Networking imaginaries 2: multi-scalar networked learning for research and public pedagogies

Anna Wilson, School of Education, University of Glasgow, anna.wilson.2@glasgow.ac.uk

Abstract
The world faces a variety of complex problems and predicaments (Thomas, Williams and Zalasiewicz, 2020) where decisions across all scales that we make now may have profound, unpredictable and/or irreversible consequences. Examples include climate change and biodiversity loss; rapid development and diffusion of generative AI; the decarbonisation of energy, transport and industry; challenges around land use; and challenges around migration. These are multi-scalar, global and highly localised. They have in common that they involve heterogeneous networks or assemblages of humans, non-humans, landscapes, technologies and infrastructures, entangling social, environmental and technological dynamics. In this paper, I suggest that networked learning can offer both a research methodology for studying these problems and a potential form of public pedagogy that may be useful in finding ways to reframe public debate about and understanding of their nature and consequences.
To illustrate my position, I describe the processes and findings associated with a recent project exploring imagined futures in which carbon capture (use) and storage (CC(U)S) has been implemented as a way of mitigating greenhouse gas emissions and so tackling climate change. The project developed place-based participatory speculative fiction as a means of encouraging adults living and working in a range of sectors and places (mostly in Scotland) that are likely to be involved in and so affected by CC(U)S. I consider how learning emerges across a range of multi-scalar networks, and how echoes between the morphologies and topologies of these networks can help generate insights that may be used to inform future public pedagogies.

Keywords
Assemblage analysis, carbon capture and storage, ecological complexity, public pedagogies, speculative fiction

Introduction

The world faces a variety of complex problems and predicaments (Thomas, Williams and Zalasiewicz, 2020) where decisions across all scales that we make now may have profound, unpredictable and/or irreversible consequences. Examples include climate change and biodiversity loss; rapid development and diffusion of generative AI; the decarbonisation of energy, transport and industry; challenges around land use; and challenges around migration. These are multi-scalar, global and highly localised. They have in common that they involve heterogeneous networks or assemblages of humans, non-humans, landscapes, technologies and infrastructures, entangling social, environmental and technological dynamics. They are also intersecting. In this paper, I suggest that conceptions of networked learning can offer both a research methodology for studying these problems and a potential form of public pedagogy that may be useful in finding ways to reframe public debate about and understanding of their nature and consequences.
Networked Learning (NL), in the plurality of forms that founded community expression in the two articles published by the Networked Learning Editorial Collective (2021a; 2021b), has its roots in the arrival, around the turn of the 21st century, of digital networks (specifically, the internet) and their uptake as both formal and informal sites of learning. In the decades since then, networked, digital technologies have become ubiquitous, infusing people's lives in ways that, arguably, mean there is no longer any meaningful division between online/offline, digital/analogue or physical/virtual (at least in the sense of virtual reality). In this 21st century context, the networks of NL are likely to incorporate the same kinds of element as those constructing the complex problems or predicaments described above. From a network perspective, "learning" may be understood as a distributed process, unfolding across and through a network, and the elements of the network are part of a *system* that learns.

In this paper, I suggest that the nature and consequences of any networked learning depend upon the active network components and the morphology or topology of the network. That is, some arrangements will encourage

Proceedings of the Fifteenth International Conference on Networked Learning 2026,

Edited by: Declercq, L., Loeckx, J., De Laat, M., Dohn, N. B., Ryberg, T.

some knowledge flows while impeding or even blocking others; and some arrangements may result in reinforcing feedback that embeds certain perspectives; others may produce dampening feedback that might cause uncertainty or ignorance; and others still might result in reconfigurations that disrupt or destroy accepted ways of thinking and practicing. If we take NL seriously, the questions of what is in the network, what does the network morphology look like (what is connected/clustered/distanced), and what are the implications for knowledge flows and emergences become vital.

