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ARTICLE

# Imprinting Change: Seeds, Ice and Earth Ethics through Artistic Practice

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**Abstract**

The planetary boundaries framework maps the ecological limits that keep Earth stable. Current research shows that seven of nine boundaries have already been crossed, prompting urgent consideration of how we hold the planet's fragility, live within shifting limits and imagine alternative futures. Art can support this work by communicating through material and sensory experience, helping connect scientific ideas with lived understanding. My arts practice investigates transformation – moments when matter shifts states – echoing Earth systems dynamics such as melting, slow drifts, sudden tipping points, cycles of life and death. This article examines three artworks developed during my Spitsbergen Artist Center Residency that explore these links. *A seed destroys itself for its own survival* uses prints on seed-storage bags to connect the Australian Grains Genebank with the Svalbard Global Seed Vault – a paradox of security and vulnerability as permafrost melts. *Doomsday Core* presents glass-blown seeds that burn and blister, evoking ice cores and apocalyptic futures. *Portrait of Longyearbyen Glacier* presses analogue film into glacial surfaces, recording atmospheric activity from a vanishing world. Rather than offering solutions, these works invite reflection and propose art as a way to engage learners with planetary systems through sensory, imaginative and human ways.

**Keywords:** Arts-based; creativity; climate change; environment; environmental insight

## Introduction

As a visual artist based in Melbourne, Australia, I make works about transformation. I record changes of state in material and process. My work develops from observing atmospheric activity in natural systems, such as temperature and weather, erosion and decay, metamorphosis and regeneration, alchemy and phenomena. I explore the cycles of life and death and the coalescing and dissipation of natural systems. I work across drawing, printmaking, analogue and digital photography, video and sculpture.

In 2017, I completed a Master of Fine Art (MFA) by coursework, titled *Changes of State: An exploration of metamorphosis through material transformations of images and objects* (Page, 2017) (Unpublished Master's thesis) at RMIT University, School of Art. My studio processes include mark making and constructed parameters that record processes of melting, freezing, moulding and transforming materials into various states, to enact themes of change.

My MFA research included referencing my archive of site documentation from self-directed research trips I made to Antarctica (2012) and Iceland (2015). Specific areas of investigation included; capturing ice in its natural form, transferring image data across different supports, melting ice and recording its trace residue on light-sensitive emulsion surfaces, freezing water to make ice forms, melting and casting materials into moulded forms. Ice became a potent metaphor

for change and impermanence. My observations focused on systems related to matter and energy changing under varying circumstances.

Recent career highlights include an artist residency at the Spitsbergen Artist Center, Svalbard, Norway, where I documented a seed deposit in 2022 from Agriculture Victoria's Australian Grains Genebank to the Svalbard Global Seed Vault. This article discusses the research I uncovered as part of my residency, including implications for melting ice at the Poles and ecosystem health.

The planetary boundaries framework (Rockström et al., 2024) helps explain the limits that regulate Earth stability (Stockholm Resilience Centre, 2025). Scientists first identified nine key systems in 2009, but recent assessments (Hale, 2024; Richardson et al., 2023) show that seven of these have now been crossed: climate change, biodiversity loss, land-system change, freshwater depletion, disrupted nitrogen and phosphorus cycles, the spread of novel entities like plastics and synthetic chemicals and ocean acidification. Crossing these boundaries pushes Earth out of a safe operating space and increases risks to ecosystems and human life. Art offers a way to communicate these complex changes. By working with materials and transformation, my practice creates space for people to observe, feel and reflect on environmental change beyond scientific data.

## Ways of working as an artist

Working as an artist, I approach these boundaries not just as scientific markers, but as lived pressures that show up in materials, landscapes and processes. My work often begins with observing matter in transition – melting, drifting, eroding – moments where stability gives way to change. These transformations echo the Earth's own shifting thresholds, reminding me that the planet is a living system that is dynamic, reactive and increasingly strained.

Art has something to offer here. Art communicates. It carries ideas through material and interaction. It speaks to our senses and fills the gaps between scientific data and human experience. Where science draws lines, art moves between them. Art has no boundaries, only layers. It's limitless and intersects with other ways of knowing. In this space, art can make planetary boundaries visible – not as abstract graphs or policy targets, but as lived, felt realities. It can invite dialogue about vulnerability, precipice and consequence. The role of art can materialise thresholds. Make the invisible visible. It can bring to the surface, for wider audiences, issues usually kept within scientific realms.

