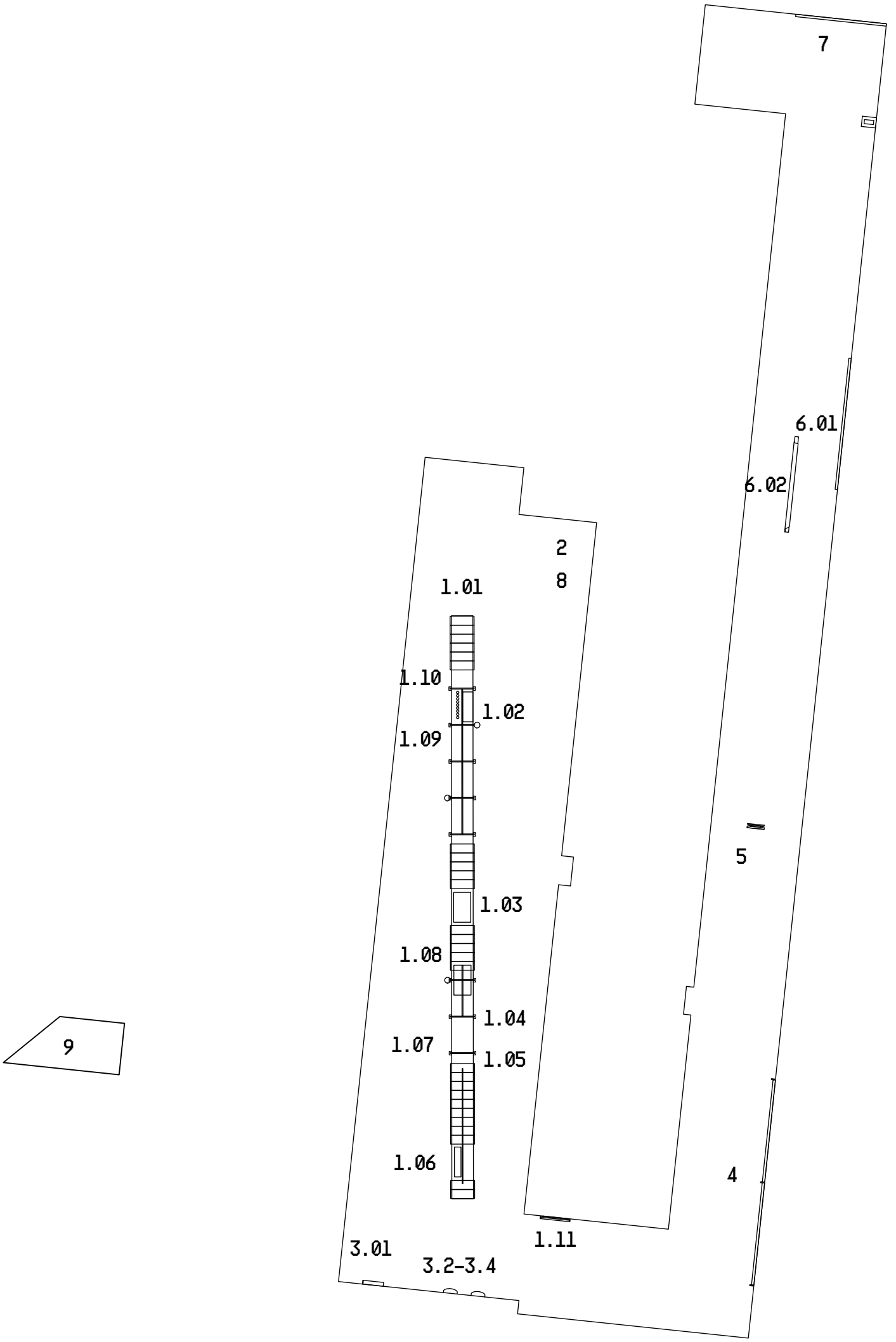
DEEP TIME REAL TIME

THE 2025 ALASTAIR SWAYN LEGACY EXHIBITION



THE EXHIBITION WILL EXIST FOR 7,016,400 SECONDS THE EXHIBITION WILL OPEN FROM FEBRUARY 25 TO MAY 17

DEEP TIME REAL TIME

Deep Time Real Time explores the relationship between design and planetary systems through two opposing temporal scales – 'deep time' and 'real time'.

In the late 18th century, within the context of a burgeoning industrial revolution, polymath James Hutton posited a theory that envisioned an 'infinitely' old and continuously regenerating Earth. This geological concept radically shifted our perception of time, expanding scales from thousands to billions of years and revealing the interconnectedness of the ecological systems we rely on.

As global citizens, we struggle to reconcile this geological timescale with our everyday lives. This affects our time-based thinking, limiting our ability to make decisions on regenerative actions and to develop collective societal and design responses to the complex challenges of our planet.

Today, technology offers new ways of seeing and knowing information that enable us to better understand the entangled, inter-relational and hidden conditions of our world. Through gathering, analysing and visualising data – often in real time – we can better understand environmental conditions that would, otherwise, be invisible.

Technology is, however, never a neutral actor. An inherent conflict lies in the fact that many of the most innovative technologies are designed and used for military applications, or the exploration and extraction of resources by the mining industry. This uneasy foundation makes it imperative that we critically question how these tools and practices are utilised – and for whose benefit.

Indeed, through creative ingenuity these very same technologies are being re-designed, hacked and re-deployed to support the repair, regeneration and preservation of ecologies. These adaptive and opportunistic processes are enabling new time-based thinking and spatial practices to emerge.

Deep Time Real Time reveals the agency of time-based thinking and foregrounds a research-led approach to design and creative practice. The exhibition is centred around a large-scale installation by architecture practice Simulaa, comprising a 'timeline' of digital, geological, and material samples that visualises the journey of materials through time. A series of architects, designers and artists have been invited to respond, creating a collection of time-based creative and research works presented through the lenses of ecology, energy and technology.

Deep Time Real Time invites visitors to consider the complexity of these intersecting concerns, and to situate themselves in relation to the distant past and the far future.

EXHIBITING, DESIGNING AND THINKING THROUGH TIME

Deep Time Real Time is an exhibition and research project exploring our relationship to planetary systems through two opposing temporal scales – 'deep time' and 'real time.' The exhibition recognises that as citizens – and as architects and designers – we struggle to reconcile geological timescales with our everyday lives. This, in turn, affects our collective ability to make decisions on regenerative actions for the future of the planet.

Curatorially, *Deep Time Real Time* makes a case for time-based thinking – or 'time literacy'[1]– as critical to a future in which architecture and design practices work towards the preservation, repair and regeneration of planetary ecologies. It positions exhibition making as a critically engaged, explorative and discursive practice in which to test, evolve and disseminate practice-led design research.

Deep Time Real Time is complex, layered and 'big' in ambition, yet the ideas and works are intended to be experienced by visitors at an intimate scale. Many are interactive, touchable, sprayable, poetic, responsive and, at times, very small – even microscopic. Here, there is resonance with expanded curatorial practices that pursue 'new modes of thinking and understanding that offer associational and [exploratory] approaches that build abilities to consider how our choice, actions and lives are entangled with the other species and forces of the planet.' (Newell et al. 2017, 4)

On entering the main Project Room, a large-scale armature titled *Strata Signals* (2025) by architecture practice Simulaa – also the exhibition's co-curators – operates as a type of proto-apparatus or observational structure, positioned deliberately at an oblique angle. The structure is fabricated from found building elements, steel, timber, hemp and canvas, and organises a display of digital, geological and material samples that visualise the journey of materials through time. The architects have repurposed steel 'web forge' – a material that partially lines the Design Hub Gallery's wall – to literally and metaphorically 'recycle' the building and form a layered plinth-display surface.

Strata Signals includes a timeline of drill core samples on loan from the Geological Survey of Victoria's Drill Core Library. Visitors are invited to engage directly with the material, inspecting and spraying sections of the geological samples with water. In turn, the material reveals a visual and olfactory transformation, demonstrating 'readability' as a record of time and acknowledging its origins in extractivist land-use practices. As exhibition co-curators André Bonnice and Anna Jankovic write in their curatorial essay: 'By placing them on public display, [we] seek to reframe their significance, positing them as instruments of public knowledge and engagement… a material repository that can extend our understanding of deep time."

Also presented within *Strata Signals* are material samples and documentation collected from researchers and nonprofit organisations across inter-disciplinary and scientific fields. Examples include video works from Clean Air Task Force – an organisation advancing scalable solutions to combat climate change – and the Society for the Protection of Underground Networks (SPUN), who track global underground fungal networks critical for ecosystem health and carbon storage.