The 'wicked' (Lönngren and van Poeck, 2021) nature of the multi-scalar system-level challenges listed above can in part be understood in terms of the morphology or topology of the networks they arise in. As well as being heterogeneous, these are inherently qualitatively as well as quantitatively complex (Smith and Jenks, 2006), characterised by non-linear interactions between components, a mix of weak and strong physical and semantic coupling, and topologies that result in amplifying and dampening feedback. These are precisely the properties of complex networked systems that lead to emergence and tipping points. As a consequence, they are difficult to grasp, defying linear logics and reductive analyses. Small changes in certain critical parameters or sets of parameters can lead to phase changes, where the system shifts into a new, qualitatively different metastable state. In such systems, any causal explanations and predictions are fraught with uncertainties.

This leaves space for polarised public "debates" in which neither side understands the other – or indeed the problem or predicament itself and the consequences of making one decision or another in relation to policies, strategies and actions. They thus pose a challenge of public pedagogy: how to create sufficient public, authority and industry understanding to make it possible for the "debates" to turn into informed discussion about realistic choices that set the systems onto non-destructive future trajectories (Smith and Wilson, 2024).

In previous papers at the Networked Learning Conference and elsewhere, I have reported on projects that have explored the use of participatory speculative fiction to elicit imaginaries about evolving contemporary challenges including surveillance capacities in higher education (Ross and Wilson, 2023; Wilson and Ross, 2025), climate change (Wilson et al., 2024) and waste (Wilson, 2024; Wilson and Robertson, 2025). This paper continues the development of this approach. In it, I explicitly consider the role of the "researcher" (understood as an evolving network or assemblage in her own right) in both tracing and creating networks at all stages and scales of the research process. In addition, I explore the potential of such work to function not only as a critical, productive research methodology but also as a form of public pedagogy that might be used to inform discussions about the social, environmental, technological and infrastructural changes that might be needed to engage with the complex predicaments described above. This particular example is carbon capture (use) and storage (CC(U)S), a technology that is being pursued in many countries but that somehow has failed to gain traction in the public imagination.

The paper is ordered as follows. I first give a brief overview of uses of speculative fiction to explore socioenvironmental challenges and predicaments. I then give an equally brief description of CC(U)S, including its possible implementation in Scotland, where most of the empirical research informing this article was carried out. I then describe the place-based, participatory speculative fiction approach I developed with my colleagues Cameo Marlatt and George Robertson and the outputs of this process including the insights generated through assemblage analysis. Finally, I discuss the project from the perspective of learning across multi-scalar networks.

Speculative fiction and the exploration of possible futures

Researcher-generated fiction has become increasingly popular as a way of exploring possible socioenvironmental and sociotechnical futures. For example, de Freitas and Truman (2021), Garforth (2019) and Wood and Meyer (2022) engage with speculative fictions to explore the potential impacts of the climate crisis, while Bina, Inch and Pereira (2020) consider smart cities and Selwyn et al. (2021) and Ross (2022) explore digitisation in educational contexts. Other researchers have used speculative fiction in co-research, including as a process and a form of data – for example, Doyle (2020) used speculative and creative story-telling processes to facilitate young people to communicate their ideas about the impacts of climate change on coastal areas of the UK; Rousell, Cutter-Mackenzie and Foster (2017) used participatory speculative fiction and world-making with young people to explore visions of climate-changed futures; and I have worked with various colleagues to use participatory speculative fiction to explore waste (Wilson, 2024), climate change (Wilson et al, 2024) and surveillance technologies in HE (Wilson and Ross, 2023; 2024; Wilson et al., 2022).

There are several reasons for choosing to elicit imaginaries rather than use more conventional approaches to probing understandings such as surveys or interviews. In researching topics which involve the widespread

implementation or diffusion of advanced, complex technologies – as is the case with CC(U)S – participatory speculative fiction has the following advantages:

- Because they are asked to produce fictions, those creating them are not under pressure to be accurate or factual (i.e., they are not asked to demonstrate technical or scientific expertise).
- There is no requirement to find solutions to the complex predicaments or problems at stake: rather people are invited to explore the space of possible futures.
- Fiction-based approaches offer a way to avoid giving the sense that people should embrace (or resist) a particular intervention or "solution".
- They also offer a way to avoid giving participants the impression that the researchers are able to give what people ask for (a common problem with some activities that mix community engagement and consultation with research).
- Fictions can reveal conscious and subconscious influences and associations through narrative tropes and images.