My artwork sits within this conversation. It's located within the planetary boundaries framework because it responds to the same questions: What happens when systems change? How do we live with thresholds? My work explores transformation – moments when matter shifts, states of change. I'm drawn to processes such as erosion, decay and metamorphosis. These changes echo the dynamics of Earth systems: slow drifts, sudden tipping points, cycles of life and death. While my artworks reference climate change, they also reference broader themes and broader patterns – the coalescing and dissipation of natural systems, the fragility and impermanence of life.

Elemental energy is recorded in this process. This force we all live within, is what interests me. In Bergson philosophy (Bergson, 1907) it's referred to as 'elan vital' (vital impetus or vital force), the creative impulse within an organism that propels life to evolve towards growth and change.

This article considers; how art can engage planetary boundaries, what artistic research contributes to understanding Earth system change and how works may support environmental education – helping new audiences connect science, ethics and imagination.

## More on methods

All of my work begins with research – sometimes technical, such as how to produce a sculpted form in cast aluminium, or how to print a large-scale cyanotype work; and sometimes conceptual,

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like observing natural systems to capture shifts in atmospheric activity. This approach developed during my Master of Fine Art (2015–2017), where my research examined what leads me to make what I make and how material processes embody change.

My current methods build on that foundation. They combine artistic research principles with practice-led inquiry, using iterative cycles of researching an idea, making, reflecting, theorising and making again. This means working through materials as a way of thinking – testing processes, documenting outcomes and allowing experimentation and transformation to guide the work.

The Spitsbergen Artist Center Residency that I undertook in 2022 provided the field context for this research. Working in the High Arctic introduced constraints and conditions that shaped both studio and site-based components. Ethical considerations were central: permissions for fieldwork, safety protocols in extreme environments and respect for fragile ecologies.

I chose materials for their capacity to enact change. Scientific aluminium seed storage bags became surfaces for carbon transfer prints, referencing global seed vaults and the paradox of preservation under threat. Glass-blowing produced seeds that burn, blister and bubble, evoking chambers of trapped air and ash residue referencing apocalyptic states, ice cores samples and frozen time. Analogue film pressed into glacial surfaces captured imprints of light, air and temperature – a record of climate and atmospheric conditions as they vanish. Each process operates as both technique and metaphor, translating planetary thresholds into tactile experience.

Documentation was integral. I recorded processes through photography, film negatives and sketches, alongside notes on environmental conditions, linking material transformations to conceptual frames of earth ethics. This methodology positions art as inquiry, an embodied way of engaging Earth system dynamics through matter, gesture and change.

## Case studies: Three artworks

My Spitsbergen Artist Center Residency, Svalbard, 2022 has informed my research, with fieldwork and observations of natural systems.

### Artwork 1: *A seed destroys itself for its own survival*

I printed my digital photographs of seeds onto scientific aluminium seed storage bags (Figure 1), with the carbon transfer print process, an old photographic contact printing process using sensitised pigment and gelatin exposed to UV light through a negative, developed in hot water, then transferred to fix on a final surface.

The work comprises seed deposit samples from Agriculture Victoria's Australian Grains Genebank (AGG) in Horsham Victoria, Australia to the Svalbard Global Seed Vault (Figure 2) (ABC Australia, 2022), in Svalbard, a Norwegian archipelago in the Arctic circle 1000kms from the North Pole. The seeds I used for the work are seed deposit samples provided for research purposes by Dr Sally Norton, Leader, Senior Research Scientist, Agriculture Victoria.

This work developed from my Spitsbergen Artist Center Residency in 2022, a residency located in Longyearbyen, Svalbard, for artists wanting to engage their practice in the High Arctic and with themes related to climate and the natural world.

The seeds are frozen in the seed vault at –18 degrees Celsius as a food reserve in the event our current food stores are destroyed by fire, famine, flood or war. The seed vault is built 130 m into the Svalbard mountainside to retain subzero temperatures in the High Arctic. Due to global temperature rises at the Poles, permafrost around the seed vault is beginning to melt, threatening global food security. This work relates to biosphere integrity and concepts of preservation versus vulnerability.

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**Figure 1.** *A seed destroys itself for its own survival, 2025*, carbon transfer print on scientific aluminium seed storage bags, 15 × 15 cm each. Image: Amanda Page.