Strata Signals culminates with documentation from the Palynology, Palaeoecology and Biogeography Research Lab from The University of Melbourne – a research team led by Wiradjuri geologist Michael-Shawn Fletcher. Self-described 'time travellers', the Lab researchers collect sediment archives from wetlands to uncover the legacy of Indigenous care for Country, investigating changes in vegetation and fire over the span of decades to thousands of years in order to reconstruct environments over time.

In direct response to *Strata Signals*, artist and access consultant Fayen d'Evie has developed a script, performative tour and participatory audio description titled *Holding* (2024). The work implicates visitors in questions of access through the

1 The movement towards 'time literacy' is referenced to Bjornerud, Marcia (2019). 'Timefulness.' Long Now Foundation: Long Now Seminars, accessed 18 February 2025. https://www.youtube.com/watch?v=Pd9seKaplDI&ab_channel=LongNowFoundation.

purposeful handling of geological samples and human-fabricated material. *Holding* raises questions about who and what is holding Earth through epochal change, prompting poetic and ethical reflection on disturbance, pressure and collective change beyond the limits of human space-time.

Positioned almost at ceiling height on the southern wall, *Four degrees warmer* (2024) by artist Alicia Frankovich recalls an archetypal time clock, the form a direct reference to the clock found at the Brunswick Baths – the site of Frankovich's 2023 performance work *The Eye*. *Four degrees warmer* switches between the ambient temperature in the space and the given time of the day, with the four-degree increment bringing urgent attention to the catastrophic threat posed by the predicted temperature rise on Earth.

For *Deep Time Real Time*, Frankovich has also developed a suite of new works titled *T-E-S-L-A cryo T-E-S-L-A cryo crash T-E-S-L-A cryo crash dummy I-III* (2025). These pastel-coloured 'techno-fossils' reference deployed Tesla airbags, blown up and set in resin – a commentary on the pernicious influence of big tech 'oligarchs' and their aspirations to colonise space for the wealthy. Fixed to the wall at varying heights, the sculptures recall limbs and organs, bodily fragments left behind in the wake of environmental collapse.

Moving across the bridge, visitors encounter a new work by US-based architectural researcher Farzin Lotfi-Jam. *Realtime: The Imperial Architecture of Now* (2025) is a five camera, interactive work that documents the architecture of real time. The sequence of cameras track each visitor's movement, their image projected at large scale. A didactic narration explains how human activity is monitored, modelled and managed computationally while, simultaneously, layered imagery traces the historical emergence of real time systems, exploring how they've shaped space and time.

Centred in the space on a purpose-designed armature, Nicholas Mangan and Cameron Allan McKean's collaborative work *Death Assemblage (The blade that makes coral time is shaped like a mushroom cloud)* (2023) is at once intimate, and monumental. The two-sided artwork features a slab of reworked and reaggregated coral bones ground to reveal the inner structure of the coral material. Displayed under a pulsating light source, the work is intended to be experienced at close range and even touched, acting as a memorial for the coral demise of the Great Barrier Reef.

The reverse side features a video work comprised of black-and-white footage, overlaid with text by McKean listing the 43 nuclear tests conducted at the Enewetak Atoll. McKean's listing is narrated by Ying Lan-Dann – her voice, functional yet poetic, challenges visitors to consider how these tests have complicated and disturbed our understanding of coral histories over time.

Mounted on the eastern wall, *Timeline* (2024) – a woven textile by architect Emma Jackson – tells the story of Earth's geological timeline, with each epoch represented in colour and at scale. Visitors are encouraged to cross-reference the colours in *Timeline* with its neighbouring work *Tiger Fish* (2023), a large-scale carpet work representing the geological conditions of Gondwana, when approximately a third of Australia was still underwater. Displayed in the centre of the space and hanging gently over a suspended saddle, the colours and textures of *Tiger Fish* represent the behaviours of sedimentary rock or volcanic forces over time. Throughout the exhibition's duration, *Tiger Fish* will 'travel', settling in new positions as a welcoming ground surface for discursive public programs and events.

Culminating the exhibition, at the northern concrete wall, Wiradjuri artist Joel Sherwood Spring presents *HOLECODED* (2025) – a simulation of a computational generative, real time animation layered with random imagery of a never-ending hole. The work reveals the degradation caused by extractive mining practices of finite resources as an ongoing act of colonial and ecological violence. A soundscape 'sings' the work into being, connected through vibration to the absence of material; its sonic presence draws visitors through the extruded length of the 30-metre space.

Critical to realising the curatorial ambitions of *Deep Time Real Time* are the valued contributions of the exhibition's graphic designers Stuart Geddes and Žiga Testen, and access consultants Fayen d'Evie, Lloyd Mst and Jon Tjhia of Access Lab & Library (ALL).

In response to conversations with the curators, Stuart Geddes and Žiga Testen have created a single channel film in collaboration with Will Neill. Referencing *Powers of Ten* (1977) – a short film by Charles and Ray Eames – the work begins in the scale of seconds, focusing on the individual and social conception of time, and culminates in deep time. It explores the cycles of Earth's history, emphasising both the fleeting nature of human existence and the enduring forces of time. Throughout the exhibition's duration, the film will be presented in the RMIT Design Archive shopfront window – adjacent to the Design Hub Gallery – and digitally via social media and online platforms.

Geddes and Testen have also devised a responsive visual identity for *Deep Time Real Time* that supports a light footprint methodology for the exhibition's graphic treatments, including repurposing an industry standard machine to stamp concrete pipes for notations, time codes, signage and printed matter, along with 'hacked' digital devices for wall mounted artwork descriptions.

Access Lab & Library (ALL) have also sustained conversations through the exhibition's development with the curators, researchers and artists, responding with access strategies and experimental methods that are low cost and implementable. ALL's work for *Deep Time Real Time* includes audio descriptions of each work, screen readable room sheet texts and tactile gallery floor maps, along with accessibility workshops for gallery staff and scripts for performative tours – generous technologies and systems that can be further developed for a future space and time.

Deep Time Real Time centres exhibition making as an expanded field for creative practice research experimentation and a platform for criticality, reflective learning and generous public exchange. The exhibition invites visitors to think *through* time – much like a geologist – to re-envisage our future relationship with Earth's planetary systems. Vitally, *Deep Time Real Time* challenges established modes of teaching, practicing and exhibiting architecture and design, towards new spatial practices that are 'time literate' and support better outcomes for our shared geological future.

Fleur Watson
Creative director and co-curator
Deep Time Real Time
2025 Alastair Swayn Legacy Exhibition

CURATORIAL RESEARCH ESSAY

André Bonnice
and Anna Jankovic

'The mind seemed to grow giddy by looking so far into the abyss of time.'
— John Playfair, 1805

The exhibition *Deep Time Real Time* examines the perception, constructs and politics of time through the dual lenses of deep time (geological and ecological cycles spanning billions of years) and real time (the hyper-precise, instantaneous measurement of events). By investigating the role of time in shaping both human and planetary systems, the exhibition considers how our understanding of temporal scales influences our ability to contend with contemporary ecological and technological challenges.

The rigid classification of time as a measurable, linear progression – often framed through language of growth, accumulation and acceleration – is central to our inability to adequately respond to the current planetary polycrisis. In much of the Western world, time has been instrumentalised as a tool of expansion, reinforcing an economic and technological logic that prioritises perpetual advancement over equilibrium. Yet, the rhythms of life on Earth – human and non-human alike – are inherently relational, unfolding through interconnected cycles of emergence, decay and renewal. Rather than racing forward in pursuit of unchecked progress, the temporalities of the living world are attuned to deep, reciprocal exchanges. Applying deep time thinking to architecture and design encourages a shift away from the short-term commodification of the built environment, and towards a framework that acknowledges long-term ecological implications. As planetary challenges intensify, the architectural discipline must evolve to incorporate deep time *and* real time perspectives into design thinking.

Two centuries before the term 'deep time' was coined by writer John McPhee, polymath James Hutton had observed the continual erosion of land into the sea, hypothesising that if this unceasing degradation of arable soil continued, it would eventually lead to an uninhabitable planet. He sought to find evidence of some compensatory process and after 25 years of field work, it was in the geomorphology at Siccar Point on the east coast of Scotland that he found the answer. There, Hutton observed two sequences of rock – one older, near-vertical strata overlaid by another younger, horizontal strata, leading him to conclude that the Earth was 'infinitely' old. Far from being static and unchanging, he found that it was undergoing countless cycles of movement (erosion, deposition and other processes) over time scales with 'no vestige of a beginning, and no prospect of an end' (Hutton 1788, 304), beyond any temporal framework that had been conceived in the eighteenth century – Earth was then believed (according to Western knowledge systems) to be less than 6000 years old. Accompanying Hutton, mathematician John Playfair remarked that 'the mind seemed to grow giddy by looking so far into the abyss of time' (Playfair 1805, 73). This discovery – and Hutton's conceptualisation of Earth's gradual, cyclic and deep history, published in *Theory of the Earth* (1788) – became foundational to the field of geology.

