system which has enabled a "coordinated approach to climate policymaking across and between different tiers of governance", a closer look at the subnational picture reveals more complexity across the states in their adaptation approaches (Eckersley et al. 2023, 168). Thus, in a self-selecting way, even as the German and international students in the M.A. come from a range of disciplinary backgrounds,[2] they articulate shared concerns around issues of sustainability and climate-related concerns.

The differences lie in their understandings of environmental histories and cultures, and the expectations they bring to bear on the environmental humanities classroom. For instance, in our conversations in two semesters, some expressed an interest in learning about environmental discourses and preparation for a potential career in an environmental field, others sought to put our discussions in conversation with global events, some articulated a restlessness with reading and writing as a meaningful way to reckon with 'crises', some envisioned the classroom as a space that ought to generate 'solutions'. Variously, they sought examples of "hope", "pragmatism", "realism" and/or expressed feelings of hopelessness in response to having read and analysed how structural relations

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2   Students in the M.A. programme come from a wide range of backgrounds, including literary studies, biochemistry, sociology, history, art, business, gender studies, food and nutrition, psychology, geography, media studies, neuroscience, and computer science, among others.

(such as, political economy; colonialism; corporate profit; resource struggles; militarism; exploitation etc.) exacerbate environmental concerns.

In response to similar student responses in the environmental humanities classroom in the United States, literary scholar Caroline Levine (2023, xi) advocates that the "aesthetic humanities" ought to do more than rehearse their (literary) "moves" by offering a "space of collective action" which operates "between dreams of a total global revolution and the small-scale act or gesture". Addressed perhaps to the American literary studies reader, Levine offers examples of collectives and social movements which have organised to meet (human) survival needs such as food, housing, and shelter. Learning from existing movements which organise for transformation is a valuable exercise, as such pedagogical approaches might go beyond "damage-centered research" to help reimagine ideas of change (Tuck 2009).

Yet, using 'actions' as uncomplicated inspirations to enact even ostensibly progressive environmental goals can be misleading when such actions are delinked from the ideological forces they draw from. For instance, Levine (2023, 77-9) cites the example of Zero Budget Natural Farming (ZBNF) and Subhash Palekar's work in India as an example of a "grassroots movement" which offers alternatives to the corporate-dominated agriculture in distressed rural areas. On one hand, the ZBNF practices work towards building systems of food production and cultivation with farmers, by implementing seed saving, soil care and regeneration, and fermentation techniques. On the other, Palekar's advocation of ZBNF relies on tropes of the Hindu Right, promotes bionativism through the 'native' cow, and considers forests as "model nature" that ought to be mimicked (Münster 2021, 314; Flachs 2021).[3]

Could narratives of desirable environmental action be complicated, and to what ends? As scholars have shown in their ethnographies of activism and movement building (Davé 2023; Graeber 2002), reflections on ambiguities – which inform, accompany, and problematize actions – can be productive sites of inquiry. For instance, to cite an example from my ethnographic research in the post-extraction Kudremukh region in southern India, the celebration of eco-tourism by some residents often disguises that the benefits are mainly accrued by upper-caste landowners who have access to property and the capital to make significant investments in constructing homestays, even as the region's small-scale and

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3 Anthropologists have analyzed the Zero Budget Natural Farming as an "ambivalent" proposition since "politically reactionary, economically naïve, and ecologically progressive traits cohabit in this movement" (Münster 2018, 760).

marginalized landowners find it challenging to partake in such a model (Nayak 2022). Environmental actions/solutions, as the above examples show, can be utilised tactically to serve dominant interests.

An important goal for the Human and More-than-Human Ecologies course therefore has been to depart from the simple opposition of ideas and actions/practices by examining ambiguities in the specifics of their locations and via empirically informed case studies. Towards this end, I suggest that the classroom space focused on reading, thinking, and practicing expressing one's positions with the goal of learning and dialogue might be one among numerous reflective ways to build tolerance for ambiguities and their implications.

Overall, the course's learning objectives are framed through open-ended questions: how, and when do the human and more-than-human relations emerge as a distinct conceptual field in the environmental humanities? How do contemporary case studies modify existing and popular debates about nature/culture/ecologies, and how have these debates shifted through time? How do we analyse these relations in specifics of place, history, emotion, politics, power, economy and culture? What methods have been developed by humans to study multispecies relations, and what are their limits and affordances? Over a period of fifteen weeks, these questions subtend five overlapping topical themes to focus on conceptual relationships which structure the world.

In *Toolkit*, the first organizing theme (followed by *Spaces*, *Senses*, *Relations*, and *Futures*), we examine the topic's development diachronically. Given the interdisciplinary background of the students, these sessions are concerned with staging a ground for the seminar's future conversations–for instance, how nature/culture debates shifted since the 1980s to the early 2000s, and how historians have reckoned with multispecies relations in the past. The weeks in *Spaces* foreground thinking with landscapes and environments within which multispecies relations play out, such as in the context of war ecologies, and in the ocean and sky; *Senses* focuses on multispecies sounds, such as that of yeast, and on emotions like love and grief; *Relations* grapples with aspects of kinship, gender, economy, race, religion, rural-urban relations; *Futures* lurches between conditions of toxicity, future-making, and the ethics of living amid contemporary crises.

The selection of readings is not exhaustive, and choosing the above five broad topical themes allows for a dynamic syllabus, in that I occasionally change up the readings depending on in-class discussions. The thematic approach also allows for pairing readings situated in different places and worldviews to encourage a comparative and interpretive approach, such as on goats in Uttarakhand (Govindrajan 2015) and fish in the Paulatuuq in Arctic Canada in a week on Kinship (Todd 2014), and on meerkats in the

Kalahari (Candea 2010) and multispecies mourning in West Papua (Chao 2022) in a week on Emotions.

In the week on Multispecies Histories, for example, I paired the historian Tamara Fernando's "Seeing like a Sea" with Etienne Benson's "What was an Environment?" (2021) and Clapperton Mavhunga's "Zvipukanana: Tiny Animals with No Bones" (2024). Fernando's (2022) article opens with a description of a white-tip reef shark in 1801 making its way through the sea grass in the Gulf of Mannar looking for rays and oysters. At the same time, "with no electroreceptors comparable to those of sharks or rays", Fernando writes, a fishing collective was also on search for oysters. In seeing sharks and humans as agents in search of oysters, each using different kinds of tools and expertise, Fernando's article "inverts our perspective to the sea-or ocean-floor" (2022, 128-9) to provide a multispecies history of the Ceylon pearl fishery. The article helped us track how multispecies ecologies are shaped by different scales: of world events, such as globalization, imperialism, colonial violence, slavery; of sea water dynamics, ocean life, and mollusc responses to stimuli and temperature; of the expertise and caste-knowledge of Tamil Parava fishermen, which in turn help us view them as agents in colonial pearl fisheries system.

In the same session, in addition to multispecies histories of place, a text might also work to expose the role of language and the process of reading itself. Mavhunga's (2024) article on the *zvipukanana* (tiny animal with no bones) tracks concepts which have come to reference insects, and which derive from *kurarama* (lived experience), *tsumo* (wisdoms or proverbs), and *zvirahwe* (riddles). Alongside seeing how biological life is embedded in *dvizhimbabwe* "cultures of knowing", the piece interrupted skimming since the author foregrounds the Zimbabwean terminologies throughout, followed by their English translations. Benson's (2021) "What was the Environment?" examines how different variations of the 'environment' as a concept, emerged as a site of knowledge and practice beginning with the late eighteenth century in the Western world. Collectively, the pieces worked to throw critical light on how concepts are materialised in the relations between multispecies life, ecologies, and languages before the contemporary moment, and outside of strictly Anglophone discourses.

4   Engagement

In *Teaching to Transgress*, bell hooks contends that excitement about ideas alone are not enough to generate a meaningful learning process in the classroom, which can only take place from collective effort and "in recognizing other's presence" (1994, 8). To create such a space of effort, I prefer to structure classes by 1) drawing on collaborative reading practices,[4] which includes group work and reflective exercises, and 2) using transdisciplinary materials, including multimedia. Utilising a wide range of materials and a mix of genres – from academic writings published in journals, films, digital storytelling, audio, and fiction – encourages accessibility and offers alternative forays into key topics. Furthermore, the multimodal materials encourage students to go beyond representations of fact and evidence towards thinking broadly with experimentations with senses and abstractions (Welcome, Thomas 2021).

Over time, as I came to learn that reducing the number of assigned readings leads to better discussions, I typically included two readings, or paired the reading with multimedia materials each seminar. Students were asked to prepare brief responses of not more than two-three sentences to at least one reading or multimedia material, and post their contributions on the course discussion board. Students therefore were able to view how their peers engaged with the week's topic, often citing these as particularly valuable for their learning during the anonymous course feedback. The responses also helped structure our seminar time as I clustered them by similarity, and offered a short contextualization of the readings in relation to the week's thematic focus.

For instance, in the module on *Senses*, I drew the students' attention to *Singing Ice*, a book of Ladakhi folksongs about the Himalayan mountains, glaciers, rivers, and streams. Prepared by Morup Namgyal, a folksinger and song collector, in collaboration with researchers and translators, the songbook emerges from the "urgency to preserve and share the environmental knowledge embedded in materials".[5] The songs – written in Ladakhi which uses the Tibetan script, and transliterated and translated into English – captures the sounds of ice, water, glaciers in their movements and sensations, with spiritual and place-based references. Namgyal and other community

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4 I thank Kaushik Ramu for this phrase.

5 *Singing Ice: Ladakhi Folk Songs About Mountains, Glaciers, Rivers, and Steams* (2022). Alongside Namgyal, the researchers, translators, and illustrators who worked on the songbook are mentioned on the webpage, which can be accessed at `https://susanschuppli.com/SINGING-ICE-1`. The website also contains snippets of a video interview with Morup Namgyal and of collective singing workshops in 2022 and 2023.

members also organise singing workshops to collectively remember and memorialise this local knowledge.

The book is one fragment of artist-researcher Susan Schuppli's multimedia project *Learning from Ice* (2019-22), which combines scientific and local knowledge from different global contexts to understand the impacts of climate change on glaciers.[6] Each sub-project deals with layered relations around ice: from the decades of scientific knowledge mobilised to interpret its behaviour to how knowledge-making can be the site of geopolitics; the politics of cold and its relation to human rights violations and claims for environmental justice; forced migrations due to glacial recession and water scarcity, and the use of historical and Indigenous knowledges with engineering techniques to create artificial glaciers in the form of 'ice-stupas' in the Ladakh region. The films, archival clips, audio recordings, text, and photographs not only help reimagine the banal ice but also make visible the artistic, scientific, historical, legal and local knowledge practices which intersect with the ice as material in a melting and warming world.

I assign *Learning from Ice* in the weeks on Senses, alongside Sophia Roosth's article on 'Screaming Yeast' (2009) which is a close historical reading of sonocytology, a technique used by scientists to record, amplify, and analyse the intracellular vibrations of yeast cells. In the discussion forum, student responses ranged from reflections on the sounds themselves[7]

> I don't know what kind of sound it (ice) makes when it is not moved/ modified by something else. For example, we see in the videos that the ice is melting so we hear the sound of water, then we see a boat going through sea ice and we hear the ice breaking against it. So the ice actually does many sounds, in correlation with different agents.

to imagining a wider role for sensory knowledge

> [...] the sensory experience of something draws our attention to the vulnerability of organisms or habitats [...] We start to make and feel new connections and can learn to understand our surroundings.

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6 I first came across the *Learning from Ice* project through *Gondwana* (2022), a video installation exhibited at the Kochi Biennale 2022-23, curated by Shubigi Rao. *Learning from Ice* (2019-22) is available at https://susanschuppli.com/LISTENING-TO-ICE.

7 The following responses are cited with student permission and are anonymized to protect privacy. Thank you to the students for letting me include their insights.

and wondering about the role of interdisciplinary methodology for environmental justice goals:

> [...] is it more for the pleasure of the creative process? [...] (I) thought how much yet has to be worked on in terms of environmental justice for the big layer of communities living in glaciers-borderline areas in the next decades.

A student who read both 'Screaming Yeast' and the sub-project 'Listening to Ice' reflected on sound and its relation to empathy via tensions of relation and alterity:

> Is the capacity to produce sound sufficient to provoke an empathic response? I am thinking of Descartes who dissected live animals and called their screams just the workings of the machine. Is empathy evoked if we choose to focus on the ways another entity is similar to us? Does something need to be similar to us to deserve our concern? Is that the opposite of "othering"?

Thinking with materials such as yeast and ice offer compelling entry points into wider discussions of how the study of sounds has a long history in ecological and ethnological studies. The session also offers a chance to dispel ideas that sonic methods are, as one student put it, an "avant-garde method of knowledge production", by showing how the study of sound galvanized different fields and movements in the early 20th century (Sterne 2022, 2) and that the health of habitats and ecosystems have long been measured through mapping their acoustic diversity (Farina, Gage 2017).

5 Conclusions: Thinking with Relations and Difference

I close with three propositions for thinking with and across relations and differences.

One, insisting on specificities allows us to reflect on lived experiences from the mundane to the existential, of life amid war or song amid glacier recessions, of octopus dramas and desires, and the untranslatable and destructive, to name a few. For instance, in one of the weeks on *Spaces*, the seminar engages with Munira Khayyat's (2022) ethnography in South Lebanon's borderlands, subjected to ongoing war, where farmers continue to grow tobacco and graze goats in landscapes that contain unexploded mines. As a hardy dryland crop, tobacco grows in the rocky landscape and is a state commodity which "feeds the poor and serves vested interests". Similarly, goats are inexpensive to raise, and can "usually walk over explosives without triggering them" (Khayyat 2022, 189-90). Khayyat

insists these difficult, yet life-sustaining practices framed by the violence of war are forms of "resistant ecologies". Initially, some expressed being uncomfortable in thinking of war, a destructive force, as creating any form of "resistant ecology". In one class, a student returned to the article to re-read aloud the lines where Khayyat insisted on resistance and the vital dimensions of living and working in war even as she recognised "war as a violent event": one of her interlocutors had characterised it as "fighting for a livable life in an unlivable world is *muqawama* (resistance)" (Khayyat 2022, 183). Attending to how individuals theorise their life from a place of impossibility and in relation to political economy focuses our attention on the material effort of living and subsistence, and how these are tied to a deep knowledge of landscapes even amidst war.

Two, in encountering diverse types of humans, animals, plants, insects, molluscs, fungi, and non-life via the case studies, we necessarily must suspend our certainty about basic categories – life, death, time, ethics, value, play, beauty, future, humour, bodies, emotions, war, love, kin, even ecology – towards wrestling with how such representations are shaped by relations of power and the politics of location (Al-Bulushi, Ghosh, Tahir 2020). For instance, in the current iteration of the course, alongside the visuals of Qatar airport referenced at the start, I showed students images of a post-industrial site overgrown with weeds, an oil rig in the ocean, and a bird in flight between skyscrapers, to ask if they thought of these as 'ecologies'. This elicited the following responses: that since the concept was borrowed from the natural sciences, 'ecology' ought to mean some feedback between organisms and environments; that 'ecologies' necessarily encompassed a variety of environments and relations; that since oil rigs or buildings were "artificial" one couldn't refer to them as 'ecologies', while some also felt that since built infrastructures were often sought by non-humans for shelter or life, these too constituted 'ecologies' in a sense. Parsing shared analytical vocabularies (and their dissonances) across disciplinary boundaries, as ecologists and social scientists suggest, can be crucial in seeing how social and biophysical processes co-constitute one another (Rademacher, Cadenasso, Pickett 2023).[8]

Third, in these efforts of engaging with the material histories, imaginative registers, and cultural practices across places and scales, students learn to bridge the classroom and the world via existential

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[8] The authors write that "plural ecologies and the singularized science of ecology share some essential epistemological aspirations, if not actual methodological ground, in contemporary practice" (Rademacher et al. 2023, 130-1).

and environmental lines of enquiry.[9] In doing so, the point is not so much that we will have infallible answers to our questions or will have achieved justice once we begin the task of inquiry. Perhaps the point is that staging repeated encounters with irreducible lifeworlds in the thickness of their structural differences might help cultivate an open and inclusive orientation towards the world in all its horror and wonder.

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9 While pedagogical efforts are not uniform in their effects, the anonymous course feedback at the end of the semester offered some clues. Students "appreciated the selection of themes and texts" and the "non-European and non-American examples", mentioned the collaborative reading responses and discussions as spaces where they felt "free, welcomed and encouraged", and felt the readings "broadened horizons and perspectives".

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Sounding Carbon Ruins: Speculative Design for Climate Futures

Graeme Macdonald
University of Warwick, UK

Jonathan Skinner
University of Warwick, UK

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!

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.

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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.

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?

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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

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

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

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.

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

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[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

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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.

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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 constelled 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

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9 See for example Rinkinen, Jalas, Shove 2015.

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-focused – 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

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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.

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

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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

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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.

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

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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.

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.

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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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Preservation by Record of Ireland's Shell Middens: Citizen Science Practice and Pedagogy

Rory Connolly
Trinity College, Ireland

Alan Healy
Farming Rathcroghan, Tulsk, Roscommon, Ireland

Abstract PRISM (*Preservation by Record of Ireland's Shell Middens*) was a citizen science pilot in Ireland that mobilised volunteers to record vulnerable coastal shell middens through a digital reporting platform. The project enabled rapid documentation, targeted rescue sampling, and new radiocarbon determinations, while serving as a field-based teaching laboratory that tested place-based, co-productive approaches to at-risk heritage. By bringing deep-time archaeological archives into dialogue with contemporary climate hazards, PRISM, and similar projects, can advance environmental humanities practice and inform alternative climate adaptation strategies.

Keywords Citizen science. Coastal archaeology. Shell Middens. Place-based learning. Climate adaptation.

Summary 1 Introduction. – 2 Coastal Heritage and Co-Production: The PRISM project. – 2.1 Coastal Shell Middens. – 2.2 Co-Production and Decision-Making. – 2.3 Data Validation and Sampling. – 3 Pedagogical Insights and Teaching EH. – 3.1 Bridging Research and Participation. – 3.2 Citizen Science as Method and Pedagogy. – 4 Concluding Remarks.

1   Introduction

Human-induced environmental and planetary change has been the subject of extensive exploration in social sciences, humanities, and broader cultural frameworks.[1] In recent years, the environmental humanities (EH) have emerged as a vital field that challenges the separation of nature and culture and foregrounds questions of meaning, ethics, and justice in discussions of environmental change.[2] Scholars stress that climate change is not only a physical phenomenon but also a cultural one, shaped by competing narratives, images, media, and values (Higgins et al. 2020). Teaching the environmental humanities therefore requires attention to both scientific knowledge and the socio-cultural contexts through which it is understood and contested. The urgency of climate change, coupled with the loss of cultural heritage through erosion, sea-level rise, and other environmental hazards, calls for pedagogies that engage learners and the broader research community with complex socio-ecological systems and encourage collaborative responses (Holm et al. 2013; Izdebski et al. 2016).

Climate change has led to a myriad of impacts that resonate across all levels of our planetary systems. These impacts are varied and extensive, and present multiscalar challenges across physical, biological, and human systems. For instance, melting polar ice and glaciers, rising sea levels, and shifting weather patterns are tangible manifestations of a warming planet (IPCC 2022). Concurrently, these alterations trigger biological impacts, including shifts in species distribution, changes in phenology, and heightened risk of extinction.[3] Human societies, particularly those most vulnerable and least responsible for emissions, grapple with increased food and water insecurity, loss of livelihoods, threats to health, and displacement, further exacerbating existing socio-economic and political inequities (Adger et al. 2012; Markkanen, Anger-Kraavi 2019; Nyiwul 2021). The socio-cultural relationships that local communities maintain with their surrounding environments are also disrupted, leading to the erosion of cultural identities, knowledge systems, and ways of life (Eira et al. 2018; Green, Raygorodetsky 2010; Williams 2012). The intricate and multi-dimensional nature of these impacts calls for

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[1] See Briggle 2021; Bulkeley 2021; Hamilton et al. 2015; Leichenko, O'Brien 2020; Little et al. 2023; Merchant 2020.