Although the precise methods vary, these approaches deliberately enrol multiple actors – human and non-human – as both authors and characters that produce 'a learning network or assemblage that explores a particular issue or challenge' (Wilson and Robertson, 2026, p. 46). The approach developed here further develops the place-based version of participatory speculative fiction that has previously been used to elicit the everyday ordinaries of climate changed futures (Wilson et al., 2024). It is based on an ontology that combines ecological complexity (Smith and Wilson, 2024) with a conceptualisation of stories and fictions as Deleuzian assemblages (Deleuze and Guattari, 1988). In this view, the fictions created in response to researcher-provided prompts are created within networks of knowledge, affect, experience and sociopolitical and cultural resources. They are contingent – representing the influences and norms of the specific time and place. Because of this they reflect not only individual hopes and fears, but also those sociocultural dynamics animating the present.

Carbon capture (use) and storage

Carbon capture (use) and storage (CC(U)S) is one of the technological interventions that might help efforts to slow and even reverse the increasing concentration of CO_2 in the Earth's atmosphere. Although carbon capture and sequestration actions can include afforestation and other nature-based solutions, CC(U)S most often refers to a specific set of interconnected actions, each requiring their own infrastructures and logistics. The first is the capture of CO_2, either at its point of emission at e.g. a power plant, cement factory or foundry, or through "scrubbing" the gas from the open air (see, e.g., Wilberforce et al. 2022) – this is the CC part of CC(U)S. The second step is the transportation of the gas to local storage and then to a processing site. This may be by tanker or by a local network of pipelines. The CO_2 may then be distributed for re-use (the (U) part of CC(U)S) – for example to a food packaging facility or a carbonated drinks manufacturer (which would ultimately lead to its loss at the consumer end of the cycle) – or to a manufacturing facility where it might be a feedstock or a catalyst that is eventually captured again. For gas that is not destined for re-use, the next stage is long distance transport, via high-pressure pipeline, to a long-term storage site – usually an exhausted mine or depleted oil field, where it is injected under even higher pressure with the intention of storing it forever (or until science finds a way to deal with it differently).

CC(U)S is a central element of many governments' plans to deal with climate change (see, e.g, Pultar and Ferrier, 2024: Roy, Mohanty and Misra, 2023; Wennersten, Sun and Li, 2015). At scale, it requires truly significant infrastructural development that is likely to have impact not only on work in affected sectors but also on landscapes, as do other climate change mitigation technologies (wind and solar, increased grid capacity and massively increased large scale battery storage). Yet most people are either completely unaware of CC(U)S or have heard of the term but have no associated concrete conception of what it entails (Evensen, Dickie and Bartie, 2024). In Scotland, a major CC(U)S project is in development, although somewhat delayed: the Acorn project (Alcalde, 2019) will use a disused part of the pre-existing national natural gas pipeline network to transport CO_2 from the industrial, densely populated Central Belt to the north-east coast terminal at St Fergus and thence via undersea pipeline to depleted oil fields in the North Sea, reversing the journey that brought oil and gas to the refineries of the past.

The CC(U)S Futures project

In 2023/4, I received funding from the UK Industrial Decarbonisation Research and Innovation Centre (IDRIC) to explore the understandings and anticipations of people living and working in sectors and places in Scotland that were likely to be implicated in the implementation of CC(U)S through a series of place-based participatory fiction activities. My intention was to both trace existing and create new networks of knowledge and affect operating across multiple scales: first, networks of past, present and future in particular places; second, networks of knowledge and effect mobilised in individual stories; third, networks of knowledge and affect amongst and between participants in each workshop; and finally, networks of animating knowledge and affect across stories and places.