Geologist Marcia Bjornerud describes the Earth as a 4.5-billion-year-old closed regenerative system within which everything 'is incessantly recycled, reforged, and restocked' according to circular logics developed 'early on' (Bjornerud 2019). Despite recognising this cyclical pattern, human perception of time on Earth remains largely bound to anthropocentric durations such as a 'generation', our 'lifetime' or (shorter yet) the decisive periods of a 'financial year', or a 'term of government'. The immediacy of these temporal frameworks limit our ability to think and make decisions with regard to long-term future consequences, resulting in a sort of 'time-blind hubris' (Bjornerud 2020, 15) or denial. In contrast, Bjornerud speaks of 'timefulness' and the importance of 'time literacy' – thinking *through* time, as a geologist does – to enhance our understanding of the deep past, such that we may also forge an engagement with the deep future.

Deploying the one-way linear processes that have shaped our 'modern' world, we have all the while neglected the inherent regenerative nature of the Earth – its cyclical processes, the limits of the geosphere and biosphere to support life – with willful disregard for our capacity to disrupt, exploit and cause irrevocable harm. The concept of deep time, and a geological perspective on planetary rhythms, is foundational to sustainability – to regeneration, conservation and recognising the interconnectedness of all things. How might we as a society equip ourselves with the tools to expand our limited perception of time, to gain a deeper understanding of these orders of magnitude and planetary systems that we are entangled with?

At the opposing temporal scale, digital technologies rely on real time, driven by ever-increasing technological precision – for military and surveillance applications, GPS satellites and digital financial systems – and creating an environment where time is measured to the millisecond. Real time has its origins in the history of timekeeping as a form of colonial and militarised control, from the establishment of Greenwich Mean Time (GMT) by the British Empire in 1884 to the present day United States Naval Observatory Master Clock – UTC(USNO) – which comprises various atomic clocks that set the time on every smartphone and laptop. As the work of German filmmaker and author Harun Farocki demonstrates, military technologies do not remain confined to warfare; they extend into commercial, industrial and everyday surveillance systems. Developed for reconnaissance, targeting and battlefield analysis, these technologies have been repurposed in contexts ranging from security and policing to workplace monitoring and consumer behaviour tracking (Elsaesser 2004, 11–40).

However, these same technologies have also enabled a new suite of environmental monitoring systems that rely on real time precision timekeeping. Advancements in environmental 'sensing' technologies allow humans to observe and analyse planetary conditions in unprecedented detail. Platforms like Pl@ntNet enable digital biodiversity monitoring, while others like MethaneSAT provide live data on global methane emissions, exposing industrial polluters. Digital earth[2] systems use satellite monitoring and biochip tracking to create real time maps of ecological phenomena, from animal migrations to atmospheric changes (Bakker 2024, 105), while LiDAR scanning, hyperspectral imaging and remote sensing offer new ways to visualise geological and ecological transformations, revealing patterns invisible to the human eye. Yet, these tools carry an inherent tension – their origination in military and industrial contexts raises ethical concerns for their use and application. Despite these nefarious origins, however, in the past decade scientists and conservationists have redeployed these technologies to achieve conservation goals (Bakker 2024, 89).

The exhibition *Deep Time Real Time* openly explores this tension, asking: Can these technologies, initially designed for extraction and control, be repurposed for ecological restoration and planetary awareness? Or are they irrevocably tied to exploitative systems?

Some critics argue that we need less digitalisation, not more, and that any acceleration will lead to increased resource extraction, consumption and waste. Bjornerud also notes that 'an unfortunate reality is that the unintentional consequences of our technologies will almost always outlive our intentional implementation of them.' (Bjornerud 2019, 22:20) But as author and researcher Karen Bakker argues, 'carefully regulated digital technologies can and should be used to advance environmentalism. This digital environmentalism agenda could, if thoughtfully managed, reduce resource extraction and waste, accelerate action on climate change mitigation and adaptation, and widen our toolkit for biodiversity conservation.'
(Bakker 2024, 105)

This kind of 'digital environmentalism' can be seen in the rise of citizen-science and crowdsourced data collection, which has transformed environmental and conservation efforts. Platforms such as *iNaturalist* empower individuals to become active participants in ecological research by turning their

2 'Digital earth' is the term coined by former US Vice President Al Gore in 1998 to describe the concept of a virtual representation of the Earth that is georeferenced and connected to the world's digital knowledge archives.

smartphones into remote sensing devices. Each smartphone can be repurposed to document and geo-tag features of biodiversity in real time, contributing to expansive, publicly-accessible databases. This distributed form of data collection enables researchers, conservationists and policymakers to track species distribution, detect environmental changes and respond to ecological threats and events with a level of granularity and immediacy previously unattainable. The scale of this participatory approach has created a resurgence of public engagement in science reminiscent of the Victorian era, when amateur naturalists played a crucial role in documenting the natural world.

Central to *Deep Time Real Time* is the display of a timeline of drill cores, on loan from the Geological Survey of Victoria's Drill Core Library, which holds thousands of geological samples extracted from across the state. This archive serves as both a scientific record of deep time and a testament to extractivist land-use practices. Typically, these cores are accessed exclusively by energy and mining companies – with occasional use by students and researchers – reinforcing their primary function as a resource for industrial and economic gain. By placing them on public display, this exhibition reframes their significance, positing them as instruments of public knowledge and engagement.

This reframing positions the Drill Core Library as an equivalent public resource to that of a state library. Just as historical and literary records contribute to a broader cultural and intellectual commons, so should geological samples be recognised as a material repository that can extend our understanding of deep time. In making these cores interactive, the exhibition also encourages a tactile, sensorial experience that goes beyond visual observation. Highlighting the importance of touch in engaging with geological material, allowing visitors to perceive differences in texture – smooth versus rough, solid versus fragmented – offers a tangible interaction with the processes that shape planetary matter over vast timescales.

The discourse on 'extraction' in contemporary design is largely binary, and it is often solely framed as a destructive process that must be stopped. Despite these sentiments, our transition towards renewable energy and sustainable technologies will rely on extracting increasing amounts of rare earth minerals needed to build solar panels, wind turbines and battery storage systems. Instead of outrightly condemning 'extraction', it is imperative that we rethink extractivism as a process that must be reformed, minimised and made more accountable. The display of drill cores in the exhibition helps to frame this discussion, shifting them from industrial commodities to public knowledge, and allowing us to critically examine the complexities of extraction – if only to confront us with the reality of where the materials of our built environment and everyday objects originate.

Deep Time Real Time also engages with multiple epistemologies, juxtaposing Western scientific frameworks with Indigenous knowledge systems. In her book *Braiding Sweetgrass* (2020), Robin Wall Kimmerer, as both a Potawatomi woman and a classically trained scientist, highlights how the right type of scientific gaze can rebuild relationships with the environment, stating that 'science can be a way of forming intimacy and respect with other species that is rivalled only by the observations of traditional knowledge holders. It can be a path to kinship.' (Kimmerer 2020, 162)

The Palynology, Palaeoecology and Biogeography Research Lab at The University of Melbourne, led by scientist and Wiradjuri man Professor Michael-Shawn Fletcher, approaches time through the lens of thousands of years, examining the intricate relationships between climate, fire and human land management. Unlike geological deep time, which spans billions of years, the lab's work focuses on reconstructing ecological histories over more recent timescales, revealing how Indigenous land practices have shaped landscapes for millennia. The lab exemplifies how the right scientific gaze – one that respects both empirical data and Indigenous knowledge – can deepen our understanding of environmental histories and inform future land management strategies. To reveal these histories, they analyse sediment records by extracting 'mud cores' from wetlands, uncovering evidence of long-term bioregional change and the role of fire as a tool of cultural land stewardship. Their research challenges the dominant Western narrative, which views pre-colonial landscapes as 'untouched wilderness' (Wilson n.d., 2), and instead evidences how Indigenous people in Australia have been integral to ecosystem dynamics for thousands of years.

This perspective reinforces the importance of seeing time not as a singular, linear vector but as a layered and interconnected process. Just as the exhibition's drill cores timeline invites reflection on extractivism and the material histories of our built environments, the lab's work prompts a reconsideration of human agency in shaping landscapes, challenging the idea that intervention is inherently disruptive and instead recognising it as a fundamental ecological force, one that can be beneficial if we give due consideration to time.