[2] See Castree 2021; Hansard, Moskowitz 2022; Holm et al. 2015; O'Gorman et al. 2019; Rose et al. 2012.

[3] See Antão et al. 2022; Bestion et al. 2015;; Chatzimentor et al. 2023; Parmesan 2006; Urban 2015; Visser, Both 2005.

a profound shift in our understanding and responses to this crisis (Adger et al. 2012; Bauer, Bhan 2018; Holm, Winiwarter 2017).

In response to the planetary crises, EH curricula have proliferated across Europe over the past decade, yet they remain diverse and unevenly distributed. In the United Kingdom, for example, Bath Spa University created the first Master's programme in Environmental Humanities (MAEH) in 2016, drawing on strengths in ecocriticism, environmental philosophy, anthropology and heritage studies. Similar programmes at King's College London and the University of Leeds combine climate history, culture and society, postcolonial ecocriticism, and disaster studies (O'Gorman et al. 2019). In Ireland, the Trinity Centre for Environmental Humanities was established at Trinity College Dublin in 2017, offering an MPhil in Environmental History that promotes mixed (quantitative-qualitative) methods and interdisciplinary EH approaches. Indeed, Northern Europe hosts several such research hubs, including the Environmental Humanities Laboratory at KTH Royal Institute of Technology, or the Oslo School of Environmental Humanities, to name but a few (O'Gorman et al. 2019). It's important to note that while some programmes and centres may carry an explicit EH label, many nonetheless integrate EH approaches into various areas of environmental and historic studies. For instance, the Rachel Carson Center for Environment and Society (RCC) in Munich. What unites these initiatives is a commitment to interdisciplinarity and public engagement.

Site-specific and locally grounded perspectives are a vital, though often underutilised, resource for teaching EH in Europe. Archaeological practice, especially in its public and community-engaged forms, offers a particularly rich foundation for such place-based pedagogies. Field encounters with landscapes, monuments, and heritage sites situate learning within tangible socio-ecological contexts, encouraging participants to think critically about environmental change through material traces and lived experience. Whether through excavations or participatory heritage mapping, public archaeology exemplifies how education can connect abstract environmental questions to particular places and communities. While public participation in the research cycle has long been established in archaeology, its application within EH is a more recent development and part of the wider emergence of a citizen humanities.[4] Co-creative citizen science and transdisciplinary methodologies are likewise increasingly recognised as essential for addressing complex socio-ecological challenges and informing effective policy and management decisions (Agnew et al. 2022).

Building on these principles, we argue that place-based and participatory approaches can be tailored to diverse natural and

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4   See Dobreva 2016; Gianquitto, LaFauci 2022; Hayes et al. 2025; Heinisch et al. 2021.

cultural heritage settings across Europe to support research-based and co-creative pedagogy, while fostering socio-ecological awareness and collective capacity to address climate change and heritage loss.

2   Coastal Heritage and Co-Production: The PRISM Project

The PRISM (*Preservation by Record of Ireland's Shell Middens*) project was conceived as a pilot scheme under an Irish Research Council Government of Ireland grant, based out of University College Dublin (UCD), and supported by the UCD Earth Institute. It sought to test how citizen science could contribute to the recording of vulnerable coastal shell midden sites along Ireland's coast, preserving vital cultural and environmental data before it is permanently lost.

2.1   Coastal Shell Middens

Shell middens are archaeological deposits composed predominantly of mollusc shells, frequently intermingled with faunal remains or other artefactual materials. They form through repeated episodes of shellfish processing and consumption, accumulating as conspicuous mounds or stratified layers that can be several metres in thickness **[fig. 1]** (Waselkov 1987). Shell middens are a virtually global phenomenon recorded on all continents except Antarctica (Rick 2023; Robson et al. 2023). They date from at least the earliest stages of the Holocene, and continue to accumulate to the present day in certain regions.

Beyond their utility for reconstructing past dietary habits and subsistence systems, the shells themselves are increasingly utilised within multi- and interdisciplinary research projects as high-resolution palaeoenvironmental archives, reflecting fluctuations in past ambient environmental conditions and broader climatic shifts (Andrus 2011; Hausmann et al. 2017). Analyses of shell morphology and molluscan community composition can also provide vital historic baselines for ongoing conservation and restoration efforts (Faulkner et al. 2019; Roberts et al. 2025; Robson et al. 2024).

Figure 1   Eroding coastal shell midden sites in the north-west of Ireland.
Photo by Rory Connolly, 2023

Ireland's National Monument Service (NMS) records 534 midden sites across the Republic of Ireland (NMS 2025) with the substantial majority of these being situated in coastal settings, making them highly susceptible to storm surges, erosion, and other destructive forces (Bonsall, Moore 2017). Ireland lacks a dedicated coastal archaeological response unit, and as a result, many coastal middens are damaged and lost each year without appropriate investigation, especially during extreme weather events. In line with global trends, climate projections show that Ireland will continue to warm, with the strongest warming and most heat-wave days in the south and east, while the north-west will see substantial increases in summer and autumn temperatures and a large reduction in frost and ice days. Precipitation projections are less certain, but the models indicate drier summers and wetter autumns and winters, along with a marked increase in heavy rainfall events, a pattern that implies heightened risks of flooding and erosion along the western and north-western coasts (Nolan 2024). Ireland's position on the North Atlantic storm track also exposes it to increasingly intense cyclonic activity. In recent years, extra-tropical systems such as storms Ophelia (2017) and Lorenzo (2019) brought hurricane-force winds leading to severe damage and abrupt episodes of coastal erosion (Met Éireann 2025). In August 2020 Storm Ellen, formed from the remnants of Tropical Storm Kyle, intensified rapidly and delivered gusts up to 143 km h^{-1}, with storm surge and spring tides causing coastal flooding and extensive tree blow-down across western counties. Most recently, in January 2025 Storm Éowyn set a new national wind record of

183 km h⁻¹, highlighting how such intense systems amplify hazards to coastal infrastructure and cultural heritage (Met Éireann 2025). Unfortunately, even under the most optimistic future climate projections for Ireland, the loss of many shell midden sites is inevitable and unstoppable, particularly in areas of soft coastline (Daly 2019). Erosion also presents opportunities, however, as new previously unrecorded midden sites can become exposed (Bonsall, Moore 2017).

2.2 Co-Production and Decision-Making

PRISM's underlying rationale was that human responsiveness can, in some cases, be more effective than large-scale remote sensing technologies. Local communities possess intimate knowledge of their landscapes and can quickly detect changes as midden deposits are exposed or damaged following storm events. The project established four key objectives:

- **Objective 1** To pilot a scheme to build capacity for addressing climate change impacts in Irish coastal communities through citizen engagement.
- **Objective 2** To create a transdisciplinary framework for local communities to become active participants in the research cycle.
- **Objective 3** To promote the use of digital tools and participatory mapping and act as a proof-of-concept.
- **Objective 4** To strengthen cross-sectoral collaboration to mitigate loss of archaeological information at coastal shell middens under threat.

As a pilot scheme, PRISM focused its efforts in County Sligo, in the north-west of the island, where over 115 shell midden sites are recorded (NMS 2025). High-resolution projections indicate that the north-west, including Sligo, will face more variable precipitation regimes, heavier rainfall events, and heightened storm surge risk, exacerbating erosion and coastal heritage loss along already vulnerable coasts (Sligo County Council 2024). In response to these vulnerabilities, PRISM's workflow sought to emphasise reciprocal communication, distributed observation, and selective rescue sampling that foregrounded three epistemic concepts that are central to both responsible public archaeology and EH: (i) thick description across scales, where site-level observations about midden exposures are read against climatic and local infrastructural dynamics; (ii) ethical reflexivity, where the act of prioritising threatened sites triggered questions about value, loss, and care; and (iii) public narratability, where evidence is organised with audiences in mind from the outset, and not simply retrofitted after the fact.

With these ideas in mind, the project established an online reporting platform built on ArcGIS Online and ESRI geospatial cloud tools (Survey123 and Experience Builder). This digital infrastructure was intended not only to facilitate timely recording of at-risk sites but also to integrate citizen observations into a wider monitoring framework, in line with recent evaluations of geo-citizen-science approaches that emphasise the accessibility of Survey123 for spatial data collection and the flexibility of Experience Builder for creating interactive, cross-platform dashboards (objectives 1 and 3) **[fig. 2]** (Hennig et al. 2020; Uelmen et al. 2023).

Figure 2 Selected screenshots from PRISM's Survey123 interface

Volunteer citizen scientists were recruited through direct engagement with local stakeholders, including coastal residents, local historical societies (Sligo Field Club), beach-clean initiatives (An Táisce Clean Coasts), and students enrolled in archaeology programmes. The project team organised public talks, guided field trips, and training sessions to equip volunteers with the skills needed to recognise midden deposits and to use the platform (objective 2) **[fig. 3]**.

Citizen scientists were encouraged to submit coordinates, geolocated photographs, and short observations on possible new sites or previously recorded sites. Importantly, they were invited to share relevant contextual information about the local environment, including possible changes to surrounding land use, or bioturbation caused by burrowing animals or vegetation growth. The project provided feedback on the status of reported sites, creating a two-way flow of information. The aim was to move beyond traditional top-down monologue interactions towards genuine dialogue, where

communication becomes reciprocal and collaborative (Rüfenacht et al. 2021).

Figure 3 Guided tour and information session on coastal shell middens in County Sligo. Photos by Rory Connolly, 2023

The platform incorporated a structured vulnerability assessment that enabled contributors to rank the severity of climatic and anthropogenic hazards affecting individual midden sites. Using a five-point scale ranging from 'no alteration' to 'major deterioration of fabric', participants evaluated risks such as coastal erosion, storm surges, sea-level rise, extreme temperatures, precipitation changes, and visitor footfall. These inputs were then visualised through interactive dashboards, allowing patterns of threat intensity and distribution to be compared across sites **[fig. 4]**.

Figure 4 PRISM's structured site vulnerability assessment. Source: Rory Connolly

2.3   Data Validation and Sampling

Over twelve months PRISM collected numerous fully anonymised citizen observations through the platform, all of which were validated through ground-truthing by project archaeologists, including partners in the commercial archaeology sector (objective 4). The correspondence between volunteer assessments and professional evaluations demonstrated the reliability of citizen-scientist data, particularly when participants received clear guidelines and ongoing support. On the basis of the citizen-generated vulnerability assessments, sites deemed to be under imminent threat of substantial damage or complete loss were prioritised for rescue sampling to mitigate the loss of archaeological data. Six sites were selected from the townlands of Rosses Upper, Culleenamore (x2), Tanrego East, Tanrego West, and Streedagh **[fig. 5; tab. 1]**. Samples of marine shell were collected from exposed shell midden section faces and care was taken when sampling to target *in-situ* contexts with minimal evidence for disturbance.

Figure 5   Map showing the midden sites sampled in Sligo Bay and Ballysadare Bay. Source: Rory Connolly, using ArcGIS Pro basemap (ESRI 2024)

Table 1 Shell middens sampled by the PRISM project

Location	Rosses Upper, Co. Sligo	Culleenamore Island, Co. Sligo	Culleenamore Headland, Co. Sligo	Tanrego West, Co. Sligo	Tanrego East, Co. Sligo	Streedagh, Co. Sligo
SMR	SL008-214	SL013-117	SL013-091	SL013-117	SL019-057004	SL005-018
NMI Licence	22E0634	22E0643	22E0644	22E0641	22E0642	22E0645
ITM Coordinates	564079, 839676	560921, 833926	561058, 834007	559556, 832107	560123, 831659	563045, 850318
Lat. Long.	54.304574, -8.551916	54.252678, -8.599685	54.253416, -8.597593	54.236228, -8.620385	54.232247, -8.611628	54.400118, -8.569123
Period	Later Mesolithic	Middle Neolithic	Late Neolithic; Medieval	Late Neolithic; Medieval	Late Neolithic	Iron Age

Fourteen radiocarbon determinations were secured, spanning the Later Mesolithic through the Neolithic and into the fourteenth century. The prehistoric results are especially significant, as they considerably refine our understanding of how these coastal sites intersect with the broader prehistoric landscape, notably the major Neolithic ceremonial complex at Carrowmore (Bergh, Hensey 2013), recently added to the UNESCO World Heritage Tentative List as part of the *Passage Tomb Landscape of County Sligo* (UNESCO World Heritage Centre 2023). The archaeological implications of these radiocarbon determinations merit more detailed discussion than is possible here and will be developed in subsequent work.

3 Pedagogical Insights and Teaching EH

3.1 Bridging Research and Participation

PRISM forms part of a wider landscape of coastal citizen-heritage initiatives that seek to mobilise local expertise in the face of rapid environmental change. In England, for instance, the *Coastal and Intertidal Zone Archaeological Network* (CITiZAN) has developed long-term monitoring programmes in which trained volunteers systematically record eroding coastal archaeology and report new exposures (Parsonage et al. 2025; Milne et al. 2023). Similarly, previous pilot schemes like the MASC project (*Monitoring the Archaeology of Sligo's Coastline*) in Ireland have proved fruitful for recording at-risk archaeology in the intertidal zone (Bonsall, Moore 2017).

The citizen science approach adopted by PRISM led to the rescue sampling of six previously uninvestigated monuments, substantially enriching the archaeological record of the north-west. Several of these sites were subsequently damaged or destroyed by storms,

underscoring both their vulnerability and the urgency of intervention. Through rapid documentation and sampling, PRISM preserved chronological and cultural information that would otherwise have been lost, while citizen scientists helped determine which sites to prioritise, embedding co-production and community agency at the heart of the project. Such collaborative practices resonate with EH pedagogy, which increasingly emphasises participatory knowledge production and ethical engagement with local communities.[5] PRISM also reflects Riede's (2018) call for incorporating deep-time perspectives into EH by demonstrating how such perspectives can be made tangible through public engagement. By encountering the fragile material traces of prehistoric coastal lifeways, local stakeholders and residents became cognisant of the ephemeral and palimpsestic character of their surrounding coastal landscapes, recording features that often went unnoticed in everyday experience. These encounters invited participants to situate themselves within a continuum of human-environment interaction extending back thousands of years, fostering a renewed sense of belonging to coastal communities shaped by both environmental change and cultural memory.

3.2 Citizen Science as Method and Pedagogy

PRISM offers several lessons for EH teaching. It demonstrates how citizen science can serve as a form of experiential learning that invites participants to co-produce knowledge rather than simply consume it. Those who participated with PRISM developed practical skills in GIS, field recording, and community engagement, while gaining insight into the ethical challenges of allocating limited resources among threatened heritage sites. These experiences undoubtedly complement wider discussions of the Anthropocene and environmental justice by grounding abstract concepts in concrete decision-making.

Shell middens connect a variety of cultural and environmental processes across multiple scales of analysis. Reading them requires knowledge of coastal geomorphology, ecology, archaeology, and local histories. The coastal settings investigated by PRISM can be understood as part of what Westerdahl (1992; 2011) terms the 'maritime cultural landscape', an integrated land-sea assemblage of sites, practices, routes, and perceptions that arise from human engagement with the sea. For teaching purposes, introducing

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5 See Gianquitto, LaFauci 2022; Heyne et al. 2024; Holm et al. 2013; Izdebski et al. 2016; O'Gorman et al. 2019.

the maritime cultural landscape framework allows participants to situate the middens within a continuum of shoreline use and change, reinforcing PRISM's emphasis on relational, place-based understandings of climate impacts and heritage vulnerability. This integrative perspective contrasts with many climate impact frameworks that compartmentalise biophysical and social dimensions. Although such separation may serve practical ends, it can obscure and limit recognition of the relational character of climate change impacts (Adger et al. 2009). PRISM enabled participants to consider these interconnections and confront narratives of heritage loss and resilience, reflecting EH concerns with storytelling and affect (Hamilton et al. 2024; O'Gorman et al. 2019).

The project helped demonstrate the importance of place-based education, focusing on a specific region and involving local communities. Such locally grounded case studies enable learners to grasp how global environmental change is experienced within particular ecologies and cultural settings, making abstract processes tangible and meaningful (Gruenewald 2003; Smith 2007; Yemini et al. 2025). They also foreground the significance of local knowledge and practices in conservation and adaptation, highlighting how community expertise complements scientific approaches in responding to environmental challenges (Raymond et al. 2010). PRISM's co-production workflow was conceived as a transdisciplinary mode of collaborative learning that brought researchers, heritage professionals, and citizen scientists into a shared process of observation and decision-making. The inclusion of non-specialists from the outset, particularly their role in identifying and prioritising sites for sampling, blurred conventional boundaries between expert and lay knowledge, demonstrating how transdisciplinary practice can democratise research and extend its ethical and epistemic reach.

4 Concluding Remarks

As climate change accelerates and coastal heritage faces intensifying threats, projects like PRISM highlight how transdisciplinary collaboration can turn vulnerability into an opportunity for learning. By integrating archaeological methods, participatory mapping, and community knowledge, the project demonstrates how research can be rooted in ethical engagement and shared responsibility. Its co-production model shows that environmental understanding is generated by dialogue among multiple ways of knowing, from academic and professional to local and experiential.

Empirically, PRISM has contributed new chronological and cultural information for six previously unsampled shell middens in north-west Ireland, providing a vital record for monuments that in

several cases were subsequently damaged or destroyed. The project's structured vulnerability assessment and digital reporting platform provide a replicable workflow for identifying, prioritising, and sampling threatened sites in other coastal regions. Pedagogically, the scheme offered a concrete example of how EH teaching can be embedded in public archaeology and citizen science, giving participants hands-on experience with GIS, field recording, and the ethical dilemmas of triaging endangered heritage. These intertwined research and teaching outcomes suggest that citizen-led monitoring can be deployed as a form of critical, place-based education in its own right.

PRISM underscores that citizen science can both expand the evidential base for understanding past human-environment relations and cultivate the skills and sensibilities needed to navigate present and future climate risks. The project offers a working template for how EH teaching and research can cultivate situated, participatory, and reflexive practices that foster both heritage preservation and climate awareness, while opening pathways for similar collaborations in other vulnerable landscapes.

Acknowledgements

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Tree-Rings as Text: Reading the Climatic and Life History of an Irish Oak

Francis Ludlow
Trinity College, Ireland

Eva Jobbová
Trinity College, Ireland

David M. Brown
Queen's University Belfast, UK

Christopher Morris
Trinity College, Ireland

Abstract   Parallels readings of natural and human archives offer many advantages in environmental history. Such literacy is best fostered at the undergraduate level onward. We thus offer a teachable case study that focuses on how an oak sample prepared for dendrochronological analysis at Queen's University Belfast can be 'read' and placed in dialogue with the Irish Drought Impact Database. This demonstrates the value of the oak record but also the need for its critical interpretation. It opens questions about how human management shaped its environment whilst growing in the Botanic Gardens Park, Belfast.

Keywords   Climate history. Dendrochronology. Drought. Natural and human archives. Newspapers.

Summary   1 Introduction. – 2 Reading Irish Dendrochronological Records. – 3 Testimony of Sample Q11445. – 4 Comparing Witnesses: Reading Q11445 and the IDID. – 5 Conclusion.