Together with my colleagues Cameo Marlatt and George Robertson, I designed site-specific workshops that deliberately networked participants with "place-histories" and "place-presents", then asked them to use these to extend these networks by imagining "place-futures" in which CC(U)S had become a reality. The workshops proceeded through four stages. In the first stage, we asked participants what (if anything) they knew about CC(U)S sand then discussed the history of the place we were in, paying particular attention to past industrial transitions. In the second stage, participants were asked to focus on a place they felt they knew particularly well. They first wrote down a few words or made a sketch that described their chosen place as it is today, and then tracked back over time to think about how it had changed, including technological change but also changes to landscape, language, dress, housing, food and culture. These first and second stages created a network of place-based knowledge resources that could be enrolled in the third stage, on which participants were asked to individually imagine "CC(U)S futures" – that is, to choose a time to project forward into the future, and write, draw or otherwise articulate a short fiction based in that future. This stage included the reading out loud of one or two pre-existing stories written by the team or produced in previous workshops. No boundaries were set on the formats of the fictions, but some suggestions were made such as describing a walk or a journey to work, or writing a letter to a friend or family member, or creating an article for a local news outlet. The fourth and final stage invited participants to share their stories if they wished and to discuss commonalities and differences. Participants were able to refuse to share their stories. They were also invited to contribute them to published (public) resources, either under their own names or pseudonyms.

The workshop prompts (and subsequent analyses) were also informed by visits to some of the sites that house the critical national infrastructure of the existing pipeline network and refineries, including conversations with local residents/workers; desk-based research into the local histories of each of the places in which the workshops took place; and desk-based research into how fiction, and particularly science had depicted energy transitions of the past, such as the transition in the UK from "town" gas to the national grid system. Details of the site visits and workshops are included below in Table 1.

Table 1: *CC(U)S Futures* Site Visits and Workshops

Location	**Site or participant type**	**No. of participants**
Informal site visits		
North-east Scotland	Gas pipeline: landing point	3
East of Scotland	Gas pipeline: major infrastructure	2
Workshops with implicated non-experts, contributing to the first set of stories published as *CC(U)S Futures 1*		
Scotland's Central Belt	Students and staff in FE in construction and plumbing	7
Scotland's Central Belt	Students and staff in HE studying a course on Energy and Society as part of a BSc Environmental Science.	19
Scotland's Central Belt	Academic researchers working on social/political science and policy relating to climate mitigation including CCUS	7
East of Scotland	Staff working for an NGO that provides professional development in implementing climate solutions	6
Scotland's Central Belt	Students and staff in HE studying Engineering	27

Workshops with implicated experts, contributing to the first set of stories published as *CC(U)S Futures 2*		
Scotland's Central Belt	Staff and apprentices working in the petrochemical industry	10
Northern England	Early Career Researchers attending a national academic CCS conference	25
South Wales	Academic researchers working on climate, waste and/or environmental challenges	7

Assemblage analysis: tracing dynamics in and across networks

I analysed the stories produced in the workshops using an assemblage approach, which understands stories and narratives first as networks of human and non-human agents and objects connected by actions and interactions. Assemblage analysis tries to identify these components and connections, including connections made by the reader, and thus to understand how these elements work to build a particular set of meanings and understandings. This version of assemblage analysis is strongly tied to an ecological complexity perspective (Smithand Jenks 2006; Smith and Wilson 2024), which guides the researcher's understanding of their own interactions with their data and gives a set of concepts that can be used in the sense-making process. These include the path-dependent emergence of futures along a trajectory of next-adjacent possibles constrained by historical and present realities (Smith and Wilson 2024). These have parallels with Deleuze and Guattari's deeply political conception of assemblage (Deleuze & Guattari 1988), and thus important connections with Deleuzian understandings of difference and repetition as the foundation of learning (Deleuze 1994), and notions such as lines of articulation and flight (Deleuze & Guattari 1988), as well as their further elaboration as twists, braids and knots (de Freitas, 2012; Wilson, 2020; 2025), which can describe and explain the emergence or impossibility of certain knowledges or understandings.