Through the microscopic, deep time and real time converge, exposing how the smallest traces – minerals, pollen and particulates – carry the imprint of both ancient planetary processes and immediate environmental shifts. In geology, mineral structures, isotopic compositions and sedimentary layers encode millions of years of environmental change, allowing scientific analysis to reconstruct the shifting conditions of Earth's deep past. Similarly, the examination of pollen grains and charcoal fragments preserved in sediment cores builds evidence of the ecological transformations and fire regimes that have shaped landscapes over the more recent few thousand years. These microscopic traces, though imperceptible to the naked eye, serve as archives of planetary-scale events, linking local environmental shifts to broader global patterns of climate, biodiversity and human influence over time. At the same time, the microscopic scale is also relevant to real time analysis, particularly in climate science and environmental monitoring. Through real time sensing, microscopic data – such as air and water quality particulates, microbial activity and atmospheric chemical compositions – can reveal and track immediate changes in both local and planetary scale conditions.

Situated at the top of the exhibition's central installation, large billboards display aerial imagery captured from the sites where the drill cores were extracted. These images juxtapose the raw geological samples with their broader landscapes and microscopic material histories. The aerial drone imagery also evidences how we have terraformed much of rural Victoria (and the planet) through agriculture, mining, deforestation and industrialisation, reshaping ecosystems, altering atmospheric compositions and leaving an enduring stratigraphic imprint that defines the (unofficial) Anthropocene. By bringing together these multiple scales – material, geological and digital – the installation interrogates the entangled relationships between extraction, representation and environmental stewardship.

Formally, the installation is less about a fixed, final state and more about proposing a method of practice – prioritising a 'hackable' architecture that can accommodate and facilitate multiple modes of observation. By integrating real time digital sensing tools into spatial design, the work underscores the necessity of time-based design thinking, wherein architecture operates not as a static entity but as a responsive and evolving system. The installation (and the research informing it) draws inspiration from the High Tech architectural movement's ethos of exposing and celebrating structural and mechanical systems, but instead of valorising industrial permanence it embraces impermanence, reuse and the ecological afterlife of materials. By layering material, environmental and technological narratives, the installation invites a viewer to see architecture as an apparatus in environmental monitoring.

Deep Time Real Time is designed to provoke critical reflection on the implications of time perception for a sustainable existence on Earth. The juxtaposition between deep time and real time underscores the complexity of environmental transformations – some slow and imperceptible alongside those that are more abrupt and increasingly urgent, to others that are instantaneous and synchronised – registered at varying scales from the microscopic to the planetary. The exhibition challenges visitors to reconsider their temporal orientation and

responsibility within the planetary systems on which we all depend. In doing so, it calls for a recalibration of architectural and design thinking, provoking us to engage more deeply with planetary rhythms, our responsibility to environmental stewardship and our evolving role in shaping built and natural environments in an era of ecological crisis.

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LIST OF WORKS

Simulaa
Live and work in Narrm/Melbourne

1 *Strata Signals*, 2025
repurposed building elements, steel, timber, hemp, canvas, digital screens, rock and earth samples sizes various

Strata Signals is an adaptable structure that facilitates an exploration of time through the spatial composition of materials, artefacts and digital media. The installation comprises repurposed steel grating taken from the walls of the Design Hub that serves as a plinth for hundreds of geological 'cores', which make up a timeline of Victoria's geomorphology. The absence of steel grating exposes the building's concrete core and represents a physical 'reforging' of the space. Positioned above, an industrial metal framing system – typically used in large-scale energy and mining infrastructure – has been reconfigured to hold an assemblage of geological and bio-based materials, research artefacts and digital displays, including real time environmental monitoring. Situated at the top of the installation, large billboards display aerial imagery captured from the sites where the drill cores were extracted. Components within the structure have been bolted, clipped, tied and strapped, rather than permanently fixed, allowing for disassembly and reuse. Operating as a dynamic system rather than a static entity, *Strata Signals* engages with material and temporal cycles, highlighting the entangled relationships between extraction, representation and environmental stewardship.

Courtesy of Simulaa, the Victorian Government (with core specimens supplied by the Geological Survey of Victoria's Drill Core Library), Palynology Palaeoecology and Biogeography Research Lab, Magnasci SRL, Algal Processing Group, Clean Air Task Force, Society for the Protection of Underground Networks (SPUN), HyperSens Laboratory, iNaturalist, Copernicus Sentinel-2 and Julien Comer-Kleine.

1.01 Resources Victoria (Geological Survey of Victoria division)

Victoria's Drill Core Library (DCL) is a critical resource for understanding the state's geological history. Located in Werribee, the library houses an extensive collection of drill cores and rock samples from across the state, which provide invaluable data on the structure, composition and mineral content of Victoria's subsurface. The facility enables geologists and other researchers to study the processes that have shaped the region over millions of years. By preserving this geological archive, the DCL plays a vital role in advancing scientific knowledge and fostering responsible resource development in Victoria.

Drill core samples from the library are presented here in a 26-metre long 'timeline' representing one to 485 million years of Victoria's geological history. Selected from geologically significant regions, the cylindrical cores represent the diverse range of rock types found across the state. These include basalt, granite, gneiss, limestone, sandstone and siltstone of varying ages and mineral composition.

1.02 Clean Air Task Force

Clean Air Task Force (CATF) is a global nonprofit organisation dedicated to advancing scalable solutions to combat climate change, including efforts to reduce methane emissions. One of the organisation's key initiatives is the #CutMethane Campaign, which uses thermography to expose methane pollution from the oil and gas sector – a major contributor to global warming. The campaign advocates for stricter regulations, advanced monitoring technologies and global cooperation to limit methane leaks, intentional releases and flaring. CATF combines research, policy advocacy and collaboration with civil society, industry and governments to protect public health and drive climate solutions.

The thermal videos presented here reveal invisible pollution escaping from gas installations at facilities across regional Australia and Europe, from wells to local distribution networks. The release of methane gas into the atmosphere is about 80 times more damaging to the climate than carbon dioxide over a period of 20 years. Although methane is invisible, CATF's use of infrared cameras helps visualise emissions to expose polluters and to help enact mitigation strategies.

1.03 HyperSens Laboratory

The Hyperspectral and Thermal Remote Sensing Laboratory (HyperSens) at The University of Melbourne integrates hyperspectral imaging, thermal sensing and remote sensing technologies to advance precision agriculture, environmental monitoring and natural ecosystem management. By combining airborne, drone, satellite and ground-based sensor data with advanced physical modelling and machine learning, HyperSens provides critical insights into soil conditions, vegetation health, water and nutrient management, and early disease detection at pre-visual stages. The lab's research supports sustainable farming practices, food security and environmental conservation, fostering applied research and innovation in precision agriculture and environmental science.

The images displayed here are a series of high-fidelity hyperspectral surveys from agricultural areas in Victoria where this technology has been applied. The human eye perceives only a small part of the electromagnetic spectrum—red (670 nm), green (560 nm) and blue (490 nm)—which combines to form what we see as true colour. However, the world is far more complex than what our eyes can detect. Hyperspectral and thermal sensors allow us to explore beyond human vision, capturing detailed information across hundreds or even thousands of spectral bands, including those in the visible, near infrared and thermal regions of the spectrum.

1.04 Society for the Protection of Underground Networks

The Society for the Protection of Underground Networks (SPUN) is a nonprofit organisation dedicated to mapping and conserving the world's underground fungal networks, which are critical for ecosystem health and carbon storage. SPUN employs a combination of environmental DNA (eDNA) sampling and real time machine learning to map fungal mycelium networks. Field teams collect soil samples from various ecosystems, extracting fungal DNA to identify present species. These geo-referenced data points are then integrated into machine learning models which, alongside environmental variables, predict fungal biodiversity patterns globally. This approach enables SPUN to identify biodiversity hotspots and regions where underground fungal networks are under threat, guiding conservation efforts and informing sustainable land management practices. By safeguarding these ecological infrastructures, SPUN works to enhance ecosystem resilience, promote carbon sequestration and support sustainable land management practices, recognising the essential role fungal networks play in sustaining life on Earth.

This footage shows fluorescently labelled carbon compounds flowing through mycorrhizal fungi, highlighting the symbiotic relationships mycorrhizal fungi form with 90% of all land plants. Through these symbioses, mycorrhizal fungi provide plants with key nutrients in exchange for carbon, allowing both plants and fungi to thrive.

1.05 iNaturalist

iNaturalist is a multifaceted platform that combines technology, community engagement and scientific collaboration to document and understand global biodiversity. Users upload photos and observations of plants, animals and fungi, which are then identified by AI and community expertise. The platform contributes to real -time remote sensing by generating extensive geotagged data sets, enabling researchers to monitor biodiversity trends, species distribution and ecological changes. iNaturalist empowers the citizen scientist movement, engaging millions worldwide in biodiversity conservation and data collection. Its data is openly shared with global biodiversity repositories like the Global Biodiversity Information Facility (GBIF), supporting conservation science and policymaking while fostering public engagement with nature and environmental stewardship.