1   Introduction

Across the environmental humanities (EH) and wider interdisciplinary teaching, a scarcity of worked case studies, syllabi and curricula exists. In EH, O'Gorman et al. (2019) argue that programme growth has outpaced pedagogical development, with insufficient discussion of classroom practice, despite efforts such as Garrard's (2012) *Teaching Ecocriticism and Green Cultural Studies*. For interdisciplinary teaching broadly, teachers at all levels can lack appropriate models, making implementation difficult (Nagle 2013), a situation with precedent in earlier integrative efforts (Davison, Miller, Metheny 1995). In ecology, a deficit of published teaching case studies is noted (Smith, Paradise 2022), and studies of schools and undergraduate settings describe limited guidance for cross-disciplinary teaching (Sisti 2021; Lim 2025). In this context, efforts such as the *Environmental Humanities Syllabus Project*, which curates syllabi and assignments, are of great value.[1]

In the space available, we focus upon environmental history as an important field within broader EH studies. As J.R. McNeill (2010, 348) states, environmental history is "more than most varieties of history […] an interdisciplinary project", drawing not only on "published and archival texts" but also on natural (biological and physical) archives, such as sediment cores that can reveal past vegetation and land use. Its "essential purpose", Donald Worster (1996, 5) argues, is to (re)open a "doorway" between the humanities and the environmental sciences, to trace how the biophysical world has influenced human affairs and how people have understood and themselves shaped nature. The practical hurdles of working across archaeology, ecology, botany, and climatology are very real, but combining their data and perspectives "will help push along the frontiers of knowledge" (McNeill 2010, 365). More recently, the concept of consilience, coined by Whewell (1840) and popularised by Wilson (1998), has been revived to frame efforts at unifying knowledge from across the humanities and natural sciences. This is not to be achieved by erasing disciplinary differences, but by treating our sources and methods as complementary (e.g., linking tree rings with texts). In pursuing this, Izdebski et al. (2016, 9) argue that disciplines mainly differ in "methods, habits, and cultural traditions", not in the essence of their work, and hence "consilience is already there". The task is now to realize it in a practical sense via improved communication, shared research questions, transparent data/uncertainty handling, and genuinely collaborative study designs

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[1]   Based at the Environmental Humanities Research Center, University of California, Irvine. See https://www.humanities.uci.edu/environmentalhumanitiesresearch/ syllabus-project.

(Izdebski et al. 2016), whilst McCormick (2011) emphasizes the need to train historians to work across methods and sources, including at an undergraduate level.

There are two main challenges. First are epistemic and methodological gaps: natural and human archives offer evidence on different scales, seasons, and have distinct uncertainties. Aligning them demands careful cross-dating, calibration, and transparent source criticism, without privileging one archive over another. Overviews explicitly flag these issues (e.g., Ludlow, Travis 2019; Nash et al. 2021; Izdebski et al. 2022), as well as warning against climate determinism, urging researchers to articulate mechanisms while acknowledging limitations. Second are collaboration and training hurdles: historians and scientists use different vocabularies, metrics, and standards of proof; effective consilience requires shared frameworks, versioned and open data, and reproducible methods, ideally taught from undergraduate levels onward and embedded in joint projects (McCormick 2011; 2019).

2 Reading Irish Dendrochronological Records

From the late 1960s, dendrochronologists (Michael Baillie, David Brown, Jonathan Pilcher and colleagues) at Queen's University Belfast began assembling tree-ring growth width measurements from the island's two native oak species (Sessile and Pedunculate), both being suited to chronology development given their longevity, clear annual rings, and a relative (though not total) absence of missing, partial, or false rings. By overlapping ring-widths from living oaks with ring-widths from historic structural timbers (e.g., from church roofs or archaeological sites like medieval mills), and again with ring-widths from even older 'subfossil' oaks preserved in the anaerobic conditions of peat bogs and lake margins, they built long annual-resolution chronologies that anchored contemporary tree-rings to those of deep time. One milestone was a 7,272-year Western European oak chronology integrating material from the north of Ireland, Britain, and Germany (Pilcher et al. 1984). Student-friendly summaries of this endeavour are given by Baillie (1982; 1995), Pilcher and Brown (2014) and Plunkett et al. (2024).

Scholars have long recognised that the annual growth rate of trees varies under the influence of weather, offering a means to 'reconstruct' past climatic conditions before the era of instrumental weather recording (Douglass 1919). A landmark of this dendroclimatological approach is the 1,100-year reconstruction from high-elevation Bristlecone Pines in California's White Mountains (La Marche 1974). In Ireland, while early oak chronology building was undertaken to refine the radiocarbon calibration curve and deliver

precise dates for archaeological contexts from which oak samples could be obtained (Baillie 1982; 1995), early studies did compare modern oak chronologies with nearby meteorological station data to ascertain whether a clear enough climate signal existed for climatic reconstruction (Hughes et al. 1978; Briffa et al. 1983). However, Ireland's mild maritime climate complicated these efforts. Unlike Bristlecones growing in harsh 'temperature-limited' sites at high elevations, Irish oaks do not usually inhabit a climatically 'marginal' growth environment, so their ring widths integrate multiple meteorological influences in a manner that can be difficult to untangle.[2] These can even include non-growing-season conditions. For example, Irish oaks tend to grow more poorly after mild winters. A possible explanation is that such winters, not uncommon in Ireland, sustain metabolic activity during an intended period of dormancy, consuming carbohydrates ideally reserved for the following year's growth (Pilcher, Gray 1982). Given these issues, García-Suárez, Butler and Baillie (2009) noted that dendroclimatic reconstructions using Irish oaks had for several decades been largely set aside.

Figure 1 Annual mean ring width index of Irish oak growth, AD1805-1825. Data: Michael Baillie and David Brown. Figure after Ludlow 2011

2 In reality, all trees do this, but dendroclimatology is more straightforward for 'marginal' locations (e.g., high altitude, high latitude, arid) where growth is mainly controlled (directly or indirectly) by one dominant climatic variable (e.g., temperature, precipitation).

Even so, long Irish oak chronologies reveal years of markedly reduced growth (Baillie, Munro 1988; Baillie 1995). When these 'poor-growth' years occur across widely separated sites in and beyond Ireland, a climatic cause is likely, with few other mechanisms able to impose such broad coherence on growth (Kelly et al. 1989). After the April 1815 Tambora eruption, which depressed European temperatures and produced the 1816 'year without a summer', Irish oak growth contracted sharply in 1816 and in 1817 exhibited a deep growth minimum [fig. 1]. Moreover, with improved statistical approaches, dendroclimatologists have successfully incorporated Irish oaks in the landmark Old World Drought Atlas (Cook et al. 2015). This finds sufficiently consistent sensitivity in the oaks to reconstruct Irish (and European) soil moisture for the Common Era using a grid of 5,414 0.5-degree cells (~50 km each, depending on latitude). Combining multiple species (oak, Scots pine, beech, ash, etc.), each with different climate sensitivities, offers further insights into climate history before instrumental weather records become more consistent in Ireland in the late eighteenth century (notably at Armagh Observatory; Butler et al. (2005)), although non-oak chronologies are not yet especially long (García-Suárez, Butler, Baillie 2009).

Beyond contributing to Irish climate history and historical dating, the oaks have also contributed to the history of Irish architecture, demography, settlement and landscape management (e.g., Baillie 1994; 2006; Brown, Baillie 2012; Adelman, Ludlow 2014; Ludlow, Crampsie 2018; Campbell, Ludlow 2020). Thus, we emphasize their importance as an archive for environmental historians and offer a reflective 'reading' of one notable oak sample, drawing from our own undergraduate and postgraduate teaching. This provides a model for others to adapt, including by using tree-ring chronologies more relevant to their own regions.[3] Several thousand chronologies are accessible from the International Tree-Ring Data Bank (ITRDB) globally,[4] although their distribution favours temperate, boreal (or high elevation) zones where pronounced seasonal cycles promote distinct growing season ring formation.[5]

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3 Rubino and Baas (2019) provide a well-illustrated introduction to dendrochronology, focusing on the dating of North American buildings and cultural landscapes, ideal for teaching.

4 https://www.ncei.noaa.gov/products/paleoclimatology/tree-ring.

5 Scarcity of chronologies from tropical and sub-tropical regions reflects a lack of clear seasonal cycles that promote clear annual ring formation, but also reflect past funding biases, though availability is increasing (Groenendijk et al. 2025). Anchukaitis (2017) provides a map of ITRDB chronologies.

3   Testimony of Sample Q11445

Figure 2 shows a sample taken from a mature oak that had grown on the Great Lawn of the Botanic Gardens Park, Belfast, but was felled in January 2012, on which occasion Jonathan Pilcher and David Brown, dendrochronologist at the Dendrochronology Lab, Queen's University Belfast, procured a sample. Because the tree was deliberately felled, having been assessed as unstable, there was no need to use a non-destructive tree-ring borer to extract a straw-width sample for ring-width measurement. Instead, a chainsaw was used to take a larger sample running 55.3cm from bark to core (including first ring and pith), giving a more intuitive picture of the tree's response to its growing conditions through time. The sample was assigned a Q code (Q11445), a number that implies the many thousands of samples processed up to 2011.[6] Preparation for ring measurement involved polishing the sample and the application of chalk powder which, when brushed across the sample, reveals the larger 'early growth vessels' that transport nutrients vertically through the growing ring. These are visible as lines of white dots that reveal each year's annual growth onset in spring (around April).

Figure 2   Full image of oak sample Q11445 from the Botanic Gardens Park, Belfast, comprising 180 annual rings, 1832 to 2011, inclusive. Photograph by the Authors

Ring counting returned an age of 180 for this oak, which had its first ring in 1832. With a known felling date of 2011, the years across which its growth spanned did not require identification by the cross-dating required for timbers from historical, archaeological or natural contexts for which rings can be counted and measured but are of initially unknown date.[7] Q11555 can be used as a witness

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6   Ring width measurements for each sample counted at Belfast and listed by Q code can be found at `https://chrono.qub.ac.uk/bennett/dendro_data/dendro.html`.

7   Rubino and Baas (2019) describe the cross-dating procedure in which patterns in the width of tree-rings from a sample of unknown age are matched against patterns in a sample for which the date of each ring is known. If a match is found, ages can be transferred from the rings of the already dated sample. Baillie (1982; 1995) discusses this for Ireland.

statement for the oak's local environment, one of special interest to the history of botany in Ireland (for which see Synnott 1997), presumably being planted shortly after the opening of the Botanic Gardens Park, Belfast, in 1828. While the tree avoided the adverse climate following Tambora's eruption in 1815, the evidence of its rings shows that it still experienced variable fortunes with prolonged periods of greater and lesser growth, punctuated by specific years of anomalously poor growth.

In some years, the tree suffered alongside the humans under whose management it grew, as when droughts impacted its growth. In other cases of human suffering, as during the Great Irish Famine of 1845-52, it appears indifferent, perhaps even benefitting from the above-average precipitation of these years (Murphy et al. 2017), when it exhibits some of the widest rings in its 180 years. Much of the large size of these rings should, however, be attributed to the 'early growth trend' (or juvenile growth) that is well-known to tree-ring specialists. This is a distinctive feature that many students will remark upon when studying an image of Q11445 and is clearly visible in ring-width measurements **[fig. 3]**. The early growth trend is driven by physiology and geometry (not weather, which albeit still influences year to year variation),[8] in which younger trees grow larger rings (on average) for the first few decades of their life, but decreasingly so, as each year's growth must spread around a larger circumference.

This offers a good starting point for students to discuss the challenges of tree-rings as sources of climate information. Dendroclimatologists address this issue in various ways. This includes the selection of samples from mature trees with many rings so that those affected by the early growth trend may be discarded or 'averaged out' (ultimately both approaches involve ensuring that climate inferences are not based upon a single witness, which is a sentiment that history students should appreciate).[9] It is also possible to address the early growth trend by fitting a line to the ring-width data that models (tracks) the average long-term trend. This can then be subtracted (or otherwise removed) from the data, in a 'detrending' process that leaves only year-to-year or decade-to-decade variation that more specifically reflects climate.

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8   As in, shorter term growth variability induced by weather is superimposed upon the early growth trend.

9   Important when the pith or first growth ring of a tree is not identifiable and hence the juvenile growth years cannot be as readily identified.

Figure 3 Tree-ring-width measurements for Q11445. Years are on the horizontal axes and standardised (relative) ring width measurements are on the vertical axes. Figure courtesy of David Brown

This discussion highlights the issue of growth variation on different time-scales: longer-term (low-frequency) trends that evolve across several decades, superimposed on which is shorter-term (high-frequency) variability occurring year to year or decade to decade. Climate itself varies on these frequencies and dendroclimatologists seek to capture as much of this as possible from their trees, but must reckon with non-climatic influences on growth. While individual oaks respond similarly to large-scale regional influences such as common growing season weather, they are complex biological organisms and will express common influences in somewhat different ways. This partly arises from the mediating influence of local or site-specific environmental contexts, including human activity. For a dendroclimatologist, these influences are studied so that their effects can be removed (as with early growth trends), but for environmental historians (also landscape historians, historical ecologists, historical geographers and others) their main interest in tree-rings may indeed lie in what their variations reveal of human agency. In the context of the managed park in which our oak tree grew, sudden and persistent changes in average growth visible in figure 3 thus have additional potential significance.

These changes are evident in a visually intuitive manner in high-resolution images **[fig. 4]**. Focusing on the years 1832 to 1920,

the early growth trend of large rings is readily apparent, including a transitional phase toward maturity from the late 1850s to around 1880, when rings remain generally large, but decreasingly so. The picture then becomes complicated. In the early 1880s, growth briefly plateaus, perhaps marking the onset of its more mature growth phase, but soon exhibits erratic behaviour with a notable short-lived peak in 1890 followed by a deep minimum in 1894 and 1895 (see change of overlay from orange to cyan in figure 4). This episode marks a 'step change' into what (certainly from 1900 onward) can be deemed the tree's mature phase.[10] This exhibits a lower but largely consistent longer-term growth rate, around which annual values oscillate, punctuated by some particularly low values, to which we will return. Students may speculate upon the difficulties of placing a definite end date on the early growth trend, as well as other visible anatomical features, such as the relatively smaller values during the first decade of growth **[fig. 4]**, or the several decades of lighter-coloured rings toward the end of the tree's life **[fig. 1]**.[11]

Figure 4 Closer view of first 'half' of Q11445, with coloured overlay on bottom marking the onset of each year's early growth (spring vessels). Photograph by the Authors

10 The transition time from juvenile growth varies between species, and even within species, influenced by local contexts (often lasting longer in open versus enclosed competitive (e.g., woodland) environments), but up to 60 years would not be unusual for oak (Haneca 2005).

11 Students may gain insight by researching early 'disturbance events' and sapwood (Baillie 1982; 1995; Rubino, Baas 2019).

Students can be prepared by select readings that suggest the types of human intervention that can drive large jumps in tree growth (as seen between 1880 and 1900, or post-1970 **[fig. 3]**). Deliberate interventions such as coppicing, pollarding or other pruning,[12] plus accidental damage, can suppress growth for multiple years (Bridge et al. 1986; Gilman 2015; Muigg et al. 2020; Sanmiguel-Vallelado et al. 2024), as can soil compaction (Day, Bassuk 1994). Thinning of stands can benefit the remaining trees with less competition for light, water and nutrients (Attocchi 2015). In contrast, changes to local hydrology caused by extraction (e.g., wells), paving, drainage or other construction may alter groundwater access to the temporary or longer-term benefit or detriment of growth (e.g., Netsvetov et al. 2019).[13] These concerns naturally invite students to consider the history of the Botanic Gardens Park and the wider cultural and scientific context of the period. For this, they can find a starting place in the major dates of the Park's history supplied by the Friends of the Botanic Gardens Park, Belfast.[14] Dates of potential relevance include new feature and exhibit construction, changes to the Park's ownership (and, relatedly, visitor numbers) and uses. All can be explored as potential influences on the Park's local environment and management regime, and compared to patterns seen in figures 3 and 4.

McCracken (1971) and Scott (2000) provide more depth for lesson plans but, in brief, the Park started as a private venture of the Belfast Botanic and Horticultural Society (established 1827) and opened on a 14-acre site in 1828. The opening and subsequent efforts in planting diverse flora and constructing exhibits occurred in the context of the transition into the Victorian Era (1837-1901) boom for naturalist and scientific societies. National bodies such as the Royal Geographical Society (1830) and the Royal Microscopical Society (1839) facilitated provincial field clubs that arranged lectures, trips and specimen exchanges. Railways and cheap print accelerated these networks. The royal garden at Kew (England) was given over as a public botanic garden in 1840 and other municipal botanic gardens flourished. These provided collections and venues for public science that increasingly involved the middle classes,

12 Coppicing occurs low to the ground, with regrowth producing multiple small shoots for fuel, charcoal, fencing, etc.. Pollarding occurs higher up and (beyond any intended uses for the resulting regrowth) may include removal of branches for safety or aesthetic purposes, especially in garden settings. Students visiting the Park can be tasked with inspecting for evidence of either practice.

13 When benefitting a tree, these factors may trigger a rapid impulse in growth (a 'growth release').

14 https://fobbg.co.uk/welcome/belfast-botanic-gardens/botanic-gardens-history/.

including in Belfast (Johnson 2025), which boasted societies such as the Belfast Natural History and Philosophical Society (1821) (Synnott 1997; Finnegan 2025). Science continued to professionalize with laboratories, standard terminologies, journals and university posts, though amateur naturalists remained important.[15] Colonial and other networks of correspondence, collecting and exchange tied this together,[16] progressing natural history from an elite pastime into a mass civic but also increasingly professional endeavor.

In the Park, our oak grew near the southernmost corner of the Great Lawn, next to a busy pathway and near to major developments [fig. 5].[17] In its early life it 'witnessed' (on 22 June 1839) the laying of the foundation stone of the famous Palm House (lying roughly 120m north-northwest) with its two wings finished in 1840 and a central dome added in 1852. Closer, and 68m slightly uphill west-northwest, was the 33.5m-long enclosed and heated Tropical Ravine house. This was under construction from the mid-1880s and opened in 1889 under head gardener Charles McKimm, with some 5,000 paying visitors in 1890 (McCracken 1971).[18] Our oak also experienced events with major attendance, not least the roughly 300,000 at the Unionist Convention in 1892.[19] In 1893, Belfast Corporation bought the Park and on January 1st 1895 opened it free to the public, investing in further works, including the extension of the Tropical Ravine between 1900 and 1902 (now 56m long).[20] Students may usefully discuss these developments as plausible causes of environmental disturbance (contributing to the growth trends and notable variability discussed earlier) by soil turnover, compaction, root disturbance or drainage changes, with the conversion to a public park also potentially

[15] The Park's entanglements in these processes can be glimpsed in the botanical observations of Thompson (1847) and the remarks of Dickie (1864; preface).

[16] The Park featured in the *International Exchange List of the Smithsonian Institution* of 1897, p. 247.

[17] The map in figure 5 was accessed via the Department for Communities' HERoNI Map Viewer: https://experience.arcgis.com/experience/8bb16b64f0994385a5c14 1027ae9d33e/. The landscape of the Park can be traced through time in several other historical maps here.

[18] See https://www.belfastcity.gov.uk/Things-to-Do/Tropical-Ravine/ History-of-the-Tropical-Ravine.

[19] Students can profitably search the digital collections of National Museums NI for historical images of the Park, including major events such as the 1892 convention. See, e.g., images from the Welch collection via https://collections.nationalmuseumsni. org/home.

[20] A warmer "stove" section was added in 1900, with a further 1902 extension for a heated pond for the giant Victoria waterlily (McCracken 1971).

bringing new maintenance routines.[21] Later, the Park accumulated more features and uses, including playing fields (1930), a rose garden (1932) and wartime allotments (1940s) (McCracken 1971). Further refurbishments occurred in 1983 (Palm House and Ravine) and from 2013 to 2018, when the Tropical Ravine was restored (Scott 2000; Patman, Armstrong 2020).