The first set of workshops highlighted the essentially networked nature of participants' understandings (and misunderstandings) of CC(U)S. Participants frequently cited digital outlets – predominantly social media such as Facebook, Instagram and Tiktok – as the sources of their ideas about the technology itself, climate change, sustainability and net zero strategies – but also as sources of news and factual information more generally.

The stories from the first set of workshops demonstrate some common conflations and misconceptions which are likely to have an important influence on how the roll-out of CC(U)S technologies will be received in future. For example, it appeared that many people equate environmentally responsible behaviour with recycling and re-use, and so see the (U) part of CC(U)S as socially, environmentally and even morally better than the S part, despite the probability that capture and use is quite likely to result in ultimate emission rather than storage or sequestration. Indeed, there was a sense that emerged within the workshops that re-using CO_2 would somehow "use it up" and so reduce the amount that needed to be stored. There were also widespread misconceptions about CO_2: including that it is toxic, polluting and inflammable. Many responses elided CO_2 and carbon or confused "net zero" and zero. There was also a total lack of awareness of what CC(U)S implementation might involve – a finding consistent with but perhaps more dramatic than the findings of conventional survey-based research (Evenson et al, 2024). These can be understood as braids and knots that have formed within the networks of knowledge that the participants drew into their imaginaries – stable configurations of elements that may prove difficult to unravel. These stories also illustrate some of the ways in which pre-existing historical and contemporary dynamics are enrolled into networked imaginaries of technological and industrial changes to landscape and life in ways that entangle knowledge and affect. Some repeated patterns and apparently stable braids and knots include:

- Resistance to change coupled with a belief that "emissions" are created by someone else.
- A nostalgia for an innocent, pastoral past, coupled with a view of industry as divorced from progress, inevitably polluting and in destructive opposition to nature, completely divorced from progress (what I refer to as the "dark satanic mills" trope).
- Very high levels of cynicism associated with assumptions of incompetence and greed within industry and government, clearly strongly influenced by awareness of water pollution, sewage dumping, and other infrastructure projects such as the UK's HS2 high-speed rail project.

The participants in the second set of workshops enrolled more technological and scientific knowledge resources and awareness of decarbonisation solutions into their story networks. However, they also reveal disconnects and

absences within these networks, and repeat much of the cynicism and mistrust animating the first set. Some of the participants who were at early career stages in industry knew very little about CC(U)S – despite its relevance, it had not been able to make an impact on their professional knowledge and learning networks. An important finding was that those early-career researchers working on CC(U)S and related research were only able to enrol very partial and focused knowledge into their story networks. During the workshops, they recognised and articulated a lack of holistic awareness, with little sense of what the broader network of CC(U)S implementation would involve. It may be this that leads to a somewhat surprising absence of CC(U)S itself from most stories in this second set, and a concomitant absence of change or disruption relating to roll-out of new infrastructure. Despite the prominence of CO_2 transport planning in current projects in the UK, only one story mentioned a pipeline, and that was for hydrogen.

As with the initial set of stories, the second set also reveals the broader sociocultural influences and dynamics that circulate within and animate these CC(U)S imaginaries: A new element that emerged in these stories was what I refer to as "Generic Green Futures" stories that conform to discourses that suggest we can somehow solve/reverse climate change without any kind of disruption or any substantial impact on our lives and landscapes.

The following dynamics were common to both sets of stories:

- An absence of resistance that was connected to a widespread sense that nothing will ever happen so there is no need to resist, which can be traced to repeated unfulfilled promises and undelivered projects, not just about CC(U)S but also other public infrastructure. This was very similar to the cynicism that was evident across the network of imaginaries created in the first set of stories.
- An assumption that commercial actors and capitalist motives lead to greed that trumps environmental concerns.
- A fear that decarbonisation will see a repeat of the localised social impacts of the end of coal mining.
- Fears around safety risks, gentrification and visual impact, all frequently-reported grounds given for objections to a range of decarbonisation and electrification projects, from pylons to battery farms.