Displayed on the screen is iNaturalist's live interactive map, showing real-time observations and geotagged photographs of plant, animal and fungi identification from its community of users around the world.

1.06 Copernicus Sentinel-2

The Copernicus Sentinel-2 mission consists of two polar-orbiting satellites positioned in the same sun-synchronous orbit, with a phase difference of 180°. The project monitors changes in land surface conditions, supporting a variety of services and applications. The mission utilises wide-swath, high-resolution, multi-spectral imaging to monitor vegetation, soil and water cover, as well as observing inland waterways and coastal areas. The data produced is open source and made available to all data users including the public, citizen scientists, researchers and commercial users. This data is critical for environmental monitoring, research and visualisation of large-scale planetary processes.

Displayed on screen are time-lapse animations generated from data captured by Sentinel-2, showing environmental changes over time in rural and coastal areas of Victoria.

1.07 Palynology, Palaeoecology and Biogeography Research Lab

The Palynology, Palaeoecology and Biogeography Research Lab delves into the past, using sediment archives retrieved from wetlands to uncover the legacy of Indigenous care for Country across Australia. The team investigates changes in vegetation and fire over the span of decades to thousands of years in order to reconstruct environments over time and highlight the integral role of people in ecosystems.

In collaboration with the Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation, Melbourne Water and the Waterway Ecosystem Research Group at The University of Melbourne, the Lab demonstrates the importance and efficacy of Traditional Owner-led wetland management and restoration, using Melbourne's degraded remnant riverine wetlands (billabongs) along the urbanised lower Yarra River (Birrarung). Seven remnant billabongs along the lower Birrarung form the basis of their study: Annulus, Banyule Flats, Bolin Bolin, Burke Road, Horseshoe, Montpelier and Willsmere. These billabongs have previously been identified as sites of ecological and cultural significance under Melbourne Water's Healthy Waterways Strategy.

The documentation here presents research currently being conducted in one of the seven identified sites – the Banyule Flats billabong.

Project team: The University of Melbourne (Michael-Shawn Fletcher, Joe Greet, Anthony Romano, Patrick Kennedy), Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation (Charlotte Hilbig and David Mullins) and Melbourne Water (Rhys Coleman).

1.08 Julien Comer-Kleine

Tarawera Murmurations is an aluminium-cast work resonating low-frequency recordings of the volcanic zone surrounding the Puia (volcano) Tarawera in Rotorua, Aotearoa. Captured with a geophone, the seismic waves detected typically exist in the infrasound range, below the threshold of human hearing (20 Hz). These low-frequency vibrations travel through the Earth's crust, revealing geological structures that would otherwise remain hidden. While humans can't perceive these deep rumbles, geophones convert them into electrical signals that can be analysed to understand subsurface conditions and seismic activity.

The work forms part of an ongoing project with Julien's iwi (tribe) on their ancestral land, and serves as a prototype for a larger body of work in development.

1.09 uRADMonitor

uRADMonitor, developed by Romania's Magnasci SRL, uses innovative electronics and IoT technologies for real time environmental monitoring of air quality, radiation and pollutants. It has established a global network of sensors, enabling accurate data collection to help individuals, governments, universities and industries address environmental and health challenges. This early adoption of IoT provides a scalable solution that supports public awareness, health and sustainability.

The uRADMonitor in the installation is monitoring the internal environment of the gallery in real time, forming part of a global network of remote sensors contributing data to this worldwide initiative.

1.10 Algal Processing Group

The Algal Processing Group at The University of Melbourne studies how environmental conditions influence microalgae growth and biochemical production over time. Their research examines the dynamic interactions between microalgae and changing factors such as light, temperature, CO_2 availability and nutrient cycles. By understanding these temporal processes, the team is able to develop sustainable methods for producing biofuels, nutritional proteins and omega-3 fatty acids. Their work includes optimising CO_2 delivery through membranes and reducing water loss with chemical monolayers. This time-sensitive approach supports long-term environmental sustainability by advancing scalable, eco-friendly technologies for future food and energy security.

The exhibition presents a series of glass tubes containing live algae cultures converting CO_2 into new algae cells and oxygen. Early cyanobacteria (a type of algae) were among the first organisms to release oxygen into the oceans and atmosphere, driving the Great Oxidation Event around 2.5 billion years ago, which transformed Earth's atmosphere and enabled the evolution of complex life. More recently, rapid atmospheric release of carbon stored by algae over millions of years as oil and gas is contributing to climate change. Replacement of fossil resources with contemporaneously grown algae realigns the timescales of carbon uptake and release.

1.11 C-SPAN

Greenhouse Effect originally aired on 10 December 1985. The US Senate hearing was led by Senator David Durenberger, who chaired the Subcommittee on Toxic Substances and Environmental Oversight of the Committee on Environment and Public Works. Notable witnesses included renowned astrophysicist Dr Carl Sagan, who provided insights into the potential impacts of increased greenhouse gases on Earth's climate. Sagan highlighted the delicate balance of atmospheric gases and warned that excessive carbon dioxide emissions could disrupt this equilibrium, resulting in significant climate changes. Forty years ago, Sagan was already emphasising the urgency of addressing these issues to prevent severe consequences for future generations.

Fayen d'Evie
Lives and works in Narrm/Melbourne

2 *Holding*, 2024
script, performative tour, participatory audio description
Courtesy of the artist

Developed in response to Simulaa's work *Strata Signals*, *Holding* implicates audiences through the purposeful handling of geological samples and human-fabricated material, raising questions about who and what is holding Earth through epochal change. Touch tours and audio descriptions are usually offered as segregated access strategies for blind audiences – d'Evie's script and performative tour approaches these forms as artistic mediums, prompting poetic and ethical reflection on disturbance, pressure and collective change beyond the limits of human space-time.

Alicia Frankovich
Lives and works in Berlin and Narrm/Melbourne

3.01 *Four degrees warmer*, 2024
modified LED temperature display
35.8 x 84.8 x 15.8 cm
Courtesy of the artist, 1301SW (Narrm/Melbourne and Gadigal/Sydney) and Starkwhite T_2maki (Makaurau/Auckland and Tahuna/Queenstown)

Four degrees warmer explores the catastrophic threat posed by a four-degree temperature rise on Earth, which would also adversely affect cities. As has been widely discussed, this dramatic rise would render many species extinct and pose a grave threat to all living species, including humans. The work switches between the given time of day and the ambient temperature, with the four-degree increment a way of imagining this devastating threat. The time clock comprising the work is also used in many municipal contexts, including at the Brunswick Baths, which was the site of Frankovich's recent large-scale performance *The Eye* (2023). Contrasting the actual time with the

fluctuating temperature gives a situated context for the work in the here and now. And of course, time as 'we' know it is *Earth* time.

(works listed in order from left to right)

3.02 *T-E-S-L-A- cryo*
T-E-S-L-A- cryo crash
T-E-S-L-A- cryo crash dummy II, 2025
deployed Tesla air bag, epoxy glass resin
dimensions variable
Courtesy of the artist, 1301SW (Narrm/Melbourne and Gadigal/Sydney) and Starkwhite T_2maki (Makaurau/Auckland and Tahuna/Queenstown)

3.03 *T-E-S-L-A cryo*
T-E-S-L-A cryo crash
T-E-S-L-A cryo crash dummy I, 2025
deployed Tesla air bag, epoxy glass resin
dimensions variable
Courtesy of the artist, 1301SW (Narrm, Melbourne and Gadigal/Sydney) and Starkwhite T_2maki (Makaurau/Auckland and Tahuna/Queenstown)

3.04 *T-E-S-L-A- cryo*
T-E-S-L-A- cryo crash
T-E-S-L-A- cryo crash dummy III, 2025
deployed Tesla air bag, epoxy glass resin
dimensions variable
Courtesy of the artist, 1301SW (Narrm/Melbourne and Gadigal/Sydney) and Starkwhite T_2maki (Makaurau/Auckland and Tahuna/Queenstown)

These works depict deployed Tesla airbags that have been blown up and then set in resin, suggesting a fossil of big tech culture here in the present. These Tesla airbags are an emblem of high capital, an emblem of a crash here on Earth. That is, the car crash – and the multiple other failures of big tech capitalism when it comes to considering the ecology, or the Capitalocene. The colonisation of space for the rich by Elon Musk's partner company SpaceX, and others, looms in the near and speculative future. These airbags evoke images of limbs and organs, suggesting bodily fragments of the masses in the wake of big tech influence. Here, forms and processes are imagined in manyfold ways.