Figure 5   Left: Approximate former location of Q11445 oak tree (333701, 372418 TM65 Irish National Grid, north is up), looking southeast toward the corner of the Great Lawn from the vicinity of the Tropical Ravine house. Right: Annotated six-inch County Series map (3rd edition, 1900-32) centred on the Botanic Garden Park, Belfast. 1. General location of Q11445, at which there are deciduous trees persistently (if probably diagrammatically) noted on historical maps. 2. Tropical Ravine House. 3. Palm House. Photograph by the Authors, taken on 12 September 2019

4   Comparing Witnesses: Reading Q11445 and the IDID

Even absent the microscope used when formally measuring ring widths, native oaks in Ireland characteristically produce rings wide enough to see unaided, making any scanner with moderate resolution a useful tool in capturing growth variation for students to study. At moderate zoom, figure 6 reveals several aspects of the tree-ring counting and measurement process at Belfast. These are akin to manuscript notations (glosses) with which history students will be familiar, the interpretation of which makes for useful discussion. Sample Q11445 has also had special glossing, with labels added to identify (usually) every tenth year as an interpretative guide.

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21   Charles McKimm, the force behind late-Victorian improvements, was made General Superintendent of Parks for Belfast in 1903, promoting a citywide approach to park management.

Figure 6 Section of Q11445 covering 1859 to 1891, with annotations by David Brown as guide in the counting process (small pin holes highlighted in white squares that mark the first year of each decade), plus labels showing the final year in each decade. Students may note that pin holes periodically change to doubles and triples, denoting 50 and 100 years counted, respectively. The upper white bracket demarcates 31 years from 1860 to 1890, inclusive, and students can be asked to see if their own count totals 31. Counting can also be attempted on later portions when the rings are smaller and more irregular.
Photographs by the Authors

An advantage in the study of Irish environmental history is the island's rich written record, including some of the longest running newspapers globally, spanning from 1733 to present. Over 100 different newspapers (more than six million pages of content) are available through the Irish Newspaper Archives (INA), a searchable online database containing the largest digital archive of historic Irish newspapers.[22] Although the INA does not contain all Irish newspapers, it offers a representative sample of Irish local and national titles that sees ongoing expansion. The INA has already been used in climate research, such as the study of 19th and 20th century droughts and their socio-economic impacts (Noone et al. 2016; Murphy et al. 2017). It has also been exploited to systematically identify and categorise drought impacts between 1733 and 2019 within the Irish Drought Impacts Database (IDID) (Jobbová et al. 2024).

The IDID comprises 11,000 individual impact records drawn from 6,000 newspaper articles and is freely accessible online (Jobbová et al. 2022),[23] detailing the spatiotemporal extent of droughts, their socio-economic and political contexts, reported consequences and

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22 https://www.irishnewsarchive.com.

23 https://zenodo.org/records/7216126.

any mitigation strategies adopted. As a teaching resource, it can be paired with other archives to demonstrate the value of employing multiple lines of evidence. When newspaper accounts are compared with instrumental weather data, for example, there is a broad but imperfect agreement. Some years that exhibit relatively low precipitation levels can have unexpectedly few newspaper reports of drought, whereas some relatively wetter years contain numerous reports of drought and its consequences **[fig. 7]**. The disparity between instrumental meteorological records and newspaper drought reporting implies that socioeconomic (e.g., agricultural) vulnerabilities that evolve through time and space control what weather conditions are deemed important, making humans sometimes indifferent witnesses to environmental variability. Having students further explore this disparity using sources such as the INA, IDID and instrumental weather data has great potential for self-directed learning, but is beyond our core focus here.

Figure 7   Precipitation and drought reporting, 1950-2020 (after Jobbová et al. 2023). Blue line shows mean Irish June-August rainfall from the Island of Ireland Precipitation Network (Noone et al. 2016; Murphy et al. 2018). Orange bars show years with >60 newspaper reports about drought (60 corresponds with a natural break in the distributions of report frequencies, identifying droughts deemed severe by the print media). The figure illustrates agreements and disparities between more objective meteorological data and droughts considered worthy of news reporting (e.g., year 2006)

Comparing testimonies from the IDID to our oak shows that these trees, like humans, are also complex and sometimes indifferent witnesses. Students can be pointed to the case of the drought in 1887, for which the IDID furnishes abundant evidence. This is identified as one of the most severe droughts for the past 150 years in Ireland (Noone et al. 2017), resulting in widespread crop failure (Barrington 1888). This motivated attempts at mitigation that were dependent upon the prevailing cultural (here Christian religious) context, with *The Irish Times* of 2nd July 1887 issuing a circular from the Bishop

of Meath approving prayers against the drought **[fig. 8]**. With the drought commencing in spring and reaching its pinnacle in summer 1887 (essentially the full growing season for oaks), it is reasonable to expect that the growth of our oak would have been curtailed. Yet, as figures 3 and 8 show, the tree grew well this year. This realization usually provokes discussion. Informed by their readings, students may for example consider whether the tree should be considered "complacent" (Fritts 1976; Speer 2010). In complacent trees, their local site is such that there is a relatively accessible water supply even during dry periods (being close to the water table or supplied by human intervention, perhaps more credible in the context of a managed park bordered to the east by the River Lagan).[24]

Figure 8   Top left: Extract from *The Irish Times* of 2 July 1887 (after Murphy et al. 2017). Top right: a zoom in to Q11445, with the ring for 1887 indicated with a white arrow. Bottom: general position of the zoom in on the larger sample. Oak sample photographs by the Authors

24   Students may note growth maxima from 1890 to 1892 **[figs 3, 9]**, high relative to the preceding decade. Precipitation levels in these years are not far from the average (Murphy et al. 2018), and do not clearly explain such high growth. Students might thus like to consider a growth release as an explanation.

The IDID again proves useful in testing this interpretation, with a further notable drought just six years later in 1893, and to which Q11445's potential complacency should presumably still apply. Students will find that this was one of the most impactful droughts in nineteenth century Ireland, with 176 records in the IDID (Jobbová et al. 2024). Such was its severity that a rain-making scheme involving the detonation of balloon-lofted dynamite was somewhat wryly proposed **[fig. 9]**. Inspecting the rings for 1893 again implies a tree apparently indifferent to these conditions, but the rings for 1894 and 1895 are different. Figure 9 reveals these as much smaller, and irregular in shape, with little of the 'late wood' that forms after the initial spring growth with its large early vessels. If again primed by their readings of tree-ring literature, students may suggest that this reflects the tendency for oaks (and other species) to exhibit not only multi-year responses to climatic and other shocks, but also a lagged expression.[25] Here, oaks may show minimal impact during a drought year, being sustained by carbohydrate reserves and/or groundwater reserves, but only to postpone the expression of that impact.[26]

Recognizing the potential for such mismatches in timing is critical when using tree-rings to identify climatically stressful years in regions or periods for which human documentation of climate is not abundant.[27] A related nuance is seasonality. Oaks are less sensitive to non-growing season weather,[28] but a lagged or multi-year expression may be more likely if drought occurred in (or continued into) autumn and winter (Babst et al. 2012), perhaps reducing groundwater recharge for the next growing season. One advantage of comparing the Irish oaks and newspapers is that the latter often provide this crucial context and in some cases offer precise drought start/end dates, if still informed by shifting human priorities (Jobbová et al. 2024). Thus, the IDID shows that impacts of the 1893 drought were

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25 One teachable example (simplified here) concerns summer 1540 in Central Europe. Over 300 written reports suggest extreme heat and an 11-month 'mega-drought' (Wetter et al. 2014). This was queried by Büntgen et al. (2015) using tree-ring evidence, which did not support such conditions in 1540. Pfister et al. (2015) then pointed to a possibly lagged tree-ring response with a notable minimum evident in 1541.

26 The 1893 drought and its potentially lagged expression can introduce students to 'autocorrelation' in tree-ring series, in which the width in any given year can be positively correlated with the widths of the preceding few years. Put differently, the width of a ring will be affected not only by the weather or other transient influences in the current year, but also weather and other transient influences in those years immediately preceding.

27 E.g., Ludlow and Kostick (2026) use continental European oak growth minima as independent evidence of drought in explaining famines reported in written sources, 750-1000.

28 Dormancy and associated 'frost hardening' protect oaks from all but the coldest winters, though (conversely), recall the tendency to poor growth following mild Irish winters (main text).

still being reported in June 1894, and newspapers again reported long drought in May and June of 1895, if not as stressful (to humans) as the 1893 drought in terms of impact reports. Nonetheless, our oak grew even more poorly in 1895, with the third narrowest ring in its 180 years [**fig. 3**], suggesting that the narrow rings of 1894 and 1895 are a compound and partly lagged expression of extended drought conditions across these years. As if further complexity was needed, students may recall that the Park came into new ownership (and potentially new tree and ground management practices) in 1893, being opened free to the public on January 1st, 1895, also potentially impactful in terms of visitor numbers and behaviours.[29]

Figure 9   Top left: Zoom in to rings immediately before and after the 1893 drought. Each year's start is outlined just before the onset of early growth (usually April onward) featuring clearly visible large spring vessels (white dots) and the darker (summer) late wood. The switch to cyan lines denotes the start of a step-change to persistently reduced growth from 1894 onward. Arrows denote the anomalously poor growth of 1894 and 1895. Bottom: Location of the zoomed-in section. Top right: *The Irish Times* letter of 16 September 1893, proposing a weather modification scheme (after Murphy et al. 2017).
Oak sample photographs by the Authors

29   The great scale of the Unionist Convention in 1892 also makes it a plausible disturbance event, but if it had a significant impact on our oak, it might have been expected to more credibly first register in 1893 rather than in 1894.

The IDID identifies other droughts which, when compared to the Q11445, offer further lessons. Students can be pointed to evidence of drought in 1938 (114 reports compared to just 7 for 1937), for which the *Irish Press* (21st April) reports that "Large numbers of sheep and lambs are dying from drought on the Glencolumkille, Co. Donegal Mountains [Ulster] [...] Streams have dried up completely". Later, the *Anglo Celt* (23rd April) tells us:

> Never within memory was water so scarce on highland farms in Ballybay neighbourhood [Co. Monaghan, Ulster] at Easter. Farmers have to convey supplies to stock from the lakes. The prolonged drought is retarding the crops and rain is anxiously awaited. The local mills too are experiencing the want of water in the race.

Students may then be tasked with identifying the same year in Q11445 **[fig. 10]**, using their growing understanding of tree-ring counting, aided by the labels already attached to the sample. Here they can identify a narrow ring in 1938 without any apparent multi-year or lagged impact. They may note that newspapers identify the drought mainly at the start of the spring growing season and into early summer (especially April to May), with apparent recovery later.[30] These circumstances may have credibly confined the tree-ring expression of drought to 1938.

Figure 10
Bottom: Zoom in to rings for the 1930s and 1940s, with drought years (1938 and 1949) indicated by arrows. Top: General location of these decades in Q11445. Photographs by the Authors

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30   E.g., the *Evening Echo* (27th July 1938), states: "Meadowing, though in some cases short because of earlier drought of April and May, promises on the whole a fairly good return, with most of it saved in good condition. [...] In some places mangolds and turnips were disappointing but have shown improvement with the better turn of the weather".

A further consideration is that Ulster, the province in which our oak grew, was clearly affected in 1938. Although Ireland is small, and droughts or frosts associated with large-scale anti-cyclonic conditions are usually felt widely, there can be meaningful geographical variation in their severity. Even beyond local site factors like soil, slope, aspect and elevation, tree-rings from different regions will display some difference in patterns that increases (generally) with distance. Indeed, an instructive early episode in Irish dendrochronology was a dispute over whether there was such significant variation in British Isles climate on small scales (including microclimates) that dendrochronology would not work to build larger regional chronologies because there would be insufficient commonality in growth patterns to enable cross dating (Fletcher 1980; 1986). This was incorrect (Baillie 1980; 1983; 1984; Baillie et al. 1985).[31] Nonetheless, understanding the geographical extent of droughts is a key piece of the puzzle in reading tree-rings. Conversely, spatial variations in tree growth can allow us to reconstruct the spatial character of droughts and pluvials across Europe into the past when written records are scarce (e.g., Cook et al. 2015).

Irish newspapers often report the area most affected by droughts and, as noted, the IDID attempts to capture their geographical (and temporal) dimensions.[32] For example, drought in 1949 is identified as one of the three most impactful droughts in the entire record (179 reports), yet Q11445 does not register any growth minimum in that year or immediately after **[fig. 10]**.[33] Mapping entries in the IDID indicates that agriculture and livestock impacts were greatest in the east and southeast and, while public water supply impacts were widely reported, the north of the island (including Belfast) appears

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31 Baillie (1995,16) notes: "studies of oak growth have shown that there is a strong common element to the patterns over surprisingly large geographical areas". Common weather variation across a region (i.e., climate) is the only factor that can explain this. Part of J.M. Fletcher's skepticism about whether dendrochronology would 'work' across the British Isles was the provenance of the tree-rings he counted. These came from art-historical panels from paintings and the rings from these samples showed little common variation with British oaks. However, these panels were made from imported Baltic oaks that naturally experienced little weather in common with oaks from the British Isles. This discovery has had many applications: by finding which regional chronologies a given oak sample best matches, it can reveal patterns of historical trade in timber or timber products (e.g., Daly, Tyers 2022; Seim et al. 2024).

32 When using the IDID, it should be noted that even if the database entry indicates that the specific drought has occurred at a given place and time, that does not mean that it *only* occurred there and then.

33 Note, 1949 does not clearly appear among the most extreme drought events in instrumental meteorological records.

less affected **[fig. 11]**.[34] It must, however, be kept in mind that fewer newspapers from the six counties of Northern Ireland are included in the INA, which may exaggerate the apparent lack of severity here.
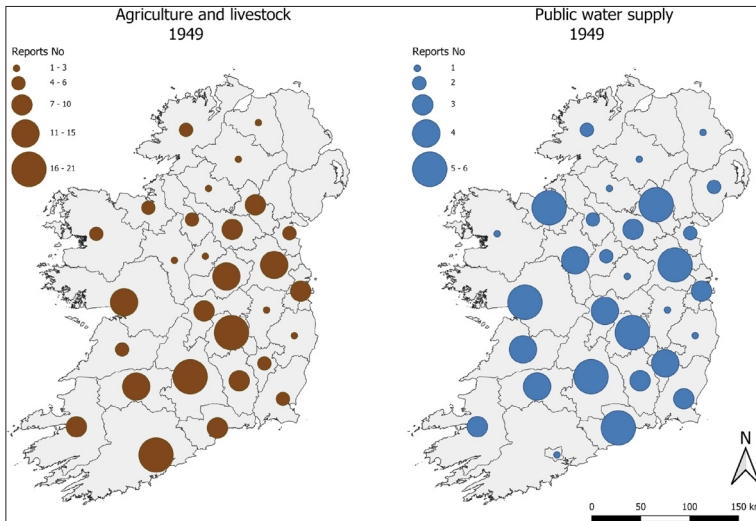

Figure 11 Most frequent impact categories for the 1949 drought, with size of the circle indicating number of reports of impacts (IDID) per county (after Jobbová et al. 2024)

5 Conclusion

Sweeney (1997, 255) describes Ireland as "a meteorological sentry post for much of northwestern Europe" and notes that:

> It is in its vicinity that the skirmishes between air masses which determine the climatic fingerprints of much of the continent are often first observed, and their sting removed. It is here that the harbingers of weather for areas further east may be first assessed and the knowledge used to provide early warning of imminent weather events [...] and it is in the vicinity of Ireland that any significant changes in oceanic circulation associated with global warming in Europe will be first detected.

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34 Reports indicate dry conditions already in April 1949 and by the end of June many counties especially in the south-east reported serious water shortages, with water rationing. Rain was only reported in July.

Reading the Irish oak tree-ring record alongside that of the Irish newspapers, making use of the full span of reliable historical recording from the early 1700s to the present, and earlier making use of sources such as Irish medieval annals that also document extreme weather for many centuries,[35] can tell us much about the biases and priorities of both species as witnesses to Irish climate history and how both interacted through time. Similar readings can be undertaken in the many regions for which tree-ring chronologies are available. Even if restricted to Ireland, a systematic use of the Irish oaks is a task that can occupy many students and scholars interested in the multiple centuries of Irish history for which these trees have acted as witnesses.[36] In writing this paper, we have endeavored to highlight (including in our footnotes) potential classroom discussion points, exercises and online resources, including the tree-ring data itself, alongside complementary archives. It is hoped that this brief paper will serve as a useful and transferable model to help promote training in the cross-disciplinarity and diversification of sources that is the hallmark of excellent research in the environmental humanities (e.g., Campbell 2016; Grillo 2022; Arnoux 2023).

Acknowledgements

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35 Available in translation at the Corpus of Electronic Texts (CELT): `https://celt.ucc.ie`. See Ludlow; Travis 2019 and Campbell; Ludlow 2021 for such a usage.

36 Students may consider many other events in reading Q11445 or other oaks. These include 'mast years' with superabundant acorn production that potentially drain a tree's reserves, major windstorms that might suppress oak growth if branches are lost (or might facilitate growth if a tree's competitors were felled), or outbreaks of various fungal, insect, bacterial or viral pathogens that can impact growth.

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General Section

Zoning in and out
Traditional Aquapelagic Temporality and Chronometric Time in the Faroe Islands

Firouz Gaini
University of the Faroe Islands, Faroe Islands

Erika Hayfield
University of the Faroe Islands, Faroe Islands

Philip Hayward
University of British Columbia, Canada

Abstract   Western chronometric time constitutes a type of temporal orientation that contrasts to earlier approaches to time and temporality. This essay explores the disjunctures between traditional temporal patterns and modern chronometric time in the Faroe Islands. We outline the geo-physical situation of the islands and their aquapelagic orientation as the context for traditional Faroese temporality and provide a series of vignettes that illustrate the persistence of pre-chronometric temporality and sensibilities in contemporary society. Through exploring these we suggest how alternative temporalities might be a resource for communities in late capitalist societies.

Keywords   Faroe Islands. Temporality. Aquapelagos. Insularity. Concept of time.

Summary   1 Introduction. – 2 The Faroes and its Aquapelagality. – 3 The Shore and the *Rekamaður*. – 4 Women and Waiting. – 5 Slow Communication. – 6 Off the Clock on Fugloy. – 7 The Airport and the New Temporality. – 8 Embodying Traditional Temporality in Performance . – 9 Watching Heritage. – 10 Reflection.

1   Introduction

> Time accelerates, decelerates, expands, and contracts... Time
> is individual and subjective. It is not always linear. We all are
> moving through time (or maybe time is moving through us), yet
> our experiences of time are not the same... Having control over
> one's own time and making decisions about the use of one's time
> is a privilege not afforded to many... Ultimately, time must be
> understood as plural, multiple, fractured, subjective, contestable,
> relative, and uneven. Yet, time is also collective...Time can often
> seem like an external dimension, an objective force acting upon
> the social world or as a container or boundary for social life. Yet
> time is emergent from social life, it is produced from socio-political
> relations and power dynamics. (Bhandari 2022, 779)

This reflective essay, authored by two Faroese 'insiders' in
collaboration with an external researcher, explores the interfaces
and/or misfits between the traditional temporal patterns of Faroese
communities and chronometric time, which has made uneven and
partial inroads into Faroese culture over the last two centuries. We
draw on the considerable lived experience of the two Faroese authors
in the islands as a framework for our discussions and complement this
with reference to a range of cultural materials that convey aspects
of traditional island temporality. The third (non-Faroese) author
has contributed his expertise in aquapelagic theory and provided
an outsider's eye on the phenomena we discuss informed by his
experiences in the Faroe Islands during his visit in 2024.