As the workshops unfolded, these repetitions and differences became clear and some narrative structures and plot lines were repeated over and over: that is, the overall network of CC(U)S imaginaries might be understood as containing morphologically similar sub-networks. Some of these included the braids and knots of knowledge that lead to widespread misconceptions and absences are likely to require careful design and deployment of public pedagogies to disentangle and reconfigure. Similarly, the very real concerns that are evident in the network as braids and knots of affect as well as knowledge are likely to require very careful public pedagogies targeting both those living in areas that will be impacted by the roll-out of CC(U)S infrastructure, and those making decisions about where this will be and how it will be done.

Re-presentation of networked CC(U)S imaginaries

As part of the analysis and re-presentation process, my colleagues and I created new stories that synthesised these repeated tropes and concerns. We also created stories that tried to capture some of the discussions that went on within the workshops, but had not been incorporated directly in stories contributed with permission to publish. I then selected eight stories that represented the initial set of workshops (with those living, studying and working in places that are likely to be affected by CC(U)S but whose work did not require them to have expertise) and another eight that represented the second set of workshops (with participants who worked or researched in areas that might have been expected to give them some expertise). I commissioned and created illustrations for these stories and published them in booklet form as *CC(U)S Futures 1* and *CC(U)S Futures 2*. The images used to illustrate these stories are shown in Figures 1 and 2. They were published on the IDRIC website and have been shared on social media as part of the UK's national Energy Week campaign.

These booklets are themselves a deliberately created digital network of visual and written textual elements that represent the learning networks that emerged within and across the workshops and site visits. They represent critical dynamics of knowledge and affect that circulate within these learning networks, including where they braid and knot into configurations that might require careful disentangling through targeted learning. They draw on recognisable historical and cultural influences and are animated by fears, hopes, distrust, cynicism and humour. They are intended to re-present the collective and individual imaginaries emerging from the workshops in ways that highlight the (often justified) grounds people have for concerns. They are also intended to illustrate the ways in which imaginations that are not able to enrol reliable knowledge and evidence fill in the gaps that result in story

networks with connections that might sometimes seem absurd. Examples include a story where people were employed to ride exercise bikes to provide the power for pumping stations, or another where distrust in local government led to their replacement by the local football teams, which may seem fantastical but express complex and durable entanglements of knowledge, experience and emotion. Critically, they are intended to be accessible, entertaining and thought-provoking ways of communicating these entanglements to members of the public, industry and government stakeholders alike.

Figure 1: Images used to illustrate the eight stories generated from participants (left) living and working in locations and sectors in Scotland likely to be impacted by CC(U)S implementation and (right) working in sectors developing or supporting the implementation of CC(U)S in the UK published as *CC(U)S Futures 1* and *2* respectively

Networking across projects

In a turn of events that I had not anticipated at the outset of the project, there was also an opportunity to network the findings emerging from the *CC(U)S Futures* project with other related projects. Over a period of 5 years, IDRIC had funded several projects that addressed social aspects of decarbonisation interventions, including CC(U)S. In 2024/5 IDRIC commissioned a series of synthesis reports aimed at industry and policy stakeholders, including one on public perceptions and just transitions which I co-led (Sovacool et al., 2025). After receiving contributions from researchers involved in 10 projects, I applied the assemblage analysis approaches I have previously used in analysing fictions to identify key nodes and connections in the network of knowledge they represented. Like the CC(U)S Futures booklets, this report is intended as both a representation of the learnings that emerged across the network of projects and a pedagogical resource.