Farzin Lotfi-Jam
Lives and works in Ithaca, USA

4 *Realtime: The Imperial Architecture of Now*, 2025
two-channel interactive video installation, continuous loop, sound (speakers)
Courtesy of the artist

Realtime: The Imperial Architecture of Now traces the historical emergence of real time computation as an instrument of imperial power. From 19th-century colonial telegraph networks to contemporary urban surveillance, real time systems have shaped how space, time and human activity are monitored, modeled and managed. These infrastructures do not merely facilitate connectivity; they also structure the spatial politics of governance, warfare and urban life, rendering entire populations and territories subject to computational oversight. The installation presents an urban history of real time in eight episodes, moving from global communication infrastructures to predictive policing, border monitoring and digital avatars. Combining real time tracking, algorithmic reenactments and immersive visualisations, it deploys techniques such as routing, delay, pose estimation and reverberation to expose the logics of near-instant governance. Found models of latency and tracking intersect with animated reconstructions of historical moments – such as the modeling of a virtual Iraqi woman for military training in 2009 – to reveal how real time computation enforces control, accelerates decision-making and structures contemporary urbanism. The work loops continuously, immersing visitors in a shifting experience of detection, anticipation and response.

Research and 3D modeling assistants: Jun Hu, Evan Harris Levy, Shujie Young Lui, Anh Shavindya Seneviratne Do, Keygan Sinclair and Yi Xu.

Emma Jackson
Lives and works in Narrm/Melbourne

5.01 *Timeline,* 2024
hand-knotted wool
5500 mm x 1200 mm
Courtesy of the artist

Timeline is Earth's entire geological timeline hand knotted in wool. Each geological epoch is isolated by a specific colour and represented at scale. The colours comprising *Timeline* are consistent with all the rugs in the artist's *Time Travellers* collection, and when read together clearly provide a time index to Australia. *Timeline* also makes explicit that the continent of Australia contains rock from the entire spectrum of Earth's geological history.

5.02 *Tiger Fish,* 2023
hand-knotted wool and silk
4200 mm x 3000 mm
Courtesy of the artist

Tiger Fish tells a 500-million-year-old Earth story. It begins at the same time the first fish and coral reefs lived, during Gondwana, when about a third of Australia was still underwater. The distinctive stripes of *Tiger Fish* represent the concertina-like folding of Silurian rock (yellow) under compression, and the erosion of that rock to form a new sedimentary Devonian rock (aubergine) in the valleys between. A carboniferous (camel) spine and tail complete the fish outline. Bulbous volcanic outbursts (orange and blue) appear around the fish-like fossilised water bubbles.

Nicholas Mangan and Cameron Allan McKean
Live and work in Narrm/Melbourne

6 *Death Assemblage (The blade that makes coral time is shaped like a mushroom cloud)*, 2024
HD video black and white, sound (continuous loop), 55" monitor, coral, aragonite, mineral powder, acrylic resin, bioluminescent pigment, ultraviolet light
Voice recording spoken by Ying-Lan Dann at Final Sound, Narrm/Melbourne
Courtesy of the artists

This two-sided artwork, *Death Assemblage (The blade that makes coral time is shaped like a mushroom cloud)*, features an aggregation of coral bones manufactured into strips then sliced, recombined and ground to reveal the inner structure of the coral. A light slowly pulses between cold white and UV bright revealing a body-sized monument – a proxy record of coral death in the Great Barrier Reef. It functions as an ossuary, a slab of dead coral bones. The accompanying video includes inverted back-and-white footage from the SeaSim coral core archives in Townsville overlaid with text by Cameron Allan McKean listing the 43 nuclear tests conducted at the Enewetak Atoll – and suggesting that understanding coral histories and timelines has been complicated by these tests. The names of the atomic tests reference 20th-century technologies, sports, Spanish colonisation, American expansion, plants and mundane objects, hinting at the bizarre historical intersections and material indexing within the coral structures.

This project has been supported by a Monash University (MADA) Creative Works grant, 2024. Nicholas Mangan is represented by Sutton Gallery (Narrm/Melbourne) and LABOR (Ciudad de México).

From 1948 to 1958, the US military tested 43 nuclear weapons around Enewetak Atoll in the Marshall Islands, spreading radioactive material into the atmosphere, the surrounding ocean the bodies of residents and the mineral skeletons of corals. More than two decades after the first device was detonated, surveyors were sent to assess the full scale of ecological damage around the atoll. This envoy included three scientists who visited the Marshall Islands in the 1970s to study the effects of radiation on local reefs. David Knutson, Robert Buddemeier and Stephen Smith made their assessments by extracting coral fragments, which were then sliced to reveal a stratified internal structure – an analogue of Earth's geological layers. In those stratifications, they found a sequence of radioactive lines that corresponded to nuclear tests in the Enewetak Proving Ground. This discovery of an obscured skeletal code transformed inert reef fragments into 'coral chronometers' capable of archiving high-resolution annual records of ocean histories. But the discovery also allowed corals, alongside ice cores, tree rings and other planetary proxies, to become reliable tools for predicting ecological changes centuries into the future. Today, we can anticipate the altered shape of Earth's oceans, in part, because the US military detonated 43 nuclear weapons around Enewetak Atoll in the mid-20th century. In the aftermath of thermonuclear blast waves, reefs fell into sync with the temporalities of technoscience and war. The blade that makes coral time is shaped like a mushroom cloud.

Narration, looped (including kilotonnes and megatonnes):

1. X-Ray, 37 kt
2. Yoke, 49 kt
3. Zebra, 18 kt
4. Dog, 81 kt
5. Easy, 47 kt
6. George, 225 kt
7. Item, 45.5 kt
8. Mike, 10.4 mt
9. King, 500 kt
10. Nectar, 1.69 mt
11. Lacrosse, 40 kt
12. Yuma, 0.19 kt
13. Erie, 14.9 kt
14. Seminole, 13.7 kt
15. Blackfoot, 8 kt
16. Kickapoo, 1.49 kt
17. Osage, 1.7 kt
18. Inca, 15.2 kt
19. Mohawk, 360 kt
20. Apache, 1.9 mt
21. Huron, 250 kt
22. Cactus, 18 kt
23. Butternut, 81 kt
24. Koa, 1370 kt
25. Wahoo, 9 kt
26. Holly, 5.9 kt
27. Yellowwood, 330 kt
28. Magnolia, 57 kt
29. Tobacco, 11.6 kt
30. Rose, 15 kt
31. Umbrella, 8 kt
32. Walnut, 1.45 kt
33. Linden, 11 kt
34. Elder, 880 kt
35. Oak, 8.9 mt
36. Sequoia, 5.2 kt
37. Dogwood, 397 kt
38. Scaevola, 0 kt
39. Pisonia, 255 kt
40. Olive, 202 kt
41. Pine, 2000 kt
42. Quince, 0 kt
43. Fig, 0.02 kt

Joel Sherwood Spring
Wiradjuri, lives and works in Gadigal/Sydney

7 *HOLECODED*, 2025
single-channel simulation, soundscape (continuous)
Courtesy of the artist

Artist and architect Joel Sherwood Spring investigates the impacts of extraction as both industry and oppression. *HOLECODED* explores subjective states made by and through digging and extraction, an experience of the plot holes that extractive practices produce – both tunnel and tunneleer. Further developed from its original presentation at the Biennale of Sydney in 2024, *HOLECODED* is a generative animation layered with random imagery scraped from the internet. Here, Sherwood Spring presents a durational performance of the never-ending hole, revealing extractive mining of finite resources as an ongoing act of colonial and ecological violence. A soundscape 'sings' the work into being, connected through vibration to the absence of material.

Original video work commissioned by the Biennale of Sydney with generous assistance from the Fondation Opale.

8 Access Lab & Library
Fayen d'Evie, Lloyd Mst and Jon Tjhia
Live and work in Narrm/Melbourne

Founded in 2023, Access Lab & Library (ALL) collaborates with creative partners to foster disability-led and artist-led access in creative settings – access that aligns with distinctive ethics, aesthetics and practices. ALL's work is grounded in Carmen Papalia's concept of 'open access' as a temporary, collectively held space; Mia Mingus' ideas around 'access intimacy'; and Nelly Kate's 'abundant subjectivity', where all perspectives are welcome and valued. Approaching access as a field for experimentation and a platform for generosity, ALL has opened conversations with the curators

and artists of *Deep Time Real Time* to propose access strategies that span the pragmatic and the imaginary: methods that are low cost and implementable now, and technologies and systems that can be developed in a future space and time.