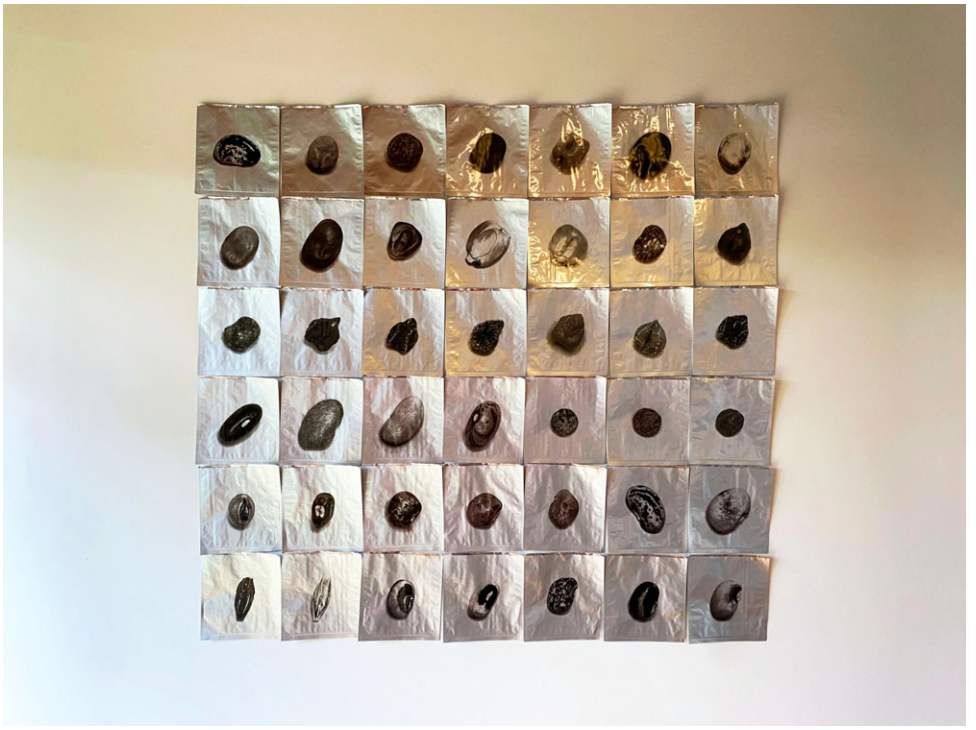

**Figure 2.** Svalbard Global Seed Vault, Svalbard, 2022. Image: Amanda Page.

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**Figure 3.** *Doomsday Core 02*, 2024, glass-blown seeds, 6 × 35 × 6 cm. Image: Amanda Page.

**Figure 4.** *Doomsday Core 02*, (detail), 2024, glass-blown seeds, 6 × 35 × 6 cm. Image: Amanda Page.

### Artwork 2: *Doomsday Core 02*

*Doomsday Core* (Figures 3 and 4) is made from blown glass and seeds which burn, blister and bubble, creating trapped chambers of air and ash residue. The work depicts seeds frozen in time, referencing an ice core sample and future apocalyptic conditions.

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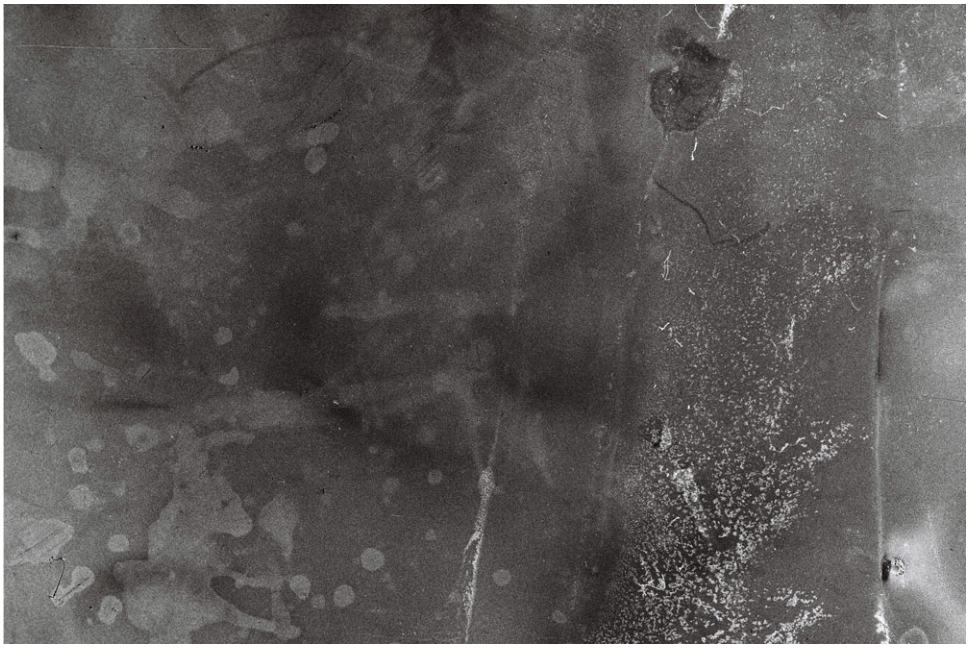
**Figure 5.** *Portrait of Longyearbyen Glacier* #15, 2022, hand printed photograph from analogue negative, 420 × 594 cm. Image: Amanda Page.