In what follows we recognise that not just the Faroese, but all
modern societies, exhibit temporal dynamism (and/or disjunctures)
and a resultant "multiple sense of temporality" (Abram 2017,
75) to some degree but also assert that local engagements with
these factors – such as those in the Faroes – can have distinct
characteristics and cultural significances. Chronometric time,
measured and displayed with precision by mechanical and, more
latterly, digital media), is most evident in the Faroes in the capital,
Tórshavn, and (unsurprisingly) in the international airport at Vágar.
It is, however, less marked and deterministic within smaller and more
remote communities across the country where more traditional daily,
seasonal, annual and generational temporalities have been retained,
to varying degrees. As we go on to discuss, the relationship between
traditional and chronometric times is complex. Indeed, as the opening
quotation to this essay emphasises, it is "plural, multiple, fractured,
subjective, contestable, relative, and uneven" (Bhandari 2022, 779)
and can also be manipulated by communities who recognise that they
do not have to be subservient to a chronometric hegemony introduced
from elsewhere.

There is, of course, nothing unusual about some communities being less dominated by chronometric time than others. For much of history, humans have not had access to, let alone systematic reliance on, chronometric equipment. The earliest forms of time-keeping devices (sundials and water clocks) date back to ancient Egypt (ca. 1200 BCE), but were relatively few in number and, similarly, while mechanical clocks were invented in Europe in the fouteenth century, they did not become widely available until the eighteenth century (and then only on civic buildings, in places of work and middle and upper class homes). In terms of portable technologies, pocket watches were introduced and became popular amongst affluent westerners in the eighteenth century and wristwatches became available and affordable to a broader population after World War One.[1] Digital mobile devices – which combine digital time keeping with telephony and a range of other functions – are the latest media to have spread chronometry through global communities. Along with these technologies, organisational practices and schedules related to factories (fixed shift patterns marked by sonic alerts, the practice of clocking-on etc.), transport networks (first rail timetables and then scheduled flights) and broadcasting (with fixed program times creating rhythms across the day), all helped cement a chronometric organisation of time and, arguably, of consciousness in those societies heavily permeated by them. However, this diffusion was not uniform in the moments at which and/or extents to which it permeated regions and/or specific communities within them. In the contemporary era, even with the spread of mobile device networks across the planet, remote and/or rural areas often exhibit less emphasis on and/or apparent sense of obligation to follow chronometric time than urban ones. Island have come in for particular attention in this regard. Distinctly loose and contingent patterns of temporality in (non-urbanised) island communities – often referred to, somewhat monolithically, as 'island time' – are, for example, evident in various communities whose activities precede (and now proceed without close adherence to) modern chronometric technologies and schedules due to their internal livelihood cyclicities.

The distinct approaches to temporality – and, in some instances, multi-temporality – in Melanesian societies have received particular attention. Scaglion's research on the Abelam community of East Sepik province, Papua New Guinea, for example, led him to characterise that

> Although Abelam do recognize and make reference to historical or linear time, their primary temporal orientation is fundamentally

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1   See Donzé 2022 for a detailed history.

different, being based on notions of episodicity, cyclicity, repetition, and replacement. (Saglion 1999, 211)

This characterisation accords with a significant strand of anthropology that stresses the qualitative nature of time as a socially experienced and, thereby, *constructed* phenomenon (Munn 1992). There are various ways of approaching the social experience of time shared by those (directly or indirectly) involved in livelihood patterns and relations to seasonal patterns or long-term cycles and episodes, and of how these become culturally inscribed. These include shared understandings of work patterns, resource use and planning and the inscription of the temporal sensibilities involved in aspects such as language and visual-material artefacts that can serve as orientation points and/or reflections on temporal sensibilities themselves (as explored by the various contributors to Fortis and Küchler 2021). Such analyses focus on Indigenous temporalities as internally generated and maintained phenomena. Exploring locational factors from another angle, within a more chronometrically determined context, Oroz (2022) has explored island time – or, at least, island time on the Adriatic island of Dugi Otok – and the way in which it has been culturally constructed between insiders and outsiders. This process, he contends, has been marked by "overlapping discourses of temporal othering, usually imposed by non-islanders" and "internalised notions of time slowing down" that "are re-appropriated by islanders and entangled and sustained for the purpose of island branding and touristic promotion" (Oroz 2022, 13).

Oroz characterises his intervention into discussions of island time as being located at the "crossroads of Mediterranean studies, island studies, time studies and Balkan Studies" (Oroz 2022, 9) and being presented in order to "trigger fresh perspectives in our understanding of 'island time'" (13). In what follows we also position our related reflections at the crossroads of cultural anthropology, island studies, Nordic studies and time studies. As importantly – and in our attempt to "trigger fresh perspectives" – we approach our island context study from the perspective of aquapelago studies.[2] Within this, we regard the island aspect as a component of an integrated terrestrial and aquatic assemblage generated by livelihood activities and subsequently inscribed with the everyday practices and cultural imaginary of communities. Within aquapelagic contexts, experience of working on and/or in the sea has its own patterns and cycles that create distinct temporalities. These patterns merit detailed analysis, both in general and in the Faroese context, but are not addressed below (except in passing), given our focus on the terrestrial (i.e., island)

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2   See Hayward, Joseph 2023 for a detailed overview.

manifestation of aquapelagic patterns. Like Oroz's article, our case study is also a European one that examines the "entanglement of space, body, and time… reflective of the "modernity emerging at the fringe of diverse borderland regimes" (2022, 12) However, the "borderland" we address is significantly different to Oroz's case study, lying at the northwestern edge of Europe in a territory slowly extricating itself from Danish colonial administration. Located in the northeastern corner of the Atlantic Ocean in a cold water context, the hedonistic Sun-Sea-Sand-Sex aspect of Mediterranean tourism outlined by Oroz in Dugi Otok[3] is replaced by more demanding hiking and adventure tourism and experience of natural landscapes and the various types of mist, drizzle and rain that frequently envelope them.

We commence by outlining key determinants on the physical, economic and cultural nature of the Faroe Islands, contemplate the nature of Faroese island temporality as generated by and manifested in various aquapelagic practices and then conclude with what can be gleaned from the national experience of time to reflect more broadly and "trigger fresh perspectives" on contemporary/Anthropocene temporalities.

2 The Faroes and its Aquapelagality

Located midway between Norway and Iceland, the Faroes Islands is a self-governing territory within Denmark with a population of ca. 55,000. Many Faroese – and particularly young islanders – spend time in Denmark for study, work or vacations during their lives, and with a substantial proportion returning, in what can be regarded as a cyclical pattern of migration (Hayfield 2017). While the total landmass of the eighteen main islands, hundreds of adjoining islets and skellies is only 1,400 km^2 **[fig. 1]**, the Faroes has a large regional footprint through its maritime economic exclusion zone, which covers ca. 274,000 km^2 of ocean. Traditionally reliant on fishing as a subsistence and trading activity, the Faroes is home to a paradigmatically aquapelagic society in which aquatic spaces are essential to the islanders' "habitation of land and their senses of identity and belonging" (Hayward 2012, 5). The concept of the aquapelago, initially advanced in debates in the journal *Shima* in 2012-14,[4] was formulated to characterise societies that are heavily reliant on marine resources and the various ways that reliance creates a distinct *weltanschauung* (world view) that

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3 While Oroz does not discuss the fourth 'S' in his article, we presume the holidaymakers he refers to are – at very least – not adverse to practicing it.

4 This material has been collated online at: `https://www.shimajournal.org/anthologies/aquapelago.php`.

extent, still is – difficult to make plans with a fixed time schedule in the islands. Fishers of past generations needed skills and science, "but also art and omen" (Gaffin 1996, 30). The ocean's flows and twirls, its capriciousness and intensity, resonating the maritimity of the temporal orientation of islanders, is alien to the present-day hegemony of chronometric time, and its continuing influence on the pace of life in the North Atlantic should not be underestimated. The temporal dynamism created by the interplay between nature's flow and the movements and schedules of everyday life constitutes what could be called 'Faroese time', which is premised on waiting, hoping and doubting as capacities that connect the past to the future, and vice versa. Chronometric time may be used in such durées but does not determine them. Time, says Augé, "is a palimpsest; everything inscribed there does not reappear, and sometimes the earliest inscriptions surface most easily" (2016, 85).

The temporality of the aquapelagic assemblage can be considered as suspended within the fluidity of the sea. Discussing so-called 'liquid modernity', Bauman offers this interesting reflection about fluids

> Fluids, so to speak, neither fix space nor bind time. While solids have clear spatial dimensions but neutralize the impact, and thus downgrade the significance, of time (effectively resist its flow or render it irrelevant), fluids do not keep to any shape for long and are constantly ready (and prone) to change it; and so for them it is the flow of time that counts, more than the space they happen to occupy: that space, after all, they fill but 'for a moment'. In a sense, solids cancel time; for liquids, on the contrary, it is mostly time that matters. (Bauman 2000, 2)

Baumann's presentation of solid/fluid contrasts is insightful for the example at hand. Through their practices, creating the 'islandness' of the islands within their aquapelago, the Faroese negotiate the boundaries and connections between the sea and the land and with time itself. The narration and negotiation of slow/fast and wavering time at spatiotemporal intersections, based on social and cultural representations of time, is a process that reflects local/global (temporal) dynamics in flux in a small island setting. It can be characterised as the art of "temporal trampolining", moving back and forth in time in relation to work and movements (Pedersen 2012, 5-9). While the analytic slow/fast time dichotomies obviously refer to representations of relative tempi linked to a variety of settings and domains – which generate clashes between competing (and in some cases hierarchical) temporalities as they intersect – they suggest a wavering trajectory of time and of chronometric time in particular. In what follows, we explore this through vignettes of Faroese

experience that exemplify traditional Faroese senses of temporality and indifference, resistance to and/or partial accommodation of chronometric hegemony.[6]

3   The Shore and the *Rekamaður*

At the island's edge, between land and sea, "every intrusive artefact, material and cultural, has had to pass", Dening asserted (1980, 31) – at least until international air transport became an alternative in the twentieth century – and the coastline is therefore an essential cultural contact zone and place of reception, waiting and departure. The water's edge in the Faroes comprises wind-swept and wave-beaten shorelines of a rocky or sandy nature that are the result of centuries of coastal erosion and storms. This dynamism fosters a narrative of the island "as always becoming" (Kothari, Arnall 2019, 313). The practice of *at leita eftir reka* and the figure of the *rekamaður* are notable in this context. The two terms translate most easily into English as 'beachcombing' and 'beachcomber' but are very different in their nature. The English language terms date back to the 1840s and suggests a relaxed and amiable whiling away of the hours collecting material such as shells or wooden objects along beaches, as typified in E.J. Banfield's 1908 memoir *Confessions of a Beachcomber*, which served to popularise the practice. The Faroese term *at leita eftir reka*, has substantially different connotations that reflect the deep roots of the practice in the region. In essence, the term refers the act of seeking and gathering *reki* (something that is floating in the sea or drifting ashore). *At leita eftir reka* held a particular position in traditional Faroese culture, particularly in the medieval era when *reki* had a high value. Given the absence of trees on the islands, wood was (and still is) a premium product, and it was not an easy task to import timber for house building. What is known in English as driftwood was once the main source for all timber used for construction of houses in the Faroes. In the remote village

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6   We stipulate that we explore illustrative vignettes in this article since the relatively short space of a journal article does not provide us with nearly enough space to explore the wide range of temporally related systems and behaviours that exist in the islands. To give two examples of topics that we have not had space to consider: seasonality was once a major rhythm in the island fishery but is one that has largely been over-ridden by highly mobile industrial fishing ships. Tidal factors have also been important in local artisanal fisheries – particularly the *kyrrindi*, the period when the tide turns, although these local fisheries are now much diminished.

of Gásadalur, a family managed to build a whole sitting room from precious mahogany wood found on a beach.[7]

Indeed, *reki* was so important to the local economy that, the right to collect it from the beach was regulated in traditional law.[8] There were also rules concerning the size of driftwood that could be taken. Small items of driftwood could be collected by local people while larger pieces were the property of the (Danish) king, or rather, his local representatives. Driftwood with no clear sign of human processing (such as timber from whole trees) could be collected and used or traded by the *rekamaður* (Petersen 2013, 76-7). Illustrating the deep roots of the activity, there is a term, *rekapláss*, that denotes beaches known to offer good access to *reki* and, thereby, locales within the Faroes where *at leita eftir reka* has been more prominent than elsewhere. Given that farmers had rights of ownership to the beaches adjacent to their land, they could also monitor and restrict *at leita eftir reka* in their areas but, in practice, many people, especially poor people without land properties, engaged in it as a semi-clandestine practice. Patience and persistence were essential, as the arrival times of precious drifting materials were unknown, and no outcome was guaranteed from extended periods of monitoring the shoreline. The most famous *rekapláss* in the Faroes were the coves in Viðoy, the main beaches in Vágar, and the beach in Kirkjubø and most of the driftwood washing ashore there, and elsewhere in the Faroes, starts its long oceanic journey in the mouth of rivers such as the Yenisey) in northern Siberia, drifting into the Kara Sea and then further to the North Atlantic (KvF 2017).

Jens Pauli Heinesen's novel *Rekamaðurin* (1977) drew on this local heritage and introduced the reader to an unusually stubborn and optimistic man waiting for the 'perfect catch' to bring wealth and honour to him and his kin. A local proverb says *tolin trívst* (patience thrives'), implicitly contrasting temporal self-control and endurance against the "lack of decorum" of haste and impatience (Bourdieu 1979, 57). While *at leita eftir reka* is now a far more marginal practice, the *rekamaður* remains significant for embodying the dynamic connection between the sea and the land in the aquapelago and for performing and demonstrating some of the temporalizing elements of life on small islands. Their solitary enterprise, scouring

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7 Referred to in KVF (2017). *Rakamaðurin á Hellunum* (documentary by Mikkelsen. T. and Eli Dam, J.). Tórshavn: National public broadcast company of the Faroe Islands. https://kvf.fo/sjon/sending/rekamadurin-hellunum?sid=75858.

8 *Reki* was defined as everything drifting in the sea that no owner is collecting. Everything that had once been in another possession before it was lost at sea – like chests, timber, clothes, etc. – was the property of the king, if the owner did not lay claim to the objects within a specified period of time (Petersen 2013, 71). Later, in the nineteenth century, *reki* offshore was deemed the property of the State.

the waterfront for exotic objects over extended periods, is motivated by their eagerness to discover 'new' things that are not present on the island. The first passage of Heinesen's book (1977, 1) introduces the core dilemma of its protagonist

> Very few beachcombers enter World History, they search and search, lie awake throughout the night in fear that the flotsam of a lifetime will be taken by the current along the waterfront without anyone to take care of it.[9]

The problem is not just foraging in vain. The worst thing is to fail to spot 'once in a lifetime' material onshore before it is carried away by the waves and currents. This is the ultimate scenario that keeps Heinesen's *rekamaður* restless and insomniac. He never knows what the next day's catch will comprise (or whether there will be any the next day). In the novel, the *rekamaður*'s one-man enterprise represents a Herculean effort that, like a Sisyphean trial, falters every time it approaches its goal (Gaini 2011). Even after painful failure (he loses a huge haul), the *rekamaður* returns to the beach to start anew, because "maybe he would, this very night, find the passage through the headland of hope" (Heinesen 1977, 117). *Rekamaðurs* collect objects that they make creative use of. In this regard, *at leita eftir reka*, is more than simply scavenging. The *rekamaður* acts as a *bricoleur*, rearranging available materials into new motifs. The *rekamaður* is motivated by prospects of the imminent future manifest in people's dreams and desires. As Anatole France says, "out of generous dreams come beneficial realities" (cited in Urry 2016, 23). As prime site of potentiality, the future continues "to inform actions in the present" (Nielsen 2011, 417). From this perspective, seeing the present as "not-yet" (Pels 2015, 789), the *rekamaður* acts as the agent of altered futures through his 'outlandish' findings. His practice involves a temporal collage of aspiration, with images from the past, the present, and the future combined in a creative composition. This temporal negotiation at the water's edge, using flotsam as roots to the future, brings something old and makes something new, as Dening (1980, 31) says, symbolizing coastal communities' wavering temporalism in a location of rolling stones, gusts of wind and surging breakers that remind us "that nothing is ever completely still here" (Boon, Buter, Jeffries 2018, 9).

The temporalities at the ocean's border, with the view of the never-ending movements of the sea, the high tide and low tide, the sea-drift washed up on the beach, the boats in the horizon, and all other marine sensations, hinder the freezing of time. Visceral, lived

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[9] Unless otherwise stated, all translations are by the Authors.

experience, says Hay, cultivates 'island meanings' (cited in Boon et al. 2018, 6). The dynamism and fixity of the coastline, producing multiple temporalities of the movement of sand and rocks, gives people at the edge of the island a temporal orientation premised on a stoic and decelerated form of wayfaring on a horizon of expectation containing a 'perhaps' or 'maybe'. This Faroese 'maybe' refers, above all, to spatiotemporal positions: maybe today, maybe tomorrow, maybe next week, etc. (Norgate 1943; Ecott 2020). Illustrating the shift in *at leita eftir reka* from being a livelihood activity to a more discretionary practice, one manner in which it has been preserved and celebrated in the modern era is in artworks by Faroese artists such as Tróndur Patursson (born in 1944 in Kirkjubøur) who has produced artworks using driftwood and whalebones.

4   Women and Waiting

Faroese men have practiced long-distance working (LDW) since the late ninteenth century, when industrial fishing emerged in the Faroe Islands. Prior to this, fishing was small-scale and took place in the sea surrounding the islands, guided by the lunar cycle and the weather. However, upon the onset of industrial fishing, smacks would journey much farther afield. They sailed to fishing grounds near Iceland and Greenland in February only to return in the late autumn. Most men of working age were employed in fishing and absent for lengthy periods, leaving the tending of everyday life on the islands to women. Women's paid employment was largely centred around fish processing, drying fish on stone-paved grounds along the shoreline where the sea meets the island. Fish work was generally incompatible with family life, at least whilst children were young. Coupled with the gendered assumption that employment was the confine of pre-marriage life, only some married women sustained paid work. Still, men's absence placed a substantial physical and mental strain on women who worked like "horses", carrying out carework, housework, maintenance, and cultivation (Joensen 1985, 76).

  Thus temporalities of the Faroese revolved around fishing and the fishing season. Whilst men were seafarers, married women were shore bound. Time in this sense related to the seasonal oceanic rhythm. Yet, the rhythm of the sea is unpredictable and could with little warning transform into a harsh unkind environment. Fishing in the North Atlantic seas was, and to some degree still is, treacherous, and many lives were lost at sea. In the extract below, Grand and Olsen (2021) observe the profound backdrop from which Faroese aquapelagic relations must be understood

On one hand, the sea is enticing, stunning and vast; on the other, fierce and characterised by the profound, unpredictable forces of nature. The duality of the sea means it both gives and takes. It is both a rich local resource and a place of loss. In every Faroese family there is a fisherman, and everyone has had the tragic experience of losing relatives at sea.

From the extract, we catch sight of the ambivalence of the sea and how it frames collective consciousness in the Faroe Islands. It concerns simultaneously death and survival. According to Joensen (1982) the well-known cry "skip á fjørðinum!" ('a ship on the fjord') would cause everyone to drop what they were doing to see which ship was returning. It was especially women with husbands, fiancés or sons who waited longingly for their loved ones to return. Loosing loved ones was emotionally devastating, however, it could also literally throw families into poverty. Thus women's waiting was simultaneously emotionally charged and a reminder of their dependency on men. Understood this way, women's waiting in the Faroe Islands constitutes a primary way in which gendered power relations are manifested (Castellanos 2023).

