

You Are Here: A system thinking approach for navigating an uncertain future

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Abstract

An understanding of the complex-system nature of the world—system thinking—can enable us to discuss, accept, mitigate and perhaps influence the emergent and uncertain behaviour of the earth’s social, biological and physical systems. The extremes of these behaviours emerge as contemporary ecological and social challenges. Taking system theorist Donella Meadows’ guidance to “listen to what the system tells us” as a starting point a digital media artwork *You Are Here* is developed. As an interactive 3D geospatial data visualisation platform, the viewer is immersed in curated content sourced collaboratively from any scientific, cultural or arts geospatial-based research and potentially from alternative knowledge systems. Suggesting the complex and dynamic relationship between the earth’s systems the work encourages the viewer to ‘listen’—to become attentive and responsive—to how these systems interact and form system-based cognitive associations for navigating the inherently uncertain systems basis of the world. The first connection of the viewer with this content is made through visualisations based on lived experience and in the initial work this is the scientifically modelled journey through the atmosphere of individual breaths.

Keywords

systems thinking, data visualisation, alternative ontologies, wayfinding, overview effect, transdisciplinary research, collaborative platform, interactive media, place-based narrative

Introduction

Most approaches to the ecological and social challenges that humanity faces treat each as an isolated challenge with linear causal solutions. Often ignored are their nature as emergent behaviours of the earth’s underlying complex social, biological and physical systems and the psychological, sociological and political factors that frustrate effective action. Outlined here is recent doctoral research that explores an alternative approach based on system thinking as a personal and cultural narrative for comprehending the systems nature of the whole earth. More fully reported is the resulting proof-of-concept interactive and collaborative platform *You Are Here* for cultivating this narrative.

System Thinking

The potential of system thinking can be evaluated by considering the polarisation of society in response to many

social and ecological challenges: a vocal minority demand action; an equally vocal minority deny the challenge; and a large part of society—popularly, and incorrectly, labelled as apathetic—lie between these groups. Sociologists, such as Stephen Hawkins et al., make more nuanced claims, finding that 66% of the US population have a “sense of fatigue with our polarized national conversation, a willingness to be flexible in their political viewpoints, and a lack of voice in the national conversation.” [1] Similarly, psychologist Renee Lertzman, rejecting the apathy label, identifies a psychological ambivalence where individuals are conflicted by simultaneous opposing desires, thoughts and impulses. [2] These sociological and psychological concerns cannot be addressed by traditional communication and artistic approaches based on assumptions of a deficit of knowledge, emotion or urgency. The Hawkins results suggests the need for alternative ways of giving voice to the 66% and Lertzman calls for an assumption of the presence of care and creativity and for an authentic and honest engagement that “stretch[es] our cognitive capacity to think and experience and see ourselves as part of a system”. [3]

Lertzman’s appeal for system thinking is consistent with a broad recognition across many disciplines of the complex system nature of the earth. Such as climate scientist Will Steffen’s description of an ‘earth system’ science that unites physical and human research, economist Kate Raworth’s holistic Doughnut Economics, and social theorist Bruno Latour’s advocacy of a ‘sensitisation to Gaia’, i.e. a responsiveness to the fluxes and dynamics of the earth. [4, 5, 6] Indigenous cultures may also deeply embed a systems model of the earth, manifesting as “pattern-thinking” in Australia’s First Peoples according to Indigenous knowledge system researcher Tyson Yunkaporta. [7]

System theorist Donella Meadows offers advice on how to ‘think in systems’ that complements all these approaches. Meadows ask us to “listen to what the system tells us and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone.” [8] To ‘listen’, for Meadows, is to study the patterns of the systems behaviour, map and share knowledge of the system, expand our vocabulary with systems language, and think about the hierarchy, self-organisation and resilience that shapes its behaviour.

Lertzman offers an approach for engaging a ambivalent population, Latour and Meadows give clues as to how to frame system thinking in an art context. Together they form the inspiration for the media art project *You Are Here* described in the remainder of this paper.

The *You Are Here* Project

You Are Here is an interactive platform for visualising curated geospatial content sourced from scientific, cultural or arts-based research. Immersing the viewer in a 3D representation of the dynamic fluxes and interactions of the earth's principle social, biological and physical systems the work encourages the viewer to become attentive and responsive—to 'listen'—to how these systems interact and to form system-based cognitive associations with the patterns of system behaviour (Figure 1). The initial connection of the viewer with this predominantly data-driven, 'informational', content is made through visualisations based on lived experience, or 'experiential' content, suggesting the embodied presence of the participant within the earth's systems.



Figure 1. Experimental projection at MAP mima, Speers Point (June 2022) Image: ©Jenna Eriksen, with permission.