9 Stuart Geddes, Žiga Testen and Will Neill
Live and work in Narrm/Melbourne (Geddes, Testen) and Doonmarnwaring/ Torquay (Neill)

It's 8am, Thursday 25 February 2025, 21st century, 3rd millennium, Meghalayan Age, Holocene Epoch, Quaternary Period, Cenozoic Era, 2025
single-channel video, 2 mins 44 secs

Powers of Ten (1977) is a short film by Charles and Ray Eames that explores the interconnectedness of the universe across different scales. It zooms out from a picnic in Chicago to the vastness of the cosmos, then zooms into the microscopic level, illustrating the relative size of everything in between. Taking their cue from the Eames', this short film by Stuart Geddes, Žiga Testen and Will Neill explores a single moment through multiple time scales, offering a layered perspective of the same event. The film begins in the scale of seconds, focusing on the individual and social conception of time, and culminates in deep time. It explores the cycles of Earth's history, emphasising both the fleeting nature of human existence and the enduring forces of time.

OPENING WEEK PUBLIC PROGRAM

Thursday 27 February, 6pm–8pm
Opening celebration of *Deep Time Real Time* at RMIT Design Hub Gallery – all welcome.

Friday 28 February, 1pm–2pm
Join curators – Andre Bonnice, Anna Jankovic and Fleur Watson – for a curatorial tour of *Deep Time Real Time* focussed this week on Strata Signals by Simulaa alongside the seven responsive creative works.

Please visit the RMIT Design Hub Gallery website for a full list of programs and access resources, which include intersensory descriptions of sounds, images and videos.

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Creative direction by Fleur Watson
Co-curated by André Bonnice, Anna Jankovic and Fleur Watson
Exhibition design by Simulaa
Graphic design by Stuart Geddes and Žiga Testen
Access consultancy by Access Lab & Library (ALL)

This exhibition is produced by RMIT Culture in partnership with the RMIT School of Architecture & Urban Design and with the assistance of The Swayn Gallery of Australian Design. Find out more at alastairswaynfoundation.org. Also supported by the Victorian Government, with core specimens supplied by the State Drill Core Library.

RMIT UNIVERSITY

THE SWAYN GALLERY OF AUSTRALIAN DESIGN

The 2025 Alastair Swayn Legacy Exhibition is a landmark event, showcasing the spirit of innovation and excellence defining Australian design to inspire, educate, and connect, echoing Alastair Swayn's ethos of infusing the world with light, colour, and humanity.

The Swayn Gallery of Australian Design is the beneficiary of the Alastair Swayn Foundation which was established in 2016 to perpetuate and honour the legacy of Alastair Swayn AO.

The Foundation and the Swayn are committed to elevating Australian architecture and design culture. The Foundation provides innovative grants and opportunities for individuals, groups, and organisations across all career stages. The Foundation actively gathers and shares knowledge through research, education, exhibitions, and industry partnerships, fostering a vibrant and inclusive design community.

alastairswaynfoundation.org

The Swayn Gallery of Australian Design

TIME TRAVELLING

A conversation with Michael-Shawn Fletcher, Anthony Romano, Patrick Kennedy and Joe Greet
Palynology, Palaeoecology and Biogeography Research Lab
School of Geography, Earth and Atmospheric Sciences, The University of Melbourne
Friday 13 December 2024

Professor Michael-Shawn Fletcher and his team at The University of Melbourne's School of Geography, Earth and Atmospheric Sciences (SGEAS) are a multidisciplinary group investigating long-term interactions between humans, climate, disturbance and vegetation at local, regional and global scales.

Their work involves developing and integrating high-resolution palaeoenvironmental records from across the Southern Hemisphere using multiple proxies – including pollen, charcoal, geochemical and isotopic analyses – to provide comprehensive reconstructions of environmental change and the role of people in this process. At the core of the lab's work is a deep commitment to working in partnership with Indigenous communities and centring First Nations' knowledges of Country.

In advance of the opening of the *Deep Time Real Time*, the exhibition's curators met with Michael-Shawn Fletcher (a Wiradjuri man and professor of geography) and lab team members Anthony Romano (PhD candidate and lecturer), Patrick Kennedy (PhD candidate) and Joe Greet (self-described 'wetland plant nerd'). Here, they discuss the lab's ongoing work and one of their current research projects, Traditional Owner-led restoration of urban billabongs, which is included as part of *Deep Time Real Time* exhibition at RMIT Design Hub Gallery.

Curators: For visitors to the *Deep Time Real Time* exhibition who may not be familiar with your work, could you please provide a brief overview of the lab's key area of research?

Michael-Shawn Fletcher: Broadly we work within a discipline called biogeography, which attempts to understand the patterns and processes of life on Earth, both in space and through time. We focus on the dimension of time with the understanding that our contemporary landscape – the world we live in today – is a product of historical occurrences and processes through time that operate at various rhythms.

There are deep time rhythms that occur over millions of years and frequencies within which the world operates – day and night. Our understanding of where we are now is dependent on knowing the journey we've been on and where we're heading. If we fail to appreciate the underpinning factors that support the world we live in, then we are blind to understanding how to live on Earth sustainably.

We essentially time travel by looking at natural archives or libraries that accumulate information through time. These include wetlands, lakes, bogs and swamps, which pick up atmospheric information that is deposited as sediment layers year upon year. Depending on how long a particular place has been a wetland, it will record a story of its life through that time.

For example, by extracting a sediment core sample we can unpack the story of that place, or ecosystem, through time. Plants are usually the keystone organisms of ecosystems. They characterise biomes and ecosystems and convert the sun's energy for other life forms. Plants are essentially the architects of ecosystems, and by understanding how plants and ecosystems have changed through time, we can understand the dynamics of a particular landscape.

A key focus for the lab's work is to understand a place [Australia] that has been lived in for more than 65,000 years [by First Nations peoples]. How has human activity shaped the world we live in and, critically, how has the act of ignoring that history impacted our capacity to live and operate sustainably in the world around us?

Currently, we're facing environmental challenges that are essentially cultural issues. It is a failure to understand what Country needs and what [Indigenous] people have been doing. How might we arrest some of our current environmental problems through re-engaging with [Indigenous-led] knowledges and approaches?

Curators: What are the processes that you're undertaking at the billabongs through extracting these sedimentary core samples, and what discoveries do you envisage?

MSF: The [Traditional Owner-led billabong restoration] project is a collaboration between people who investigate time – like us – and people like Joe Greet, who are looking at the contemporary conditions of these wetlands. Without understanding the modern dynamics around plants – what they are and do and how they interact – we can't really infer our data from the past. As a result, this is a perfect union between traditional ecologists – who work on plants and the contemporary landscape – and our team, which is focused on extending that information through time.

Joe Greet: It's been great to understand these long-term, deep-time processes. I've been working with the Wurundjeri and Melbourne Water for almost a decade now, focusing on the billabongs along the lower Birrarung. Being able to learn from the lab's deep time investigations into billabong sediments is important to understanding how to better care for Country today and into the future.

MSF: Wetlands like these are in peril globally, and they're important for water purification, carbon storage, ecosystem diversity, biodiversity – all sorts of things. Here, we are lucky to have the long, extensive, network of wetlands that is the lower Birrarung.

JG: Yes, the Birrarung network of wetlands has been described as the 'Kakadu of the south' and has supported large human populations for millennia. Much of this network, however, now lies underneath the concrete jungle that we reside within – the city of Narrm/Melbourne.

MSF: One in particular – Bolin Bolin – is a fantastic billabong [near Heide Museum of Art]. It's quite hidden, but when you get to the billabong there are kangaroos and a diversity of wetland plants, though it's also very overgrown and choked. One of the unfortunate impacts of invasion and colonisation is that we've lost so much information. Melbourne was established in 1835 – nearly 200 years ago – and the understanding of what these places were like [pre-

invasion] has been lost. What we do – with Joe and his wetland team – is to travel back through time to try and understand what was there. One of the things we've found, is that – like much of Southeast Australia – the failure to care for place has resulted in it becoming a choked-up woodland of dense trees. This means that there is an increased burden on soils and, with moisture being sucked out of the ground, an increased fire risk and a reduction of habitat for grass-loving species.

Today, the public walk along the Birrarung's banks, surrounded by trees planted in the 1950s and they think that it is a wonderful and natural place. But our research reveals that it's a far cry from the diverse, dynamic wetlands that used to flood regularly from the Birrarung and were cared for in place by Wurundjeri. Unfortunately, it's a shadow of its former self. We are interested in this tension between the modern city that values green spaces and Traditional Owners who see it as sick Country and want to return health to it. Without the data that Joe provides, along with Anthony's work in the lab and Patrick's PhD research, we wouldn't be able to find the true history of these places. The issue is that the truth exists more than 200 years ago, so we have to jump in the Tardis and go back in time to take a look.

Curators: Can you expand on how your lab works with and develops research projects with Traditional Owners, such as the work you're currently doing with the Wurundjeri Woiwurrung Cultural Heritage Aboriginal Corporation and Melbourne Water for the Billabong project? How do those relationships work?