*Doomsday Core* (Doomsday Core – artist interview, Page, 2025) comprises agricultural grain seed samples from the 2022 seed deposit from AGG to the Svalbard Global Seed Vault. This work also developed from my Spitsbergen Artist Center Residency.

The paradox of security versus vulnerability is central: seeds stored at –18 °C as a safeguard by governance infrastructures (seed banks as planetary insurance), yet at risk due to melting permafrost in a warming Arctic, part of a larger cryospheric collapse. Referencing biosphere integrity, permafrost melts as a boundary breach.

The work references reading cores as data, suspended time, apocalyptic futures and climate change and the broader themes in my work of the cycles of life and death.

### Artwork 3: *Portrait of Longyearbyen Glacier*

Working and walking on the ice, I pressed analogue film into the glacial surface to create an imprint. This work captures different aspects of the glacial surface at a moment in time and records weather, light, temperature, water volume, moisture, air pockets in the ice, frozen emulsion – a record of climate and atmospheric activity (Figures 5 and 6).

Longyearbyen Glacier (Figure 7) is a small valley glacier 4.8 km long, about 520 m wide. It's a cold-based glacier, frozen throughout its entire body. Old trimlines suggest that it was 20–30 m thicker in some places around 1920 (Riger-Kusk, 2006).

This work becomes a cryospheric indexical print, an imprint, a trace, the residue of what once was, engaging the glacier as a collaborator in the making of the work. The work becomes a witness to cryospheric fragility and the thresholds of tipping dynamics.

In the context of planetary boundaries, this work comments on place-based planetary movements and in science education, references the phenomenology of climate.

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**Figure 6.** *Portrait of Longyearbyen Glacier* #1–16, 2022, hand printed photographs from analogue negative, 420 × 594 cm. Image: Amanda Page.

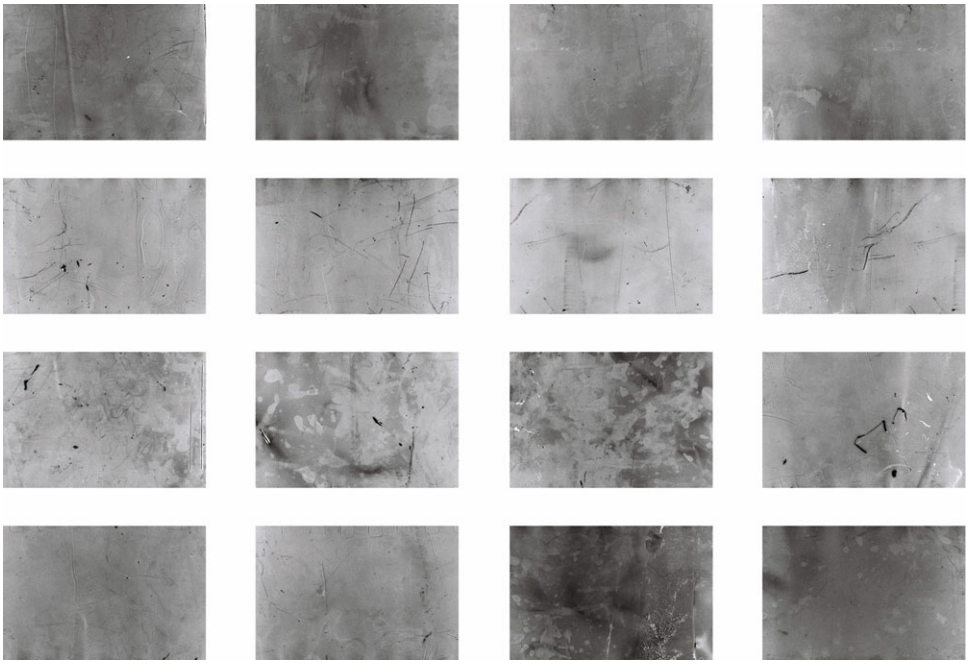

**Figure 7.** Longyearbyen Glacier, 2022, Image: Amanda Page.

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## Research contribution

By working with seeds, ice and glass, I'm working to materialise thresholds. A seed vault buried in melting permafrost. A glass core that references a frozen archive. A glacier imprint made with pressed film, holding impressions of the glacial surface from a vanishing world.