In the initial proof-of-concept work the experiential content is the scientifically modelled motion through the atmosphere of individual breaths, such as the last breath of my father (Figure 2), or the collective motion of the 15,000 breaths logged by the author's prior breath-based artwork *Catch Your Breath*. [9] The visual pattern of this motion correlates with that of four informational contents based on atmospheric motion: three atmospheric water and rainfall visualisations and global sovereign borders.

The public release version of the work will include more than twenty informational content layers selected to represent principle biological, physical and social systems and cycles at a planetary scale, e.g. terrestrial and water-based chlorophyll distribution, and population density and movement. Future releases will include bio-region level systems relevant to the viewer's locality and influence, and temporal visualisations that sensitise to long time-scale system interactions.

3D navigation is enabled by a simple gestural interface and content is activated through a set of user interaction tools. A geolocative 'pushpin' activates content that has a specific geolocation. A legend lists the currently active content and a brief description. Most importantly a systems relations diagram is populated with the active content, the suggested associations between that content, and more content that can be activated that has some relationship with the already active content (Figure 1). Using this 'System

Navigator' the viewer navigates the work by activating content that interests them, making available further related content.

Key Conceptual Developments

A number of novel conceptual developments that take advantage of the affordances of digital media make this work particularly suited to encouraging system thinking.

Firstly, the use of an immersive geospatial context with the audience taking an astronaut perspective is intended to evoke an initial state of awe—a state that aesthetic theorist Sandra Shapshay describes as the 'thin sublime'. [10] This state is further encouraged by experiential content that surfaces the audience's embodied knowledge to activate and connect with other impassive informational content. The audience navigates the work through suggested associations between the content, selecting content and building a narrative of cumulative layers of related and identifiable personally significant content. This combination of geospatial immersion, experiential content, self-narrative, and the systems-based content is intended to evoke the reflective 'thick sublime' where the new knowledge of the whole-earth's systems nature is accommodated in a psychological sense. One research proposition, tentatively supported by recent cognitive neuroscience, is that this new knowledge may take the form of innate system-based landmarks established through a cognitive wayfinding process. [11]

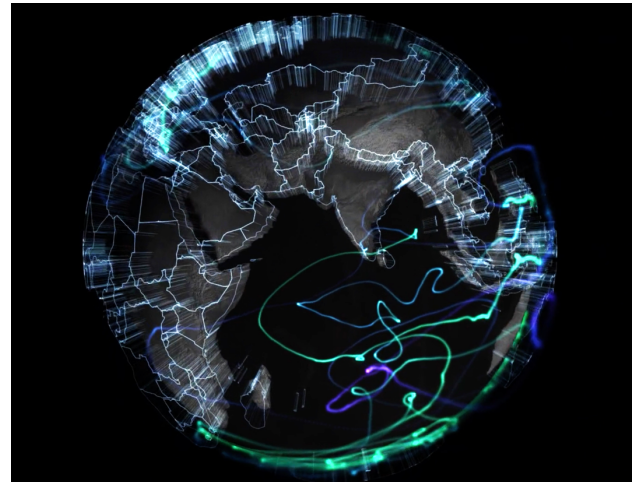


Figure 2. The predicted journey of a single breath crossing national borders. Example animation frame.

Secondly, the approach to sensitising—becoming responsive—to the earth is dynamic rather than static. The layers of content that the audience is immersed within are near-real time and shifting; they show or imply motion, dynamic interactions, history and emergent behaviour. The audience becomes a subjective actor within a dynamic system and witnesses the 'coming into being' of the world as a participant in that world. With a new knowledge of how and why the world is the way it is they come to comprehend its uncertainty and perhaps understand how to influence its future.

