





Contents

Director's Foreword <i>Christoph Heinrich</i>	7
Acknowledgments	9
Introduction <i>Darrin Alfred</i>	1
Natural Analogs Form and Pattern <i>Darrin Alfred</i>	5
Object Plates Sandra Davolio <i>Kit Bernal</i>	14
Joris Laarman and Nervous System Elena Manferdini	15
A Forest Walk An Audio-Guided Practice <i>Kimberly Ruffin</i>	20
Natural Systems Processes and Phenomena <i>Darrin Alfred</i>	25
Object Plates DRIFT <i>Kit Bernal</i>	31
Mathieu Lehanneur	33
teamLab	34
Big Nature, Big Art, and the Necessary Euphoria of Awe <i>Florence Williams</i>	35
Topophilia People and Place <i>Darrin Alfred</i>	43
Object Plates Aranda\Lasch and Terrol Dew Johnson <i>Kit Bernal</i>	49

Alexandra Kehayoglou	52
Studio Gang	53
Close-Knit Flower Sack	
Cedar Sigo	
	54
Checklist	57
Installation Photographs	116
Glossary	117
Recommended Reading	123
Contributors	126

Director's Foreword

Christoph Heinrich

Frederick and Jan Mayer Director
Denver Art Museum

Here in Denver, Colorado, we are fortunate to have so many opportunities to find ourselves in nature: to explore aspen forests, to hike along pristine alpine lakes, and to climb majestic mountains. For centuries, people have been partaking in the health benefits of Colorado's environment and weather. It has also become clearer, with the ravages and unpredictability of climate change, that these connections to nature can be tenuous and fragile but are more important than ever.

In our fast-paced and always-connected world, what better place than a museum to slow down and ground ourselves in the present? Many researchers and professionals agree that art and art museums offer beneficial avenues for personal and social well-being through broadening our mindsets, promoting creativity and connection, and allowing us to build our long-term intellectual, social, and psychological resources.

The exhibition *Biophilia: Nature Reimagined* presents an alternative way of understanding ourselves and our environment in the face of our growing separation and estrangement from the natural world due to developing technologies and inequalities. It highlights the ways in which a wide range of creatives, including designers, architects, and artists, continue to cultivate our deep psychological, emotional, and spiritual connections with nature. Of course, there are many prongs to these issues, but this exhibition does not focus on the greening of our built environment, sustainability, or combatting climate change. While rooted in science, *Biophilia* impacts visitors on an emotional level. Many of the works are performative or multisensory, and they all are eclectic and innovative responses to our inherent connection to nature. Further, many of them aim to foster connections between people, creating visually nourishing experiences that prompt positive emotional responses and transform our way of understanding ourselves and our place in the natural world.

We invite visitors and readers to reflect on their own relationship with nature and how it affects, or can affect, their physical and mental health and their attitudes toward their environments and others. Through the exhibition, we hope many become more conscious about their values and actions and are inspired to take action.

I'd like to thank Darrin Alfred, Curator of Architecture and Design, for this compelling exhibition, and Kit Bernal, Curatorial Assistant, Architecture and Design, for her research and contributions to the catalog. Many thanks must also be given to all of the lenders as well as the designers and artists who contributed their work and created new pieces for this exhibition.

Biophilia: Nature Reimagined is generously supported by the donors of the Annual Fund Leadership Campaign and the residents of Colorado who support the Scientific and Cultural Facilities District.

Acknowledgments



Introduction

Darrin Alfred
Curator of Architecture and Design
Denver Art Museum

To the degree that we come to understand other organisms, we will place a greater value on them, and on ourselves.—Edward O. Wilson

Over the coming century, the most vital human resource in need of conservation and protection is likely to be our own consciousness and mental space.—Tim Wu

Deep within us lies a profound and enduring urge to connect with nature. The natural environment plays a crucial role in our development, both individual and collective, a link that is as vital today as it ever was. Many religions and Indigenous cultures maintain that humanity is part of nature, that we come from nature, and that the natural world is sacred. Humans have evolved in the company of other life and in a matrix of conditions making this varied existence possible. We continue to rely physically, emotionally, intellectually, and spiritually on the quality and richness of our relationships with the natural environment, particularly the flora of our ecosystems.¹

The eminent American biologist and naturalist Edward O. Wilson coined the term “biophilia” to describe his theory that humans have evolved as beings deeply intertwined with the intricacies of the living world.² In his landmark book *Biophilia*, Wilson explored how our “innate tendency to focus on life and lifelike processes” could be a biologically based necessity, integral to our development as individuals and as a species.³ This deceptively romantic and apparently obvious concept conceals complex and universal human needs, and scientific evidence now confirms how the interaction between people and nature is closely linked to our physical, psychological, and cognitive health and well-being.⁴ In a hyper-accelerated digital and urban-centric world, Wilson’s hypothesis implies serious consequences as billions of people become further estranged from the natural environment.