In his memoirs Pastor Børge Kielberg recounts his observations of life in the village of Viðareiði in the early 1930s

Many go down to the landing place these days, and there they stand, staring out to the sea. They stand silently for a long time as the wind tears at their clothes, and one hears nothing but the howling of the wind and the roar of the surf. But suddenly, a cry comes from one of them. Soon the others can see it too. Now the men and sons have come ashore, and there is joy. Many people are down at the pier – mothers with their children – and soon they return in cheerful little groups. On the way home, they are repeatedly asked by many women whether they have seen any of the other ships. Some they have seen or heard about, but sometimes they are asked about ships that no one has seen or heard anything from in a long time. And then there is fear and weeping in many homes. The wait between ships returning becomes longer and still there are some left at sea. Anxiety is starting to creep in. [The text goes on to narrate the experience of one woman who is waiting.] The nights become so long, and the darkness feels so close. She has a husband, three sons and five brothers on the same ship. They have not returned, and it is no wonder that the worry can at times be so overwhelming that it is more than the heart can bear. [Eventually this ship returned]. But it does not always go well. Sometimes September passes and gradually the whole of October has crept by. A heavy atmosphere settles over the village and people start to speak slower. As time goes by, the certainty grows that some skips will not return. (Joensen 1982, 348-9)

5   Slow Communication

The simultaneous slowness-and-calmness, resilience-and-stubbornness and overarching 'maybeness' shared by Faroese villagers, and evident in practices such as *at leita eftir reka* and women's waiting can be understood as temporal-ecological adaptations to the island-water spaces of the North Atlantic. The social manifestation of these has been illustrated in an array of exoticizing and often amusing texts about the North Atlantic aquapelago. For instance, Jonathan Wylie, an American anthropologist, had to spend a lot of time drinking tea and chatting with villagers during his fieldwork on the islands in the 2000s and later commented that

> The pace of conversation is excruciatingly slow by American standards, particularly among older men. Each utterance is followed by a measured pause, and the breaks between topics are punctuated by exchanges of '*Ja, ja*', 'I reckon so' and the like – perhaps as many as four of five of these, delivered with great deliberation about fifteen seconds apart, at a volume midway between an undertone and a normal speaking voice, like a metronome overheard ticking slowly in the background. This leisurely – and not to say lugubrious – rhythm got on my nerves at first, but it proved virtually impossible to hurry things along, especially with people I did not know well. If I, or an importunate child, broke the rhythm of *ja-ja*'s and I-reckon-so's, the interruption would simply be ignored. (Wylie 2011, 67)

This observation, which illustrates the disparity of different temporalities and styles of informal communication, identifies the visiting fieldworker's problem with the long pauses and phatic words and phrases in conversation with the villagers. He waits for the men to tell something exciting and interesting, something to add to his fieldnotes, but, obviously, they do not feel any need to rush with information. The villagers, who know almost everything about each other, might also find it difficult to include the visitor in on local gossip and storytelling, because he does not have any bonds to the place.

The unrushed and clock-time omitting style of conversation, where villagers talk about events from past centuries as if they had happened yesterday, and about tomorrow's programme as if it was a century ahead, reflects a "fluid, but deep" temporal orientation (Gaffin 1996, 226) among the villagers of the islands. The lightness and gently teasing tone of the chat among them is also a way of reaffirming the social order of the community. What might look like a decelerated and laid-back village life from the perspective of the observer from the city, is island life with the unpredictable ocean as

closest neighbour. Things can change abruptly, and without notice. The temporality of the islanders is therefore also a time of waiting. It is a question of the micropolitics of pace: waiting for the right moment at the right place (Eisenstein 2021, 460-1).

In a short satirical ballad called '*Ongin letingi*' (No slacker), which was translated into Faroese by the writer A.C. Evensen (1874-1917), and that children used to read at school for most of the twentieth century, readers receive this guide for the week:

> Monday I have nothing to do
> Tuesday I have plenty of time
> Wednesday has to be my free day
> Thursday I mull over things
> Friday I do whatever I like
> Saturday the day of rest (Sabbath) is imminent
> And then the week is over. (Føroya Læraraskúli 1984)

The verse gently satirises people's narratives about the uneventful cycles of their weeks through the repetition of things in an unpretentious manner. Rather than talking about boredom, which is normally associated with a "surfeit of unwanted, static time" (Coleman 2018, 46) and the hope of a glorious life "waiting just around the corner" (Lefebvre 1960, 124), Faroese village temporality more accurately reflects a "slower, more human pace of life" (Nelson 2008, 236) without the sense of being humdrum. This is reminiscent of characterisations of the outer islands of the Okinawan archipelago where, Tanji and Broudy contend, time is "an open ocean where movements in the tides and currents of society sometimes carry people a bit off course and delay meetings" (2017, 218). The ocean is both a metaphor and a part of everyday life. The same is the case for the Faroes. You could also say that Evensen's ballad, probably unintentionally, mocks the temporal systems and distinctions that we (i.e., humans) base our conventional predictions on, and which give us the experience of, the 'passage of time' – especially when we somehow fail in our preparations and predictions. Existence in this island community in the North Atlantic, says Gaffin, "is a unique blend of the finely detailed with the indefinite" (1996, 225).

6   Off the Clock on Fugloy

Fugloy is located in the most north easterly corner of the Faroe Islands **[fig. 1]**, in a region that is as remote from the territory's capital as you can get, and in an area that was once reputed to be home to mysterious phenomena. One of the legends concerning Fugloy relates that it was once a floating inhabited by trolls and that efforts by the archipelago's inhabitants to fix it in one spot failed until a group of Christian priests set off to catch the island. Rowing fast, they caught up with it and threw a Bible onto its shore. The island then stilled and was tethered to the ocean floor. The trolls were quickly conquered, and human occupation of the island began. In terms of the discussions advanced in § 3, we might conceive of the island in this tale as a massive and highly inviting piece of *reki* that was physically bricolaged into the archipelago. We can conceive the myth as a manifestation of the Faroes' "aquapelagic imaginary" (Hayward 2018), echoing broader narratives about movements and terrestrial/marine reconstellations within the space, as well as the relationship between human and non-human in changeable environments (Kothari, Arnall 2019, 313).

Fugloy's population, spread between the main village of Kirkja and the smaller hamlet of Hattarvik, peaked at around 250-300 in the early twentieth century before declining to around 15 all-year round inhabitants by the early twenty-first. While electricity arrived in the 1960s and while the island has amenities such as a helicopter landing pad, it retains a traditional subsistence lifestyle based on livestock farming, fishing and harvesting puffins. A 2020 Faroese television documentary about life on the island entitled *Einki eitur klokka*[10] (which can be translated as 'There is not such a thing as the clock')[11] provides a series of useful insights into life on the island. While the title is rhetorical rather than accurate (in that there are clocks in the islanders' homes), one of the islanders, an elderly woman living alone without feeling lonely, says: "we are free from the clock out here". The remark is revealing. She mulls over time and says: "I have done my part in following the clock, when I was working… now I don't adjust to the clock… I go out and I don't even bring it with

10   KVF (2020). *Einki eitur klokka* (podcast documentary by Joensen-Næs, D.; Stenberg, J.) Tórshavn: National Public Broadcast Company of the Faroe Islands. https://www.listennotes.com/podcasts/dokumentarar/einki-eitur-klokka-JujX2kPz3rG/?srsltid=AfmBOoo_BTEDEwufiBC9EGiIZqIkLfGVM_60F-6FPvv2Mcm8pgLG_lts.

11   The Faroese title – taken from a participant's comment – literally declares "there is nothing *called* clock" (emphases added) but the comment in the program refers to non-adherence to clocks rather than issues of local nomenclature, hence our choice of translation.

me". She looks out over the familiar sea and confirms: "here, there is no clock". The only exception, she adds, are the schedules of ferry boat or helicopter arrivals and departures, which are only interesting for travellers or for those awaiting or farewelling them. She gets up when it is bright and goes back to the house to rest when it is dark. By ignoring chronometric time, the weather and seasonal change decides what work she should do and when. It is also significant that she acknowledges once having lived within chronometric terms of reference, when she was "working". While unspecified, this work is implicitly not the type of subsistence activity conducted on Fugloy but, rather, more modern employment, probably on a larger island.

The classic oxymoron *festina lente* (make haste slowly or more haste, less speed) comes to mind in Fugloy and underlies many local sayings. "Strange, but I never feel lonely", says another islander. "Long time gone", she adds, "since I stopped adapting to other people". This woman, sitting in her cosy old-fashioned kitchen, watching the inlet and the shingle beach through the window, checks if anything has changed in the landscape since she last looked at the sea. There's a significant detail in the scene. While she talks, the national radio is on in the background. While clocks may have a minimal presence, the chronometrically determined rhythm of daily program slots often plays out in the interiors of Fugloy homes and assumes an increased prominence during the long dark days of winter when inhabitants are often inside for extended durations. In Fugloy, and other small and remote islands, the radio has long been the main connection to the chronometrically-organised external world. Traditionally, radios held pride of place in homes, being placed in the finest corner of the living rooms of the old houses. While the amount of broadcast air time was limited, the news, conveying both maritime weather forecasts and international political updates, echoed a temporality that was far from the daily rhythm of life in the island villages. Later, with the introduction of a full schedule of Faroese national radio, death notices became a symbol of the relation betwen the temporality of the individual and the temporality of the local society (Leonard 2020, 223). In this acceptance of one facet of chronometric time, the salient point is the choice to adopt this while ecshewing a more general chronmetric detreminism.

The islanders also reflect on the huge difference between life in Fugloy and in the capital city of Tórshavn in the documentary. In Tórshavn, one of the women argues, there is "too much rush". People do not have time for anything, she laments, and the children have nothing to do except play sports. There is nothing else for them there, she asserts. The interviewees also observe that they feel allowed 'to be who they are' on Fugloy and thus be free in a different way than they would be in larger and more complex places. What is apparent in the perspectives from Fugloy is that the boundary of the island does

not give the islanders a sense of being *un*free and, in that regard, it suggests the benefits of what Vanini (2011) has characterised as islander 'insulation'.

The insulation isolation/ is felt through the water's edge, or, from the reverse side, through the island's edge, making the boat (and later the airplane) vital for connection to other islands and to the rest of the world but, as Hay (2013) emphasises, this not a rigid confinement that cuts islanders' links to the surrounding ocean and beyond. A different type of temporality, temporal estrangement and experience of alternative cultures is, for instance, manifest in the life story of one of the neighbours of the clock-less Fugloy islander, an elderly man who spent virtually his entire adult life travelling the Seven Seas as a mariner. He went to sea at the age of sixteen and some of the trips during early adulthood lasted one-and-a-half years. His voyages took him to various ports around the globe before he returned to pursue a peaceful life in the place that he calls home. His return to the island and his affection for the ocean suggest that both function as his place of origin (DeLoughrey 2018, 187). Despite his retirement from the rigid schedules of shipboard life, he characterises that there is always plenty to do on the island, if you want.

7 The Airport and the New Temporality

For almost all of the Faroes' history, harbours have been the arrival and departure points for incoming and outgoing travellers. The reliance on ships and ship routes has reinforced the aquapelagic nature of the island experience and the vagueries of sea travel times have contributed to Faroese senses of temporality and the general unpredictability of things. The Faroes first commercial airport opened in 1963 and has been extended and upgraded in various stages over the last sixty years (most notably in 2014). Its operation has obviated the need for time-consuming oceanic wayfaring and arriving and departing onshore – once important aspects of lived experience and movement for islanders – and has, thereby, significantly decentered the aquapelagic aspect from contemporary travel. The airport (like any other) is a hub for travellers leapfrogging through regions and cities, and has introduced new spatiotemporal configurations and schedules into the Faroes. The connections facilitated by modern aviation operate within "the universe of disciplined time" (Thompson 1967, 64) and has thereby led to moments of uneasy juxtaposition. When the electronic information screen at the airport started to signal flight arrival and departure 'delays' of a few minutes some ten years back, you could see the smile on many Faroese travellers' faces, an amazed look suggesting the silent question: is this a joke? The minute-craze of ultramodern 'non-places' (Augé 2008),

of which busy international airports are quintessential examples, seems incongruous at this modest airfield in the North Atlantic that inclement weather routinely cloaks, rendering 'delays' more predictable than on-time arrivals. Indeed, the airport emphasises that the seamless, foreseeable and standardized travel experience tailored for the frequent traveller is alien to people used to waiting without the slightest feeling of delay. Waiting for the right moment with the right weather at the right place used to be the social norm, reinforcing islanders' patience (Gaini 2018). Such waiting, which was not passive and empty, was not seen as 'waste' of time, because it was not measured against chronometric exactitude. It was, instead, a collective manifestation of what Appadurai calls the "politics of patience" (cited in Janeja, Bandak 2018, 8).

Vágar airport's terminal is a complex space within the Faroes. Located on Vágar island, otherwise a quiet location known for its lakes and historic villages, the terminal represents the point of transition from traditional Faroese spatio-temporality to the smooth and secular temporality and design of global 'non-places'. (Gaini 2013). The terminal's bland international design disconnects locals and tourists from the island environment and the heritage which it has been superimposed on. In the case of the Faroes, one of those heritage elements is the local temporality discussed in this article. Examining interactions at the airport from the perspective of incoming passenger returning home proves instructive. Upon arrival, most local returnees are greeted by a 'welcome home' message (in Faroese) from airline staff over the terminal's loudspeakers. While this no doubt goes over the heads of foreign visitors – for whom it would seem quaint, if they could understand the language – it represents a softening in the formulaic rendition of international travel experiences. This is also notable in the meetings between relatives, friends, tourists, airport staff, taxi drivers and others. The sense of being back home, back in place in the Faroes, manifests as a lack of hurriedness, crowdedness and divisiveness, demonstrating the informal and easy-going rhythm of social life marked by a 'living for the moment' attitude (Pedersen 2012, 2-10).[12] This might not be very different from the realities of arriving in airports in many other small and sparsely populated communities but, in the Faroes, the culturally endorsed practice of waiting and resisting haste has been key to forming its aquapelagic orientation and temporal character.

12 Given its restricted length, we have not explored issues concerning the dissonance of and/or adjustment to aspects of Faroese time required for islanders returning to the archipelago after periods living away. This is a topic that is not often broached in popular media discourse and merits detailed study in its own right.

8 Embodying Traditional Temporality in Performance

The time of the waves, the temporalism of the North Atlantic aquapelago experienced by fishers at sea and *rekamaður* at the waterfront, by the inhabitants of small villages 'of waiting' and of imagined floating islands, is culturally reproduced and typified in the *Føroyskur dansur* (Faroese chain dance). This dates back to the medieval period and is normally performed in a circle with no musical accompaniment other than the participants' own chanting. It involves sustained repetition – two small steps forward (to the left) and one step back, again and again – in a slow and sedate manner combined with an enlivening and boosting chorus. The softly moving human chain, singing one stanza after the other in a monotonous but spellbinding manner, is hard to break or distract, because it is so tenacious and unified. Hundreds of arms and legs move in harmony, for many hours, but at a snail's pace and without the sign of any spontaneity or frenzy. The dance is commonly understood to symbolise the resilience of traditional Faroese temporality and the repetitive and circular shades of continuity typify the wavering nature of Faroese time. Its survival/revival in the contemporary era signals the enduring appeal of traditional cultural forms and sensibilities to the Faroese. Indeed, the dance has also been reaffirmed, represented and dramatically extended in the distinctly modern form of music videos.[13] Xperiment, a community choir based in Tórshavn, recorded a verson of Tróndur Olsen's well-known and affectionately regarded 1915 composition *Í Gøtu ein Dag* in 2015. The song, written and sung in the style of traditional *kvæði* narrative ballads, is a short satirical composition relating how a famous historic Viking chieftain wakes up from a centuries-long slumber and encounters modern society and its new technologies and trends. Disappointed and disillusioned, he decides to return to his deep sleep. The accompanying video dramatises Tróndur's awakening through short dramatic sequences intercut with images of the choir singing the song while performing a *Føroyskur dansur*, its rhythms acting like a comfortingly familiar lullaby to return the chief to his slumber.

Along with the video for Xperiment's *Í Gøtu ein Dag*, another audiovisual production presents a striking modern inscription of Faroese traditions of patience and waiting. Hamferð, a metal band who characterise themselves as representing the ongoing adversity of island life resulting from centuries of "storms, famine, disease and

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13 While music video is often regarded as antithetical to traditional modes and styles of musical performance and cultural context, it has been deployed to different ends in what be typified as marginal music industries, such as those in island locations. In Papua New Guinea and Vanuatu for instance, music video has been used to represent traditional dances and cultural practices for several decades (see Hayward 1995).

death" (Green 2013,175), recorded a song entitled *Deyðir varðar* ('Dead cairns') in 2015 that described the darkness and coldness of night and the pain of losing a loved one in a harsh terrain. Kenneth Jørgensen's music video for the track featured the band miming in a continuous take over the peak of a total eclipse of the sun as experienced on the hills above Kvívík, on the western coast of Streymoy, on March 20th 2015. As a result, the central third of the six minute thirty seconds long video was shot in total darkness. The blacking out of an extended portion of the visual track of a music video is diametrically opposed to the form's aesthetic focus of grabbing and retaining viewer attention in a fast stimulation and gratification cycle and the video maker and band's confidence in presenting the 'eclipsed' sequence signals their familiarity with a local audience that can tolerate and appreciate such elements.[14]

9 Watching Heritage

Along with the transition zone of the airport, Tórshavn represents the islands' chronometric centre, in that the small city operates on a similar basis to other European centres of administration, commerce and tourism. Clock times, timetables and related comings and goings and openings and closings occur in predictable pre-notified patterns, obviating the need for extended waiting and the patience required.[15] Outer islanders often have a split attitude to the capital. While it offers all manner of useful retail outlets, services and leisure and entertainment options, it is often characterised as the 'most Danish' place in the Faroes, in contrast to Klaksvík, on Borðoy, for instance, which is arguably 'more Faroese' and where the more unpredictable rhythms of the fishing industry are more deterministic than administrative activities, retail or tourism.

The tensions between traditional and chronometric temporality – and differences between the capital and the outlying islands and islets – is manifest in the establishment, operation and promotion of Tórshavn's 'Faroe Time' watch company. Its website[16] offers a rich bouquet of ironies that highlights two separate temporal traditions. This begins with the emphasis on the slow, unhurried and skilled design and prototyping of the company's high-end watches

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14 See Gaini, Hayward, Hill 2025 for a discussion of landscape and cultural heritage in Faroese music videos.

15 Indeed, on the very first day of the third named author's stay in the Faroes he witnessed two locals checking their watches and being irritated at the apparent delay in a bus arriving at a local bus stop running passengers down into the city centre – behaviour at marked odds to that discussed above on outer islands.

16 Faroe Time company website: `https://www.faroetime.com/ourstory/`.

in its 'Our Story' section, implicitly aligning this with traditional Faroese craft traditions. At the same time, the site identifies Niels Arge, the proprietor and designer, as part of what might be termed the 'chronometric establishment' of the capital by virtue of his family's tradition of watchmaking. Fittingly, in this regard, the 'Inspiration' page relates that the men's watch face designs promoted on the site were developed from Tórshavn cathederal's historic clock face, which dates back to 1865, and whose installation might be characterised as a pivotal moment in the chronometrication of the city. By contrast, the website identifies the design of women's watches as based on a knitted star craft design collected on the outer islands in the 1930s by Hans Marius Debes. There's a plurality here which suggests watch design and manufacture as a local heritage practice capable of echoing the city's architectural heritage at the same time (no pun intended) that its women's watches appropriate a rural women's craft motif in a new medium. The 'Home' page goes further, displaying the company's current range of pocket- and wrist-watches on a white background below a dramatic image of sea-stacks[17] viewed by a tiny, lone observer, cross-associating the undeveloped primeval landscape (which has no need for chronometry given its lack of human inhabitants) with the luxurious time pieces. Emphasising the connection to landscape, the final 'Contact' section of the website dispenses with representations of watches altogether and includes contact information below a striking photographic image of Mykines island, in the far west of the archipelago. The company's promotion takes another turn on its Instagram page,[18] which features shots of watches placed or digitally montaged against landscape features. While the exercise attempts to further relate the products with natural features, some shots – such as the juxtaposition of a watch on a wearer's wrist against a typically remote Faroese cliff-face – raisine the question of the necessity of chronometric precision in such a locale.