JG: These relationships developed organically over a long time. Melbourne Water manages the [lower Birrarung] wetlands and recognises that, while they provide some level of ecological value, they're heavily degraded. They have come to understand that it is important to work with the people that have lived here for thousands of years to [learn how to] better manage those sites, and I've come on board for that process in my role as a wetland plant 'nerd'. We regularly meet on Country with community to discuss the threats facing these sites and how we might better manage them. Michael – who's been working with Wurundjeri for longer than I have – came out on one of these days and shared the story of Bolin Bolin, which is an incredibly important site. Michael described how by looking at the sediments and the changing vegetation patterns had changed through time, they could see the loss of Wurundjeri land management practices, particularly cultural burning. The research and work that Michael, Anthony and Pat are doing is vital to exploring those patterns throughout the Birrarung cultural landscape, and understanding how we might use that information to better manage and care for water Country.

MSF: I've worked with a lot of Traditional Owners and community and, for this project, Joe has set up a great system. During the on-Country days, everyone's invited and it's a horizontal structure where everyone is valued and listened to. That is very important for people who've been marginalised for so long, yet who hold the key to the future. It's vital, empowering and it helps to rebuild centuries of distrust. The important thing is that these are long conversations and a long-term commitment and it's a journey we're taking together. We are not parachuting in and then nicking off [to write] our [academic] papers.

Anthony Romano: Our questions are born out of the interests that Wurundjeri have as well. So, we're not coming in and saying, 'This is what we want to do and what we want to be answered.' The work is driven by what they want to know as well as what we can do that will help feed into how they care for Country.

Curators: Your work's relationship to scale is particularly fascinating to us. Michael mentioned earlier the scales of time and space, and how the research looks at microscopic elements to reveal events and occurrences that happen at much larger time scales and spatially across larger regions, biospheres and natural bodies. This is a compelling idea – looking at the microscopic to reveal the larger context. Can you describe this in more detail as it relates to your process.

Patrick Kennedy: We analyse natural archives – or natural books – but the problem is that they're not written in words. They're written in particles, microscopic particulates or things that are sub-fossilised through time. These different microscopic 'words' address different questions.

The simplest one to start with is charcoal. The only thing in the environment that produces charcoal is fire. So if you have charcoal in a sediment core then it's telling you something about fire. If it's a woody bit of charcoal, then we know it must have come from a woody fire. If it's a herbaceous or grassy piece of charcoal, then we know that it's come from a herb or grassy plant that's been burnt. The cores [we work with] are at least a metre long or, in the case of Bolin Bolin billabong, six metres long. The top of the core is the youngest and the bottom is from when the billabong started as a wetland, [when it was cut off from the river]. If we look at charcoal at the top, we're looking at fire from a recent time while if we're looking at charcoal from the bottom, we're looking at fire from the start of the billabong. If we do that sequentially then we then get a story through time of fire – the presence or absence of fire, the kinds of fuel that are being combusted. That's an example of the sort of language we're 'reading'.

The things that produce pollen in the environment are plants and so we can look at the kinds of pollen in these natural books. Different families, genus and species of plants produce pollen that look different [under the microscope]. Their morphology is different – they have different shapes and patterns. They're like mini pieces of artwork under the microscope. If we look at the kinds of pollen along the core, we can then understand the kinds of plants that occur through time. When we piece that together, the pollen and the charcoal, we can then understand the relationship between fire and plants and start to address the question of what people were doing in this place through time. Fire doesn't often spontaneously combust in the landscape – it's put there. By addressing the fact that most landscapes are humanised, we can uncover their cultural-environmental histories.

AR: We're looking at echoes of the past that are recorded but are invisible [to our eyes]. There are billions and billions of them and they're everywhere. The air right now is teeming with information, a faithful representation of the now and of the past – it is a real mind-bending idea. You can build an outline or a sketch of what happened thousands or millions of years ago, and then each piece of information comes together like an animated sequence. The resolution keeps increasing and the picture starts to reveal itself, which is so exciting.

Curators: The analogy of 'words' – individual particulates that [collectively] become a 'book' – is really interesting. It leads into how empirical evidence and science can be used to reveal broader ecological patterns as a way of identifying with and weaving oneself into a place. For the exhibition we have referenced the book *Braiding Sweetgrass* (2020) by Robin Wall Kimmerer – a Potawatomi woman in North America and a classically trained scientist. Kimmerer states that the right kind of scientific gaze can be part of rebuilding our relationships with the land. She writes: 'It can be a path to kinship.'

Do you think this is analogous to how you see your work?

MSF: The only equivocation I'd make there is that the knowledge of Traditional Owners is still scientific. Science was a term coined to describe the processes of observation, prediction and experimentation, seeing what happens and refining what you then do next. It's been co-opted in the modern context, but there's knowledge in the Wurundjeri community that clearly shows Port Phillip Bay was once a grassland – that's encoded. I know no science that demonstrates that sort of [information] other than, I guess, the work that we're [pursuing]. I sit here in deference to Aboriginal people who know vastly more than me and have never even been to school.

Our process builds connection. In contemporary society, we rely on empirics yet there is a lot of knowledge out there that isn't empirical that we subordinate to data. Which is the beauty of those billions of microscopic 'words' – if we count enough of them, people are convinced that they are statistically significant and/or correct. This is what Aboriginal people were doing. It wasn't this mystical communion with nature. They were, like us, setting about creating a safe, predictable, resource-rich environment. And people have done that for 1.4 million years with fire, from Australopithecus right through to the Homo sapiens – the process just varies depending on the culture. What we do with data is speak the language that brings people along on the journey – I think that's where the work is crucial.

Curators: In the exhibition, we have foregrounded the idea of 'time literacy' – an idea drawn from a book by the Swedish geologist Marcia Bjornerud. The book suggests that if we were a more time literate society, then the choices we make in terms of environmental practices would be less destructive and reactionary, that we would have a longer-term view of the decisions we make and the way they will impact in 100 or 1000 years' time.

Which brings us to the question of data. It's interesting that through your research you've collected data to demonstrate what's already known to the Wurundjeri – the knowledge is already there but the data proves it within a certain context. Do you think data is power?

AR: I think it's about understanding the truth of this place that we have lived in for so long. We look at historical documents from the [Birrarung/Narrm] area, as well as paintings and artworks – they're not given as much importance or as value as the data that we've been talking about but they do shine a light on the history of this place. There are texts from early pioneers that talk about the area – there weren't enough woody trees to build so it was analogous to lightly wooded grasslands, which were cared for and managed. Yet within a year or two of land being stolen and [colonised] there were 700,000 sheep in Melbourne even though it's clear that [the British] were not clearing trees that quickly. So, our work is also about lining up our data with these early writings to reveal the dynamic nature of the past.

It's about truth-telling – part reconciliation and part protest. When I'm counting those microscopic pollen for hours on end, day after day, I think about the fact that this slide is a couple of hundred years old and it feels like – through this process of collaboration – we can give power to people that have had power taken away from them. The story of Bolin Bolin billabong is incredible and without the work that we do, it would have remained unseen. It's about making the invisible visible, and highlighting this place at the forefront of this process of healing Birrarung and healing Country. I think there're lessons in that story for [citizens] across the country and across the world. I'm sure there are instances everywhere where an understanding of our work would help others with reparation and [with forging] a relationship with landscape.

MSF: Anthony brings up an important point. It's like this fast-moving, chaotic frontier of people *doing* – I was joking that there's someone somewhere studying the left toe of the back foot of a cane toad, tiny minutia, and sometimes you think, 'What does it all mean?' But it feels rewarding that within this work we're doing there is a straight line to efficacy and action. Ecology – and essentially, we're all ecologists – is a powerful tool but it has such a short history. We worked out that the first ecological journal in Australia was published around 100 years ago – the *Victorian Field Naturalist*. So the practice of ecology is only a century old, yet the British invasion began more than 250 years ago and continues through to the present.

There's powerful information in that detailed minutia – we're contextualising the place that we live in and that becomes a tangible thing for people to grab onto – I think it's critical. It also gives us something to celebrate – this place that is so central and important to Wurundjeri. We can all participate in the truth and the history of this place coming to light, and take conscious steps torwards not repeating the same mistakes over again.

It comes back to the idea of Country and Aboriginal people not seeing themselves as apart from nature but a part of it. I think that's something that we all need to relearn, so we understand what's required of us. This is why I'm always trying to reject the notion of management, which is a hierarchical term. You manage your underlings whereas you would never manage your family. You care for your family. The English language is grossly inadequate when it comes to capturing what Aboriginal people are doing. Care most approximates it. In Wiradjuri, the word for Country is 'nurumbang' – 'bang' is the suffix and 'nurum' means 'great profundity, depth'.

Country is a place that you love because it's your home – it provides and cares for you, if you care for it. You have to sit in it, look at it, be a scientist, watch it, do something and try again. In this process, you can form a deep connection with place.