My research examines transformation and changes of state across natural systems – erosion, decay, metamorphosis – to interrogate thresholds between preservation and collapse. I'm exploring transformation and resilience through material processes and environmental systems.

My artistic research has become a lens for understanding Earth systems. It's material thinking, practice-led inquiry as knowledge production.

By translating scientific concepts into tactile, visual and time-based forms, the works contribute to environmental education, making complex ecological forces into forms we can engage with, bringing living systems into something we can sense and understand. They become portals through which audiences can access scientific ideas otherwise only kept within scientific realms.

## Thematic framing

A key theme in my work is transformation – moments when matter shifts state. These material changes echo planetary processes: erosion, decay and metamorphosis mirror the dynamics of Earth systems under stress. Within the planetary boundaries framework, this practice speaks to biosphere integrity and climate change, exploring resilience and fragility as lived conditions.

Artistic research becomes a lens for understanding these dynamics. Through residency-based inquiry and studio development, I work with materials that burn, blister, freeze and imprint – gestures that operate as metaphors for planetary limits. These transformations translate global thresholds into tactile prints and objects, making the invisible visible, the edge of change present and tangible.

Where data can feel inaccessible, art creates sensory access to complexity, inviting reflection on ethics and consequence. The aesthetics of fragility – glass that bubbles, film that freezes – teach us about system properties: what holds, what fractures, what dissolves. In doing so, the work positions art as a critical method for engaging earth ethics and planetary system governance.

## Educational implications

Seven of nine planetary boundaries have already been crossed, with melting permafrost threatening global food security. This urgency demands new ways to engage with environmental ethics and sustainability. My work uses art as a critical medium to bridge scientific realms – creating spaces where complex ecological systems become tangible and invite conversation.

Through visual narratives, these artworks invite dialogue without polarisation. They re-politicise climate conversations by shifting from abstract data to sensory experience, helping audiences to consider changes in climate as a lived reality. In education, this approach encourages inquiry and critical thinking, positioning art as a tool for exploring ecological narratives.

By materialising thresholds – seeds stored against disaster, glaciers imprinted as they vanish – art opens pathways for teaching awareness, care and shared solutions. It offers educators a way to hold controversy constructively, connecting ethics and science through imagination. In doing so, artistic research becomes a creative and communicative act. Art makes us feel better. It's good for us. And now we have evidence-based experiences that prove these health benefits. A recent research study (King's College London, 2025) that "measured the physiological responses of participants while viewing masterpieces by world-renowned artists" found that "art activates the immune, endocrine (hormone) and autonomic nervous systems all at once – something never previously recorded."As British artist Tracey Emin says, "art is probably one of the only true things left, that exists for its own sake and nothing else. Because art is a pure thing that comes from

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a realm of which we're not completely sure about. That's why we like artists. That's why we love art. That's why we think it's special . . . it has an alchemy with those that take part in looking at it." (Aiguabella, 2026)

## Conclusion

This article proposes that art can do more than represent change – it can become a tool for planetary insights and educational transformation. Through material processes and visual encounters, artistic research makes planetary boundaries tangible and invites us to feel the weight of thresholds already crossed. These works create spaces for conversation, where science meets ethics and imagination.

By communicating an educational message, art offers practical ways for audiences to engage with complex planetary systems. It opens possibilities for teaching observance, awareness and care in a time of ecological uncertainty.

This work calls for collaborations – artists and scientists – working together to shape new forms of knowledge and action. Collaboration across these boundaries is essential if we are to navigate the fragile edges of our shared future on the planet.

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## Author Biography

**Amanda Page** is an Australian artist working with transformation. Page records changes of state in material and process. Works develop from observing atmospheric activity such as temperature and weather, erosion and decay, metamorphosis and phenomena. She explores cycles of life and death and the coalescing and dissipation of natural systems. Page works across drawing, printmaking, analogue and digital photography, video and sculpture. She has exhibited nationally and been selected as a finalist in major national art awards. Her work is held in national collections including the Museum of Brisbane and Australian Prints and Printmaking at the National Gallery of Australia.

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