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17 See Fleury, Gaini, Hayward 2025 for a discussion about the role that sea stacks play for Faroese communities.

18 Faroe Time Instagram account: `https://www.instagram.com/faroetime/` (2025/04/18).

10   Reflection

At Vágar airport, as well as in other present-day Faroese contexts permeated by the chronometrically determined temporalities of the globalising world, some islanders might feel that they are being forced to compromise their 'own time' and be involuntarily synchronized to modern secular time. This imagined rupture resonates the different temporal regimes and dynamics that – as outlined in this article – people from small island communities negotiate in everyday life at the waterfront. The *ja-ja*'s and I-reckon-so's of North Atlantic villagers, we recall, pushed the visiting American fieldworker to the point of exasperation. What maybe looked like laziness and carelessness, or insulated Faroese time, to the outsider, is the time of the waves in 'the Land of Maybe'. Faroese temporality serves to remind us that there are older alternatives to chronometric time and that time *keeping* can be an assertive exercise even when its pace is slow, and when its event structures are repetitive. We can perceive resistance variously as anti-modernist, anti-imperialist or just as sheer obduracy, but the desire to syncretise or juggle varying temporalities as befits the moment represents a form of active multi-temporal choice. It is also one that recalls contemporary Faroese bilingualism (Faroese/Danish) and increasing ability to speak English in order to engage with and profit from multiple cultural grounds and media products without abandoning their cultural heritage

We can broaden out this perception to identify recognition of and access to alternative temporalities as valuable personal and social resources. These can be drawn on to combat the imposition of rigid chronometric regimes and related productivity targets of the types endemic to modern industrial organisations such as Amazon[19] (characterised as "algorithmic despotism" by Delfanti 2021). The latter can thereby be viewed as other than an inevitable and irresistible outcome of technologized modern capitalism that marks the 'end of history' of pre-industrial temporalities. The history of industrial relations under capitalism shows a continual battle between managerial perceptions of humans as production units that need to be standardised and constantly monitored in order to achieve peak productivity and the desire of workers and their representatives to *at least* gain recognition of various designated time slots for everything from toilet visits, lunch breaks, weekends and/or annual holidays. In this manner, traditional Faroese temporalities and their 'inbuilt' periods of waiting – however "excruciatingly mundane"

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[19]   It is no accident in this regard that one of Amazon's products is the online 'Amazon Time Sync' system that provides access to the current time through satellite-connected atomic clocks, synchronising time to within a few milliseconds.

(Vanini, Taggart 2013, 227) – appear far more humane than modern alternatives and far more amenable to quiet and reflective periods that are increasing inaccessible within modern temporalities that are determined by chronometric time keeping. For this reason, if for no other, they are worth documenting, comprehending and learning from.

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Filtering Death, Performing Life: Environmental Humanities and the Ecologies of Taiwan's Wetlands in Chin-yuan Ke's Documentaries

Yalan Chang
National Taitung University, China

Abstract   My paper examines Taiwan's wetlands as thresholds between life and death through Chin-yuan Ke's documentaries *Ebb and Flow* (2011) and *Sea Spray* (2022). It considers wetlands as ecological filters that unsettle modern binaries and host multispecies encounters. The paper shows how film and dance shape a storytelling politics that reframes grief for disappearing wetlands as a prompt for environmental awareness. By tracing these entangled coastal ecologies, the paper highlights how environmental humanities can connect scientific insight with cultural meaning to support wetland conservation in the Anthropocene.

Keywords   Environmental Humanities. Taiwan's wetlands. Ebb and Flow. Chin-yuan Ke. Site-specific dance. Multispecies ethnography. Anthropocene. Sea Spray.

Summary   1 Introduction: Ecologies of Life and Death in Wetland Environments. – 2 What Can Environmental Humanities Do in the Anthropocene? – 3 "Storied Waterscapes": Filtering Changhua Wetlands. – 4 Embodying Wetlands: Dancing on the Stage of Species in *Sea Spray*. – 5 Conclusion.

1 Introduction: Ecologies of Life and Death in Wetland Environments

In the precarious planetary time of the Anthropocene, wetlands stand as powerful emblems of the confluence between life and death.[1] As Dipesh Chakrabarty notes, climate change manifests through various crises, including rising sea levels and species extinction, requiring interdisciplinary approaches that extend beyond scientific expertise (2021, 14). Wetlands are dynamic and ambivalent spaces, described by Rod Giblett as "living black waters" (2013, 188) that signify both renewal and decay, and as "valuable and vulnerable" sanctuaries increasingly threatened by urban expansion (185). Occupying a liminal zone between land and water, wetlands embody ecological richness while remaining environmentally fragile, serving simultaneously as cradles of biodiversity and sites of mourning in the face of anthropogenic destruction. This paper examines Taiwan's wetlands as ecological and cultural filters through the lens of the environmental humanities, focusing on Chin-yuan Ke's documentaries *Ebb and Flow* (2011) and *Sea Spray* (2022). Centering on the wetlands along Taiwan's western Changhua coast, I explore how these "storied waterscapes" (Oppermann 2023, 36) function as critical sites where ecologies of life and death intertwine, and how Ke's films render visible the entanglements of human activity, multispecies flourishing, and ecological grief. In doing so, my paper demonstrates the potential of the environmental humanities to illuminate and respond to the precarious futures of these liminal and threatened landscapes.

This paper opens by addressing the critical importance of environmental humanities and demonstrates its relevance for engaging with contemporary challenges in the Anthropocene. Following this, the second section will be enriched by Ke's documentary *Ebb and Flow*, which offers a visual narrative revealing the interdependence between local residents and wetlands. This section examines the impact of industrialization on coastal communities in Changhua, documenting both ecological and social consequences as residents face deteriorating environmental conditions and economic challenges. The third section explores Ke's *Sea Spray*, focusing on the interdisciplinary collaboration between Ke and Min-ni Tsai's Humanity Theater as it relates to communication from an environmental humanistic perspective. While the Fangyuan Wetland prompted Ke to create *Ebb and Flow* a decade earlier, in *Sea Spray*

he addresses the concerns of a new generation regarding Taiwan's coastal wetlands, emphasizing the necessity of interdisciplinary dialogue in resolving pressing ecological problems. By integrating contemporary anxieties about wetland and seashore encroachment into his recent work, Ke cultivates a heightened awareness of the impending disappearance of these essential ecosystems. Grounded in the theoretical framework of environmental humanities, this paper explores life and death eco-imaginaries and engagements as they are interwoven through the study of human and more-than-human worlds in Taiwan's coastal wetlands. The analysis examines how environmental issues transcend scientific problems to encompass cultural, social, aesthetic, and political dimensions that require interdisciplinary engagement. Taiwan's wetlands offer a poignant case study of ecological vulnerabilities and entanglements as they face threats from industrial development, green energy infrastructure, and climate change impacts.

2 What Can Environmental Humanities Do in the Anthropocene?

Over the past two decades, environmental humanities (EH) has emerged as a key interdisciplinary field for understanding ecological crises. Initially developing from ecocriticism's focus on environmental themes in literature, the field has evolved to incorporate insights from "environmental history, philosophy, anthropology, and cultural geography" (Heise 2017, 6). This interdisciplinary blend has become essential for engaging with environmental problems precisely because traditional scientific approaches alone have proven insufficient.

Wetlands, which are crucial for biodiversity, flood protection, and as possible sources of drinking water, are facing severe crises due to what Serpil Oppermann calls "capitalist regimes of power" that exploit these ecosystems for economic gain (2023, 1). Despite containing "only 0.03 percent of the world's water", wetlands are among the most biologically diverse ecosystems on the planet. However, approximately 50 percent of the world's wetlands have been irreversibly destroyed to make space for housing and agricultural activities (Oppermann 2023, 38). Limnologists Walter K. Dodds and Matt R. Whiles have identified numerous threats to freshwater ecosystems, including wetlands: sedimentation, pesticide and herbicide residues, fertilizer runoff, sewage containing pathogenic bacteria, chemical spills, garbage dumping, thermal pollution, acid precipitation, mine drainage, urbanization, and habitat destruction (Oppermann 2023, 39). These activities demonstrate how modern capitalist practices, driven by an ontological assumption that views humans and other species as self-contained individuals acting in

self-interest, have led to "extractive land relations and managerial practices" that exploit and devastate ecosystems for human-centric gains (Ehrnström-Fuentes et al. 2023). Several key characteristics of environmental humanities make it particularly valuable for understanding wetland ecologies in the Anthropocene.

The framing of the Anthropocene as an era defined by human influence on geological processes is not without controversy (Haraway et al. 2016); rather than a neutral scientific classification, it confronts us with the troubling consequences of anthropogenic dominance and compels critical reflection beyond the confines of geology, climatology, or environmental science. These consequences involve questions of "responsibility and historical roots, anxiety and loss, social behaviors, justice, even ontology", and require understanding how to "think the unthinkable", as noted by Rosi Braidotti and Amitav Ghosh (Iovino 2021, 28-9). As some scholars such as Kari Norgaard and Dale Jamieson have argued, an exclusive reliance on scientific data may prove "politically pointless" (Heise 2016, 24-5), especially when it fails to account for the cultural, social, and ideological dimensions of ecological crises. The environmental humanities address this limitation by embedding environmental inquiry within broader conversations about values, power, and human behavior. In light of this perspective, Sverker Sörlin contends that meaningful sustainability hinges on recognizing the human forces driving "planetary pressures" and reframing our understanding of what constitutes "environmentally relevant knowledge" (Heise 2016, 24-5).

Another distinctive contribution of the environmental humanities lies in its emphasis on narrative as a means of shaping ecological awareness and motivating action. Instead of treating stories as secondary to data or policy, the environmental humanities foregrounds storytelling as a form of epistemology and pedagogy, a "technology for education" (O'Gorman et al. 2019, 448) that encourages critical reflection on the frameworks through which people make sense of environmental realities. Increasingly, this narrative turn has gained traction beyond the humanities, particularly in efforts to imagine more just and sustainable futures. Literature, film, journalism, and poetry all contribute to shaping public perceptions of environmental risk (Garrard 2017, 463). As Heise points out, literary narratives are essential for examining how different cultures conceptualize and respond to ecological threats. Similarly, Greg Garrard emphasizes the pedagogical role of literature in offering metanarratives that help learners grasp the cultural dynamics underlying environmental crises (463). Through narrative forms, the environmental humanities amplify voices often excluded from mainstream environmental discourse, particularly those from marginalized communities disproportionately affected by ecological degradation (463). In doing

so, the environmental humanities contributes directly to the goals articulated in the UN's 2030 Agenda for Sustainable Development by cultivating alternative imaginaries and challenging dominant representations of environmental risk (United Nations 2015).

While narratives help frame cultural understandings of environmental risk, the environmental humanities further emphasize the ethical and political implications of multispecies entanglements and environmental justice. A key strength of the environmental humanities resides in its capacity to bring environmental justice concerns into conversation with the entangled relations between human and nonhuman life. Environmental humanities approach ecological crises not simply as consequences of human action but as outcomes shaped by dynamic interdependencies that include material infrastructures, species relations, histories of displacement, and extractive economies. In this view, responding to environmental breakdown involves not only identifying structural injustices but also attending to the more-than-human agencies entangled in planetary change. Concepts like "multispecies ethnography; transcorporeality; intersectionality; intra-action" (Garrard 2017, 464) signal a shift toward reimagining community as a web of relations that includes both human and nonhuman lifeforms. This broader vision of sustainability reflects the principles of intergenerational justice, which emphasize safeguarding the rights and well-being of both present and future generations. Within the environmental justice movement, intergenerational justice has emerged as a central concept, articulated as the right to "the evolutionary space and time required not just for the survival of humans but all species" (Adamson 2017, 126). Confronting climate change effectively thus demands more than technical fixes; a meaningful approach must address structural inequalities through an integrative framework attentive to both marginalized human experiences and nonhuman agencies. From this vantage point, the environmental humanities advance an interdisciplinary approach that confronts the most pressing challenges to collective futures by fostering coalitional alliances across differences. Such alliances raise urgent and generative questions: "How might like and unlike actors partner to successfully transform social and environmental systems and make them more equitable and just?" and "Can humans act collectively as a species for the common good to ensure intergenerational justice?" (Adamson 2017, 130-1).

Finally, the environmental humanities occupies a pivotal role in transforming our modes of communication about environmental crises by offering expressive modes of engagement that extend beyond the limitations of scientific data and economic metrics. Through creative forms of mediation, the environmental humanities brings overlooked values, affective resonances, and cultural meanings into

public discourse, thereby reaching wider and more diverse audiences, including those in policy and decision-making spaces (Emmett, Nye 2017, 8). Heise cautions that critiques of Anthropocene discourse, especially those aimed at its essentializing assumptions about "the human species", often fail to resonate with scholars outside the humanities (2016, 28). To facilitate more effective communication, she advocates for pairing critique with "constructive alternatives" and actionable visions that can orient collective imagination and policy (28). In this light, the environmental humanities contributes not only analytical insight but also the imaginative capacity to "shape better possibilities", by generating knowledge that is emotionally resonant and socially mobilizing (Emmett, Nye 2017, 8). Beyond simply diagnosing crisis, the environmental humanities supports communicative strategies that catalyze adaptive responses that are attuned to the situated experiences of communities, the symbolic dimensions of environmental change, and the urgency of shaping sustainable futures. This communicative function becomes increasingly vital in contexts such as wetland preservation, where ecological restoration depends on the integration of scientific expertise and compelling narratives capable of inspiring public commitment and driving policy change.

3   "Storied Waterscapes": Filtering Changhua Wetlands

In both landscape aesthetics and modern conservation movements, according to ecocritic J. Baird Callicott, mountains and wetlands historically were feared and despised. However, while mountains have been aesthetically rehabilitated through the influence of landscape painting, wetlands remain largely "aesthetically reviled" (2003, 33). Unlike mountains, which benefited from the development of natural aesthetics in the seventeenth and eighteenth centuries by thinkers like Edmund Burke, Immanuel Kant, and Uvedale Price, wetlands did not experience this "revolution in taste" and continue to be considered "the real outcasts of taste in natural objects" (34). Historically, dominant attitudes toward wetlands have been shaped by an instrumental logic that prioritized exploitation over appreciation, encapsulated in the mantra to "drain 'em; make 'em produce" (34). Under a utilitarian mindset, wetlands have been persistently sidelined; they are perceived as neither profitable nor visually dominant; their ecological complexity and sensory richness are quietly set aside in favor of more economically or aesthetically conventional terrains.

In her analysis, Kathryn Yalan Chang examines Sheng Wu (Sheng-xiong Wu) and Mingyi Wu's *Wetlands, Petrochemicals, and Imagining an Island* (2011) through the lens of environmental

humanities with an emphasis on the book's critical engagement with Taiwan's environmental imagination and bioregional identity, particularly along the western coast in areas like Changhua and Yunlin. Wu and Wu's book also documents the collaborative efforts between artists, scholars, and activists that culminated in the successful Anti-Kuokuang Movement, which halted the construction of the Eighth Naphtha Cracker Project in 2011. This moment marked a rare victory in environmental activism, demonstrating the role of cultural narratives in resisting industrial expansion in Taiwan. Yet the cultural perception of wetlands in Taiwan remains largely unchanged. Often seen as desolate mudflats swarming with mosquitoes and flies, wetlands continue to be treated as expendable spaces, frequently allocated for landfill, industrial development, dike construction, or other infrastructural purposes (Lin 2011, 39). Even Da-chen and Fangyuan, which narrowly escaped destruction during the Kuokuang project, have recently been proposed as sites for solar energy development, again reinforcing the perception of wetlands as wastelands. The persistent framing not only devalues the ecological richness of these areas but also legitimizes their ongoing transformation under the guise of sustainable progress. Against this backdrop, the film *Ebb and Flow* invites a reconsideration of coastal wetlands through a more attentive, affective, and relational lens.

As Taiwan's first investigative filmmaker specializing in environmental issues for the Public Television Service (PTS), Ke devoted three years to filming the Fangyuan wetlands with high-definition cameras. He recorded the daily lives of fishermen, the seasonal rhythms of the landscape, and the striking views from both above and below the water along the Changhua coastal intertidal zone.[2] The muddy intertidal zone along the southern Changhua coast is one of Taiwan's most intact natural coastlines, recognized internationally through awards at festivals, including the Houston Film Festival and the New York TV Festival (China Times 2011). This ecologically significant site, long overlooked by mainstream narratives, becomes the focal point through which *Ebb and Flow* reshapes the relationship between local knowledge, ecological vulnerability, and visual storytelling. By centering a marginal ecological zone and giving prominence to the voices of its local defenders, *Ebb and Flow* embodies several key principles of environmental humanities.

In *Ebb and Flow*, Ke highlights the concept of ecological filtering as both a literal ecological function and a symbolic narrative thread that anchors the film's engagement with environmental humanities.

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2 See Public Television Service (2018). "Ke Chin-yuan Film Series". http://awakening.pts.org.tw/?lang=en.

Wetlands are presented not only as biologically rich ecosystems but as dynamic filtering systems that sustain ecological balance, trapping sediments, breaking down pollutants, absorbing agricultural runoff, and regulating hydrological cycles (EPA 2001). The Da-chen and Fangyuan wetlands exemplify these capacities, functioning as vital ecological infrastructure that reduces environmental contaminants and supports biodiversity comparable to that of tropical rainforests and coral reefs. Through the specific example of oysters, which are shown to filter estuarine water within just two days (Ke 2011, 0:53′14″-0:53′25″), *Ebb and Flow* materializes this ecological function and draws attention to the often-unseen labor of nonhuman organisms in maintaining ecosystem resilience.

Importantly, Ke's ecological framing resists reduction to technical data by incorporating the voice of Taiwanese biologist Hsing-Juh Lin, who argues for a precautionary approach to conservation. Lin emphasizes that oyster shells may contain genetic or biochemical resources of future medicinal value, which remain beyond the reach of current scientific knowledge (Ke 2011, 0:53′28″-0:53′46″). His intervention underscores a critical dimension of environmental humanities, namely the ethical imperative to protect what we do not yet fully understand, a stance that reflects the precautionary principle of preservation ecology (0:53′47″-0:54′00″). In other words, the intervention shifts the focus from mourning 'already known' losses to the ethical imperative to safeguard uncertainty. Instead of relying solely on instrumental logics or utilitarian calculations, *Ebb and Flow* invites viewers to recognize ecological value as distributed, speculative, and entangled with uncertainty. This move translates passive witnessing into an active ethical commitment to intergenerational justice, a demand to protect what benefits those yet to be born (Adamson 2017; Heise 2017). By drawing attention to ambiguity and affect rather than certainty and control, the documentary creates a space for reimagining human–nature relations beyond extractive paradigms. In doing so, *Ebb and Flow* illustrates how environmental humanities contributes to ecological discourse, not by opposing science, but by expanding its temporal, ethical, and imaginative horizons through narrative and visual media.