Discussion

The elicitation of imaginaries, subsequent analyses and re-presentations described above demonstrate the potential for networked conceptualisations of learning to inform research methodologies and potential public pedagogies. They also point to the diminishing importance of distinguishing between the digital and non-digital, as thinking

and imagination is distributed across all possible network components. It is worth noting that research included the mirroring of network morphologies and topologies across many scales. At the scale of the physical and technological, CC(U)S itself involves national (and potentially international) infrastructural networks of capture, pumping and storage station nodes connected by pipeline and road transport networks. The project created new networks at the scale of the individual, inviting them to draw together networks of prior knowledge and experience of place, history and other infrastructural management change to produce imagined futures. At the scale of the workshop, knowledges and experiences were networked across participants in ways that revealed common conceptions, misconceptions, experiences and absences. In the case of the early career researchers, they also revealed the extremely weak levels of connectivity across the knowledge networks of those working on different aspects of the scientific and technological developments that are intended to make CC(U)S feasible at scale. At the scale of imaginaries, the project revealed braids and knots of knowledge and affect that resulted in repeated story-network shapes, evident in repeated narrative tropes and arcs.

Across all of these scales, my role as researcher has been to trace these morphologies and topologies in both pre-existing networks and those that were deliberately created as part of the project. This has been an ongoing experience of my own networked learning, which then feeds in to the design of externally-facing resources (the two booklets and the synthesis report) that I hope will be useful in the public pedagogies needed to enable realistic, fair and informed discussions about CC(U)S and other interventions that may be proposed as ways to address the complex predicaments that are characteristic of the Anthropocene.

References

Alcalde, J., Heinemann, N., Mabon, L., Worden, R. H., De Coninck, H., Robertson, H., ... & Murphy, S. (2019). Acorn: Developing full-chain industrial carbon capture and storage in a resource-and infrastructure-rich hydrocarbon province. *Journal of Cleaner Production*, 233, 963-971.

Bina, O., Inch, A., & Pereira, L. (2020). Beyond techno-utopia and its discontents: On the role of utopianism and speculative fiction in shaping alternatives to the smart city imaginary. *Futures*, 115, 102475.

Carmichael, P., & Tracy, F. (2020). Networks of knowledge, students as producers, and politicised inquiry. *Mobility, Data and Learner Agency in Networked Learning*, 117-135.

de Freitas, E., & Truman, S. E. (2021). New empiricisms in the Anthropocene: Thinking with speculative fiction about science and social inquiry. *Qualitative Inquiry*, 27(5), 522-533.

Deleuze, G. (1994). *Difference and Repetition*, trans. Paul Patton, London: Athlone.

Deleuze, G., & Guattari, F. (1988). *A thousand plateaus: Capitalism and schizophrenia*. Bloomsbury Publishing.

Doyle, J. (2020). Creative communication approaches to youth climate engagement: Using speculative fiction and participatory play to facilitate young people's multidimensional engagement with climate change. *International Journal of Communication*, 14, 2749-2772.

Evensen, D., Dickie, J. & Bartie, P. (2024). *Public reactions to carbon storage in the UK: Quantitative survey findings.* A report for the British Geological Society.

Garforth, L. (2019). Environmental futures, now and then: Crisis, systems modeling, and speculative fiction. *Osiris*, 34(1), 238-257.

Lönngren, J., & Van Poeck, K. (2021). Wicked problems: A mapping review of the literature. I*nternational Journal of Sustainable Development & World Ecology*, 28(6), 481-502.

Networked Learning Editorial Collective (NLEC) (2021a). Networked Learning: Inviting Redefinition. *Postdigital Science and Education* 3, 312–325. https://doi.org/10.1007/s42438-020-00167-8

Networked Learning Editorial Collective (NLEC) (2021b). Networked Learning in 2021: A Community Definition. *Postdigital Science and Education* 3, 326–369. https://doi.org/10.1007/s42438-021-00222-y

Pultar, A. & Ferrier, J. (2024). Transforming Industry: Strategic Policy Insights for Scotland's Industrial Decarbonisation. *IDRIC Policy Synthesis Report for Scotland.* The UK Indusrial Decarbonisation Research and Innovation Centre.

Ross, J. (2022). *Digital futures for learning: Speculative methods and pedagogies*. London: Routledge.

Ross, J., & Wilson, A. (2023). Reconfiguring surveillance futures for higher education using speculative data stories. In N. B. Dohn, J. Jaldemark, L. M. Öberg, M. Håkansson Lindqvist, T. Ryberg, & M. de Laat (Eds.) *Sustainable Networked Learning: Individual, Sociological and Design Perspectives*. (pp. 19-33). Cham: Springer Nature Switzerland.