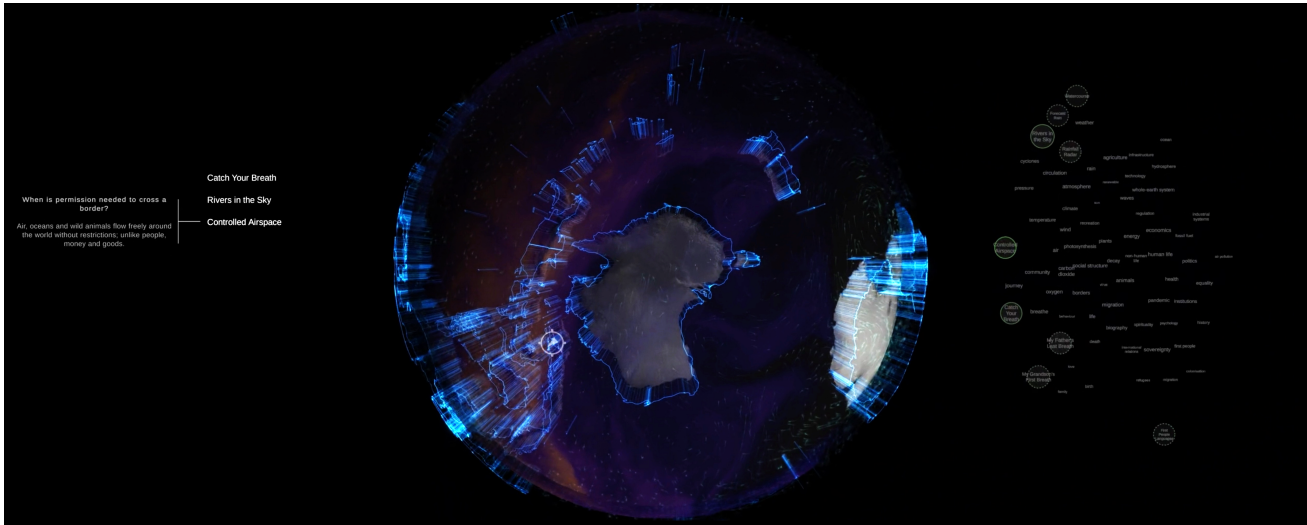


Figure 1. Visualisation components: geospatial visualisation (centre), legend and information (left), system relations diagram (right). Three content layers: multiple breath trajectories (barely visible), national borders, atmospheric water. Example animation frame.

Thirdly, *You Are Here* is performative in that the exploratory and narrative components contribute to a heightened audience investment and agency. After the initial emotive engagement through an experiential content layer, the audience enters a reciprocal arrangement with the work where their activation of further content cascades into still further possibilities. The work becomes fully formed as it is made unique to the audience's personal narrative through this collaboration. It is proposed that this reciprocity amplifies the sensitising approach and the work's authenticity.

Finally, and most importantly, the relationships between systems are represented flexibly. Rather than attempting to define an objective, probably rigid, ontological structure based on systems science for the relationships between the systems content, the relationships are indicated only by suggested associations. This approach should readily accommodate alternative ontologies, such as first people's knowledge systems or diverse eco-philosophical perspectives. The principal source of new knowledge for the viewer is not necessarily found in these relations, but in the actual visualised content and their interactions. Provided these are neutral and representative of diverse voices and sensitivities and of potentially diverse ontologies, i.e. both inclusive and expansive, then a 'looseness' of the associations is tolerated, and perhaps desirable.

A Platform for Collaboration

Rather than a completed artistic object, *You Are Here* is a platform for the ongoing integration of modules of digital content from diverse scientific, cultural and artistic sources that contribute to a more meaningful whole. Ultimately the project will become an open-platform for any contributor. This configuration is valuable for two reasons. Firstly, the potency of single-issue data visualisations is amplified when incorporated within *You Are Here* as content curated within a considered and neutral context. This interoperability across multiple research and cultural domains can provide

an alternative and valuable expressive research output for a small investment in technological or creative resources.

Secondly, the work can continuously evolve with new contributions from multi- and trans-disciplinary collaborative researchers expanding and reimagining the content and the possible audience narratives and modes of staging. In this context the project's goal of encouraging responsiveness to the earth's systems becomes the collective transdisciplinary research question rather than the specific research interests of the individual researchers.

Conclusion

The conceptual framework and software architecture of *You Are Here* have been developed with the following objectives:

- an almost literal interpretation of Donella Meadows notion of 'listening to the system',
- an interactive form of speculative stumbling that encourages the viewer to establish a personal relationship with the earth's systems,
- a collaborative and flexible research platform that accommodates expanded sensitivities, diverse voices and alternative ontologies
- an architecture that is amenable to distributed and alternative staging, and a broad audience reach

Together these objectives make a significant contribution to Renee Lertzman's call for authenticity and an "expanded cognitive capacity to see ourselves as embedded in a system". The project offers a new holistic way of engaging with the world and the potential basis for a common language and purpose for communicating across the spectrum of a polarised society.