Just as natural systems continuously adjust and filter changes, cultural and social filters shift narratives and perceptions of wetlands. Ke's film elucidates how wetlands can be viewed through cultural, economic, and political lenses that affect their value and management. Colonial and industrial perspectives have historically viewed wetlands as wastelands or obstacles that must be drained and developed, while economically, wetlands' value is often filtered through the lens of resource utilization and development potential. *Ebb and Flow* captures local residents' narrations about the Kuokuang Petrochemical project, their concerns regarding its impact

on their traditional way of life, and their fears that the wetlands' ecological balance will be compromised. As one fisherman states at the beginning of the film, "If the Kuokuang Petrochemical is built, it will cut off our chances of survival" (Jiang 2011). Ke elevates personal anxiety and grief into a collective environmental justice concern. This narrative amplification was integral to the successful Anti-Kuokuang Movement. The documentary form, by giving prominence to these local defenders, facilitates the translation of affective lament over imminent loss into direct political resistance.

Throughout *Ebb and Flow*, marginalized communities affected by environmental deterioration, including residents of small villages along the Changhua coast, voice their concerns about wetlands that are fundamental to their livelihoods. Ke's interpretations of the lives of the fishermen and their entangled relationships with wetlands and other species illustrate how the politics of storytelling operates as a central concern of the environmental humanities. His cinematic approach diverges from economic or policy-driven narratives by attending to what Serpil Oppermann describes as "storied waterscapes" (2023, 36), environments that are not only ecologically significant but also saturated with memory, perception, and cultural meaning. Ke's attention to place is deeply relational. In his own words, he has spent over two decades observing fishing villages along the Changhua coast, developing what he describes as an intimate understanding of "the pulse of life in the intertidal zone" (Ke 2022b). This long-term engagement allows him to depict wetlands not as static landscapes but as dynamic protagonists.

Visually, *Ebb and Flow* resists conventional environmental documentary formats. Instead of relying on voiceover or expository narration, *Ebb and Flow* centers ambient sound – "hymns, harmonicas, wind, and waves" (Tsai, Yu, Ke 2013, 172) – and emphasizes the presence of both human and nonhuman actors. Migratory birds, cows, dogs, and villagers appear during receding tides "as if scheduling a rendezvous" (Eslite.com n.d.), forming what Ke portrays as multispecies commons. By minimizing external commentary and privileging sensory immersion, *Ebb and Flow* enables what Oppermann calls a "terraqueous imagination", revealing the aesthetic and emotional textures of coastal life (2023, 36). As such, Ke's film does more than document an ecosystem; it stages a cultural intervention that reclaims the wetland as a place of belonging, where "curiosity, fear, and wonder" intersect (36). It is through this storied lens that *Ebb and Flow* challenges the dominant filters shaped by economic, political, and aesthetic forces that have historically rendered wetlands as marginal or expendable.

Despite the ecological and cultural value of the Changhua wetlands, they continue to face opposition from stakeholders who prioritize industrial development. As Renbao Xu, president of the

Da-chen Township Chiefs' Association, argues, the area has "no national-level wetland, only barren mudflats where nothing grows" (Li 2024). This rhetorical dismissal aligns with a long-standing utilitarian perspective that treats wetlands as vacant lands awaiting conversion. Xu warns that wetland designation would "severely restrict industrial development", a statement revealing how economic narratives often take precedence over environmental and cultural concerns. In contrast, the stance of Fangyuan Township illuminates the complexities of ecological conflict. Chief Baoling Lin emphasizes the region's unique biodiversity and the globally recognized "sea ox" tourism culture, stating that over 200,000 people had engaged in "ox cart oyster picking" by the end of 2023 (Issue Center and Trust Center 2024). These cultural practices are inseparable from ecological preservation and reflect a model where wetlands serve as both habitat and heritage. By juxtaposing these positions, *Ebb and Flow* reveals that the conflict is not simply economic; it arises from two incompatible understandings of what wetlands are. The ongoing local contestation over the basis of the wetland's existence (ontology) challenges Western EH narratives of aesthetic rehabilitation, showing that the ontological status of wetlands remains a matter of political struggle. Decisions about land use thus unfold within a dense field of political claims, affective attachments, and ethical commitments, an arena where the meaning of the landscape itself is contested.

However, as Ke's film makes clear, threats to the wetland are not limited to petrochemical projects. Under Taiwan's "non-nuclear homes" energy transition, the same landscapes previously protected from industrial extraction now face encroachment from so-called green infrastructure. As reported in July 2024, Changhua's coastal wetland, spanning over 12,000 hectares, faces the risk of being "transformed into a landscape dominated by industrial structures" (Jen 2024). Residents have voiced alarm: "this will not only devastate the wetland but also ruin the village" (Jian 2024). In Fangyuan Township, solar panels have already replaced clam farms, with local shellfish farmers reporting that clams "shrink too quickly after experiencing a shock" from construction vibrations (Hung, Chien 2024). The transition from fossil fuels to renewable energy does not inherently resolve environmental justice concerns but frequently reproduces them in new geographic or sociopolitical contexts.

Ke's storytelling revitalizes these contested spaces by restoring their cultural and ecological significance. Drawing on Aldo Leopold's insight that emotional connection to a place "cannot be purchased with either learned degrees or dollars" (1949, 174), *Ebb and Flow* calls attention to what is lost when wetlands are reduced to zones of utility. As James L. Smith argues, ecological degradation results in "prolonged pain, anxieties, and traumas" for both nonhuman inhabitants and the human communities who rely on them (2021,

245). *Ebb and Flow* responds not with technical solutions, but with narrative repair, reviving the stories sedimented in Changhua fishing villages and insisting that conservation is not only about species or soil, but also about memory, justice, and intergenerational care.

Set against the backdrop of some of Taiwan's most extensive and ecologically significant mudflats, *Ebb and Flow* offers more than documentation; it performs a cultural and ethical meditation on sustainability, memory, and justice. Ke's storytelling links local histories with global futures, echoing concepts such as intergenerational justice (Adamson 2017) and transgenerational justice, which Heise defines as addressing "how climate change will affect those now young and those yet to be born" (2024, 4). In response to the rising popularity of green energy and the environmental toll of coastal industrialization, Ke has initiated collaborations with younger generations, notably through contemporary dance, to express the emotional and political urgency of wetland disappearance. Ke's use of the Taiwanese example provincializes the universal Anthropocene crisis narrative, demonstrating that environmental encroachment persists even in the pursuit of "better possibilities". The next section explores how *Sea Spray* (2022), Ke's follow-up documentary, expands this environmental humanistic vision through the integration of new media and performance to reimagine ecological futures along Taiwan's disappearing shorelines.

4 Embodying Wetlands: Dancing on the Stage of Species in *Sea Spray*

A decade after completing *Ebb and Flow*, Ke once again focused on wetland issues in 2022, driven by concerns over the government's green energy plan and the environmental deterioration of coastal seashores. In *Sea Spray*, he expands his focus to include Taiwan's coastlines more broadly in a way that takes into account the past, present, and future of wetlands and seashores throughout the island. Collaborating with choreographer and director Min-ni Tsai and her Humanity Theater dancers, Ke sought to increase the visibility of environmental issues among the younger generation. *Sea Spray* consists of five parts: "Beginnings", "In the Name of Love", "Where River Meets Sea", "Is the Sea Still There?", and "Sattva (Sentience)". The film combines staged performances, dancers' interpretive reflections, and footage of dancers in various settings along Taiwan's coastal wetlands. Through this interdisciplinary approach, *Sea Spray* demonstrates several key aspects of environmental humanities' engagement with ecologies of life and death.

After years of engaging in environmental advocacy through newspaper columns, documentary films, and even public speeches

delivered from harbor platforms, Ke confessed that he had reached an impasse in his efforts to inspire environmental concern (Ke 2022b). Turning to dance as a new communicative form, *Sea Spray* marks his shift toward conveying ecological insights without overwhelming viewers with factual information. Instead, he seeks to evoke an embodied response, encouraging audiences to *feel* the coastal rhythms with their hearts (Ke 2022b). Rather than relying on rational, data-centered communication, Ke turns to embodied artistic expression. His approach complements existing environmental humanities work by offering a mode that stimulates civic awareness through affect and imagination. As Liping Yu, producer of PTS's *Our Island*, observes, *Sea Spray* channels Ke's ecological reflections through artistic expression to stimulate civic awareness and engagement, departing from more traditional modes such as exposé-driven storytelling, logical argumentation, or information-heavy discourse (Chen 2022).

Dance, as an embodied and relational art form, offers a distinctive mode of environmental communication rooted in the principles of environmental humanities. Rather than translating ecological knowledge into an abstract argument, dance engages the body as a site of perception, feeling, and response. As Lauren M. Butler suggests, if art allows scientific knowledge to be transformed into meaningful "action", then dance becomes a medium that "creatively communicat[es] the physical world" and "embodies" emotional connection and situated understanding (Butler 2018, 194). *Sea Spray* puts this potential into practice by presenting ecological awareness, political expression, and sensory engagement as interwoven dimensions of movement situated in wetland and coastal environments. Ke's work responds to a broader cultural silence that Bill McKibben identifies in the context of climate change. McKibben asks, "Where are the books? The poems? The plays?" – pointing to a noticeable absence of artistic responses to global warming, in contrast to the vibrant creative production during the AIDS crisis (McKibben 2005). In turning to dance, Ke addresses this gap not by delivering facts or logical appeals, but by inviting audiences to feel ecological relationships through bodily motion and attentiveness to place. Defined as "a type of movement language" (Fleming 2023, 47, 60), dance engages both visual and bodily perception as a means of conveying the dynamics of human-environment relationships. Moving through "the land's topography, inhabitants, and infrastructure" (Fleming 2023, 62), the dancer not only inhabits space but also reacts to it, shaping meaning through motion. This form of engagement enables the audience to participate emotionally, as Butler notes, "When an audience watches dance, their mirror neurons ignite", producing a sensation as if they themselves were performing the movements (2020, 186). This is a concrete neurological mechanism

that translates abstract visual witnessing into a visceral and felt registration of the wetlands' fragility and vulnerability. The neurological resonance helps explain Ke's use of dance in *Sea Spray* as a way of allowing spectators to register the fragility, dynamism, and vulnerability of the wetlands on a visceral level.

Ke's project centers on a practice known as "site dancing". Ke and choreographer Tsai collaborate with the Humanity Theater to perform improvised dances in ecologically sensitive locations, such as tidal flats and estuarine zones. These performances are not only situated in outdoor spaces but emerge from direct engagement with the site itself. Karen N. Barbour defines site dance as a practice of "creating dance that engages with specific sites" and "cultivating responsive relationships and dialogues between places and dancers" (2019, 114). Expanding this idea, Melanie Kloetzel argues that site-specific dance employs "practical and hands-on tactics" to give political expression a spatial and embodied dimension (Kloetzel 2019). Ke's *Sea Spray* picks up on this logic through the adoption of site-based dance as a mode of activating the coastal landscape while framing the landscape not as an inert backdrop but as a space shaped by ecological struggle, multispecies movement, and embedded histories of resistance.

In *Sea Spray*, Ke transforms Taiwan's wetlands and coastlines into sites where environmental trauma becomes both visible and affectively perceptible through dance and cinematography. Over the course of more than a year, Ke and the performers from Humanity Theater traveled across a diverse range of coastal regions, including Fangyuan in Changhua, Mailiao in Yunlin, Dongshi in Chiayi, and Bali in New Taipei City, each representing different stages of industrial development and environmental degradation. These landscapes functions as more than physical settings because they hold layers of ecological memory and loss, exposing a tension that environmental humanities identify between the cyclical patterns of nature and the disruptions imposed by extractive modernity. The opening segment of *Sea Spray*, titled "Beginnings: Tidal Rhythms, an Evolving Stage", establishes this contrast vividly. Ke juxtaposes the Fangyuan Wetland, where dancers move in sync with the ebb and flow of oyster-field tides, with Mailiao's industrialized coast, home to the Sixth Naphtha Cracker Complex. At Mailiao, the dancers are confronted with overwhelming sensory cues, including "the smell of swimming pools, dead mice, and hydrochloric acid", accompanied by "a strange, unsettling scent" (0:10′55″-0:11′40″), all of which trigger both bodily unease and emotional disturbance. These embodied reactions register the affective toll of environmental damage by illustrating that industrial pollution inflicts physical deterioration as well as psychological and perceptual imprints that manifest as environmental trauma through bodily experience.

Throughout *Sea Spray*, Ke reflects on the passage of time not solely as chronology, but as a measure of ecological endurance and cultural mourning in the Taiwanese context. By focusing on three ecologically compromised seashores, the disappearing algal reefs at Datan in Taoyuan, the crumbling windbreak forests and flood-stricken homes in Dongshi (Chiayi), and the congested tourist coastline of Kenting, Ke maps a geography of loss shaped by decades of developmental sacrifice. These wounded landscapes become, in Fredric Jameson's terms as cited by Hal Foster, examples of a "geo-aesthetic atmosphere", where aesthetic composition (such as black-and-white cinematography) communicates collective grief over sites that are disappearing or irreparably altered (Foster 2018, 320). Through monochrome cinematography, *Sea Spray* channels an elegiac tone that functions as both artistic expression and ecological witnessing. Rather than presenting nature as pristine or timeless, *Sea Spray* reveals coastlines and wetlands as fragile environments shaped by exploitation, chemical intrusion, and infrastructural violence. In doing so, Ke's work contributes to a form of geo-aesthetic documentation that does not simply represent ecological crisis but immerses the viewer in its atmospheric weight. The visual and choreographic strategies employed throughout the film allow spectators to encounter environmental trauma not as abstract data, but as a layered experience involving place, memory, and bodily sensation.

Additionally, *Sea Spray* demonstrates the potential for mutual healing between people and the sea in the sections "Where River Meets Sea" and "Is the Sea Still There?" These parts explore spiritual loss and renewal by showing how performers turn to seascapes for healing when facing difficulties. Instead of seeking one-sided solace, the dancers are prompted to reflect on what they might offer in return. As one performer states, "Only after experiencing [the ocean] can you appreciate how beauty and positivity become ingrained and influence your body and mind; It nourishes you" (Ke 2022a, 0:33′01″). This notion of reciprocity echoes Raffaele Rufo's proposition that trees, or by extension, any part of nature, "are not there only to heal and save us", but instead prompt us to engage with the "wounds of modern civilization" through sensory awareness and memory (2023, 110). Ke's direction guides this process. In Bali, a riverside district in New Taipei City, he instructs the dancers to "use your body to respond to it, speak to it, use your body to communicate with it" (Ke 2022a, 0:24′35″), setting in motion an interaction with the sea that is at once physical, affective, and reflective. This dialogue between bodies and seascapes leads the performers to recognize their previous disconnection through the realization that they had not made "true contact" (0:25′12″) until they chose to trust the sea. One describes the moment of surrender as when "things fall away one by

one until there [is] nothing left" (0:26′30″), a moment of decentering the self in favor of openness to environmental presence.

The language of healing continues throughout the film, as performers speak of digging their feet into the sand, synchronizing their breath with the waves, and being "touched" by the earth (Ke 2022a, 0:28′06″). These somatic exchanges echo Pegge Vissicaro's notion of nonhuman collaboration in dance, where "sensate bodies rhythmically twisted and turned" (2023, 5). One performer even recalls becoming "an animal during the pas de deux" (0:06′45″), highlighting the fluid boundary between human and nonhuman subjectivity. Such interspecies intimacy also draws on Kim Satchell's concept of "intimate others", which replaces radical otherness with ethical proximity, encouraging "closer and deeper relationships between organisms in their environment" (2008, 208). At the heart of this ethical practice is what Kloetzel and Pavlik call "attending to place", where "attending" means both paying close attention and taking care (2009, 7). In the final segment filmed at Nantien in Taitung, the dancers' slow movements and tactile engagement with the cobblestone beach reflect this attentiveness. One performer describes the cobblestones as having "a rhythmic 'sound'" that "conveys the energy of the ocean" (0:49′53″), while another observes the shore as a place to "listen to [her] true self" (0:50′41″). Such embodied experiences resonate with Miriam Marler's understanding of somatic engagement in place, which frames stillness and slow movement not as passive state but as conditions that generate "micro-level responses in the body" and invite relational attention to the subtle elements of their environment (2024, 73-4). For Ke, these tactile and sensory immersions are not aesthetic choices alone but necessary means of countering what Pauli Tapani Karjalainen contrasts as the cold detachment of "remote sensing" with the rich, immersive quality of "intimate sensing", a mode of perception that involves "the body, soul, and mind" (1999, 5). It is through this immersive contact that the wetland and seashore become not just scenic backgrounds, but co-agents in a process of mutual transformation. In one particularly moving black-and-white sequence, dancers stand atop breakwaters while a voice from the sea laments: "You have excavated my spirit, occupied my body, and severed my connecting nerves" (Ke 2022a, 0:44′42″-0:45′14″). Here, the sea is not only a witness but also a co-agent of grief. By modeling this shift from seeking one-sided solace to expressing care and commitment, *Sea Spray* translates trauma witnessing into the practice of ethical engagement. This voice, emerging from layers of environmental trauma, gives shape to what Rufo calls "embodied memories" (2023, 110), placing the landscape in dialogue with human perception and historical injury. In this relationship, healing becomes possible not through transcendence but through shared vulnerability.

Sea Spray concludes with a return to personal narrative, as performers reflect on what the seashore offered them. One speaks

of "an immersive feeling", another of "becoming one with this place" (0:50′48″-0:51′00″), and yet another emphasizes that "every encounter in this world is an encounter with one's self" (0:51′09″). As the director Tsai notes, the coast holds "a wealth of stories to tell" (0:51′23″), a claim that positions dance with place as a catalyst for both ecological reflection and personal revelation. Aurora Brown Lagattuta's insight that dancing with specific locations has the potential to "shift, transform and uplift" the performer, the land, and the multispecies community (2019, xi) finds vivid realization in *Sea Spray*. The performers' embodied exchanges with intimate others not only gesture toward an ethics of care but also model how ecological trauma might be approached through reciprocal sensing, shared presence, and collective creativity.

5 Conclusion

Taiwan's wetlands, like those described by Judith Lewis Mernit, are entangled in ongoing struggles over conservation, development, and ecological meaning (Mernit 2015). As liminal sites positioned between land and sea, wetlands offer a vivid illustration of what Giblett calls "the quaking zone", a threshold space where ecological tensions and cultural perceptions collide (1996, 3). These spaces operate beyond the role of background scenery but emerge as sites shaped by contestation, temporality, and cohabitation. Throughout this paper, I have examined how wetlands resist binary classifications of value and waste. Ke's *Ebb and Flow* and *Sea Spray* contribute significantly to this rethinking by reimagining wetlands not only as ecological systems but as spaces of embodied knowledge, cultural memory, and emotional intensity. In *Ebb and Flow*, ecological filtering is visualized through the oyster's role in sustaining biodiversity, while cultural filtering emerges through the voices of Changhua residents negotiating conflicting visions of industrial expansion and local heritage. The site-based performance sequences in *Sea Spray* extend this vision through what Eno calls "ecological integration", in which performers and places become entangled in reciprocal acts of sensing and healing (2018, 4).

Rather than framing wetland spaces solely through loss or exploitation, Ke's two documentaries engage affect, memory, and somatic presence to produce what Timothy Morton describes as an "ecological lament" (2007, 186). The result is a cinematic mode of mourning that, instead of paralyzing, motivates collective action and public dialogue. Wetlands and seashores in these films are portrayed not only as ecologies to protect but as narrative and affective terrains through which people come to terms with their place in the world. In the Anthropocene, where the life and death of wetlands and seashores unfold as intertwined ecological and cultural struggles,

Ke's films offer not solutions but sensibilities that invite us to witness, to remember, and to respond.

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