Ross, J., & Wilson, A. (forthcoming). Learn to Analyze Anonymous Participant-created Texts Using Thematic and Assemblage Analysis. *SAGE Research Methods Datasets Series*, in press.

Rousell, D., Cutter-Mackenzie, A., & Foster, J. (2017). Children of an earth to come: Speculative fiction, geophilosophy and climate change education research. *Educational Studie*s, 53(6), 654-669.
Roy, P., Mohanty, A. K., & Misra, M. (2023). Prospects of carbon capture, utilization and storage for mitigating climate change. *Environmental Science: Advances*, 2(3), 409-423.
Selwyn, N., Pangrazio, L., Nemorin, S., & Perrotta, C. (2020). What might the school of 2030 be like? An exercise in social science fiction. *Learning, Media and Technology*, 45(1), 90-106.
Smith, J., & Jenks, C. (2006). *Qualitative complexity: Ecology, cognitive processes and the re-emergence of structures in post-humanist social theory*. London: Routledge.
Smith, J. & Wilson, A. (2024). *Radical Ecology in the Face of the Anthropocene Extinction*. London: Routhledge.
Sovacool, B. K., Wilson, A., Clery, D., Gough, C., Feliciano, D., Robertson, G., ... & Bradshaw, O. (2025). Industrial Decarbonisation Frontiers Report: Public Perceptions and Just Transitions. *IDRIC Frontiers Report Series*. The UK Industrial Decarbonisation Research and Innovation Centre.
Thomas, J. A., Williams, M., & Zalasiewicz, J. (2020). *The Anthropocene: A multidisciplinary approach*. John Wiley & Sons.
Wennersten, R., Sun, Q., & Li, H. (2015). The future potential for Carbon Capture and Storage in climate change mitigation–an overview from perspectives of technology, economy and risk. *Journal of cleaner production*, 103, 724-736.
Wilberforce, T., Olabi, A. G., Sayed, E. T., Elsaid, K., & Abdelkareem, M. A. (2021). Progress in carbon capture technologies. *Science of the Total Environment*, 761, 143203.
Wilson, A. (2024). From Crime and Punishment to Future Archaeologies – reimagining relationships of waste and value. In: Jordan-Baker, C. and Holloway, P. (Eds.) *Writing Landscape and Setting in the Anthropocene*. Palgrave Macmillan.
Wilson, A. and Robertson, G. (2024). CC(U)S Futures 2: Visions from within the Sector, 2024. *IDRIC Research Reports*. The UK Industrial Decarbonisation Centre.
Wilson, A., & Robertson, G. (2026). Waste Stories: Networked Imaginaries. In Dohn, N.B., Cutajar, M., Borg, ., Ryberg, T. & De Laat, M. (Eds.). *Narratives of Hope in Times of Change*. Cham: Springer Nature Switzerland.
Wilson, A., Robertson, G., & Dickie, J. (2024). Future ordinaries: Assembling place-based knowledges and literacies in real and imagined harmscapes. *Futures*, 159, 103376.
Wilson, A., Robertson, G. and Marlatt. C. (2024). CC(U)S Futures 1: Visions from the Scottish Cluster, 2023/4. *IDRIC Research Reports*. The UK Industrial Decarbonisation Centre.
Wilson, A., & Ross, J. (2025). 'Your U-Well-Being Journal is due today': on some possible intersections between surveillance and student wellbeing in the future university. *Studies in Higher Education*, 50(6), 1233-1247.
Wood, N., & Meyer, F. (2022). Just Stories: The Role of Speculative Fiction in Challenging the Growing Climate Apartheid. *Psychology in Society*, 63, 29-51.

This work was supported by the UK Industrial Decarbonisation Research Centre (FF 4.5) and the Leverhulme Trust (RPG-2021-079). I would also like to thank the participants in the project workshops, Cameo Marlatt and George Robertson for their story-making on the CCUS Futures project.