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References

- [1] Stephen Hawkins et al., 'Hidden Tribes: A Study of America's Polarized Landscape', Report (New York: More in Common, 21 August 2019), 11.
- [2] Renee Lertzman, 'The Myth of Apathy: Psychoanalytic Explorations of Environmental Subjectivity', in *Engaging with Climate Change: Psychoanalytic and Interdisciplinary Perspectives*, ed. Sally Weintrobe, The New Library of Psychoanalysis (London; New York: Routledge, Taylor & Francis Group, 2013), 117–33.
- [3] Renee Lertzman, Climate psychologist says neither gloom-and-doom nor extreme solution-obsessed optimism is the best way to discuss climate change productively, interview by Catherine Clifford, CNBC video interview excerpts, 26 September 2021, <https://www.cnbc.com/2021/09/26/how-to-discuss-climate-change-productively.html>.
- [4] Will Steffen et al., 'The emergence and evolution of Earth System Science', *Nature Reviews Earth & Environment* 1, no. 1 (January 2020): 54–63, <https://doi.org/10.1038/s43017-019-0005-6>.
- [5] Kate Raworth, *Doughnut Economics: Seven Ways to Think like a 21st-Century Economist*, Kindle (Chelsea Green Publishing, 2018).
- [6] Bruno Latour, 'Sensitizing', in *Experience: Culture, Cognition and the Common Sense* (Boston: MIT Press, 2016), 315–24.
- [7] Tyson Yunkaporta, *sand talk: How Indigenous Thinking Can Save the World*, E-reader version (Melbourne: Text Publishing, 2019), Ch. 'Which Way'.
- [8] Donella H. Meadows, *Thinking in Systems: A Primer*, E-reader version, ed. Diana Wright (White River Junction, Vermont: Chelsea Green, 2008), Loc. 2967.
- [9] Andrew Styan, *Catch Your Breath*, 2016–2020, Interactive artwork, aquarium, water, high speed photography, video display, computer, 2016–2020, <https://andrewstyan.com/portfolio/catch-your-breath/>.
- [10] Sandra Shapshay, 'A Two-Tiered Theory of the Sublime', *The British Journal of Aesthetics* 61, no. 2 (1 April 2021): 123–43, <https://doi.org/10.1093/aesthj/ayaa047>.
- [11] Michael Bond, *Wayfinding: The Art and Science of How We Find and Lose Our Way*, E-reader version (London: Picador, 2020).

Bibliography

- Bond, Michael. *Wayfinding: The Art and Science of How We Find and Lose Our Way*. E-reader version. London: Picador, 2020.
- Hawkins, Stephen, Daniel Yudkin, Miriam Juan-Torres, and Tim Dixon. 'Hidden Tribes: A Study of America's Polarized Landscape'. Report. New York: More in Common, 21 August 2019.
- Latour, Bruno. 'Sensitizing'. In *Experience: Culture, Cognition and the Common Sense*, 315–24. Boston: MIT Press, 2016.

Lertzman, Renee. Climate psychologist says neither gloom-and-doom nor extreme solution-obsessed optimism is the best way to discuss climate change productively. Interview by Catherine Clifford. CNBC video interview excerpts, 26 September 2021. <https://www.cnbc.com/2021/09/26/how-to-discuss-climate-change-productively.html>.

———. 'The Myth of Apathy: Psychoanalytic Explorations of Environmental Subjectivity'. In *Engaging with Climate Change: Psychoanalytic and Interdisciplinary Perspectives*, edited by Sally Weintrobe, 117–33. The New Library of Psychoanalysis. London; New York: Routledge, Taylor & Francis Group, 2013.

Meadows, Donella H. *Thinking in Systems: A Primer*. E-reader version. Edited by Diana Wright. White River Junction, Vermont: Chelsea Green, 2008.

Raworth, Kate. *Doughnut Economics: Seven Ways to Think like a 21st-Century Economist*. Kindle. Chelsea Green Publishing, 2018.

Shapshay, Sandra. 'A Two-Tiered Theory of the Sublime'. *The British Journal of Aesthetics* 61, no. 2 (1 April 2021): 123–43. <https://doi.org/10.1093/aesthj/ayaa047>.

Steffen, Will, Katherine Richardson, Johan Rockström, Hans Joachim Schellnhuber, Opha Pauline Dube, Sébastien Dutreuil, Timothy M. Lenton, and Jane Lubchenco. 'The emergence and evolution of Earth System Science'. *Nature Reviews Earth & Environment* 1, no. 1 (January 2020): 54–63. <https://doi.org/10.1038/s43017-019-0005-6>.

Styan, Andrew. *Catch Your Breath*. 2016–2020. Interactive artwork, aquarium, water, high speed photography, video display, computer. <https://andrewstyan.com/portfolio/catch-your-breath/>.

Yunkaporta, Tyson. *sand talk: How Indigenous Thinking Can Save the World*. E-reader version. Melbourne: Text Publishing, 2019.

Author Biography

Andrew Styan is a new media artist developing strategies for shifting public engagement with contemporary ecological and social challenges. Using electronics, computer coding, data visualisation, interactivity and devices to create installations, videos and kinetic objects, his practice makes visible underlying systems and processes. These conceptual and material concerns reflect a former career as a metallurgist in the steel industry, and lifelong interests in nature, photography and science. He received the national Dr Harold Schenberg fellowship for graduating artists in 2015, and a nomination in the European S=T+ARTS prize in 2018. His work has toured nationally with Experimenta. His theoretical and practical research focuses on the systemic origins that are common to all crises of ecology, equality and democracy.