Biophilia: Nature Reimagined is a testament to this enduring connection and underscores the transformative role played by contemporary designers, artists, and architects in rekindling this bond. As we collectively navigate our rapidly changing world, this digital publication and its accompanying exhibition not only recognize and share a reverence for our need to connect with the rhythms of life but also emphasize the contributions of

these creative minds in revitalizing our relationship with the natural world. *Biophilia: *Nature Reimagined* calls upon us to heighten our senses, more closely observe the world around us, and engage in cathartic, quiet moments that allow us to breathe amid the complexities of contemporary life.

The COVID-19 pandemic, tragic as it is, has highlighted the innate human desire for connection. It has added a greater sense of urgency to the movement to connect children, families, and communities to nature. According to Richard Louv, author of *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*, the pandemic has dramatically increased public awareness of this need.⁵ Louv, a child advocacy expert, is far from alone in this ever-expanding field of psychological health. Numerous studies have verified the mental and physical benefits of spending time in nature, but for some, it took a pandemic for that need to feel like a necessity. The transformative power of nature continues to be critical in the modern-day human health and well-being literature and practice, and it has been strongly identified as a valid concern by the health sciences.⁶

Biophilia: Nature Reimagined is divided into three sections, each serving as a reminder that nature's principles and pleasures can enrich our lives and reconnect us with our natural environment. "Natural Analogs: Form and Pattern" is a testament to nature's shapes, structures, and geometries, both living and inanimate. Here, nature's aesthetic complexities, which conform to simple mathematical laws—the equations that generate patterns, cones and pyramids, spirals and waves, and the topological rules of geometry—find new expressions in a digital age. "Natural Systems: Processes and Phenomena" invites reflection on nature's dynamic processes and captivating phenomena. These works serve as a bridge between the rhythms of the natural world and the rigidity of the man-made environment, opening our eyes to the intricate beauty and interconnectedness of our planet's ecosystems. They encourage a sense of wonder and inspire a commitment to preserve and protect our natural world. "Topophilia" delves into the spiritual connection between humanity and the physical environment, highlighting the interplay between people, nature, and place. In his book *A Reenchanted World*, the sociologist James William Gibson says that such connections mostly have been destroyed in modernity but argues that "more and more people are trying to reinvent them."⁷

This catalog presents supplementary content through the written and spoken word that reflects the subject through various practices. Certified nature and forest therapy guide, Kimberly Ruffin leads an audio-guided forest walk, sometimes referred to as forest bathing, or *shinrin-yoku*, in Japan. Described as a "walk of faith," her guided walk invites listeners to engage their senses and witness the world around them. Author and journalist Florence Williams examines nature's capacity to generate feelings of awe and reveals how art can offer what we once received from the natural world. Poet Cedar Sigo contributes a new poem inspired by the spiritual and material connections between people and their homeland.

As you navigate through this publication, keep in mind that our connection with nature is not a luxury but a necessity. *Biophilia: Nature Reimagined* reminds us that the path to reconnection is ever-present, and artists, designers, and architects can unveil the wisdom and beauty of the natural world. It is a call to action, urging us to embark on a journey of reconnection with nature, not only for ourselves but for future generations. This is no small thing. Our well-being, our identity, and the survival of our planet depend on it.

Edward O. Wilson, *Biophilia* (Cambridge and London: Harvard University Press, 1984), 2; Tim Wu, *The Attention Merchants: The Epic Scramble to Get Inside Our Heads* (New York: Alfred A. Knopf, 2016), 350.

1. Given the parameters of this project, I do not address our innate interest in animals.

- 2.** Years earlier, the German American psychoanalyst and social theorist Erich Fromm had independently invoked the term "biophilia," defined as a "passionate love of life and of all that is alive." According to Fromm, biophilia manifests as the "wish to further growth, whether in a person, a plant, an idea, or a social group." Fromm used the term to emphasize the importance of nurturing our capacity for love as a foundation for our mental and emotional well-being. Erich Fromm, *The Anatomy of Human Destructiveness* (New York: Holt, Rinehart & Wilson, 1973), 366.
- 3.** Wilson, *Biophilia*, 1.
- 4.** Later, Wilson, together with social ecologist Stephen R. Kellert, published the collection of essays *The Biophilia Hypothesis*. This theory asserts the human dependence on nature "that extends far beyond the simple issues of material and physical sustenance to encompass as well the human craving for aesthetic, intellectual, cognitive, and even spiritual meaning and satisfaction." Stephen R. Kellert and Edward O. Wilson, eds., *The Biophilia Hypothesis* (Washington, DC: Island Press, 1993), 20.
- 5.** Richard Louv, *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder* (Chapel Hill, NC: Algonquin Books, 2005). Louv has coined the term *nature deficit disorder* to describe how people with limited contact with nature experience increased rates of symptoms, including behavioral disorders, anxiety, and sadness.
- 6.** Stephen R. Kellert, *Kinship to Mastery: Biophilia in Human Evolution and Development* (Washington, DC: Island Press, 1997); Stephen R. Kellert, *Birthright: People and Nature in the Modern World* (New Haven, CT: Yale University Press, 2014).
- 7.** James William Gibson, *A Reenchanted World: The Quest for a New Kinship with Nature* (New York: Metropolitan Books, 2009), 88.

Natural Analogs

Form and Pattern

Throughout history, architects, artists, and designers have turned to nature as a source of inspiration and solace during challenging times and periods of societal crisis, seeking to find harmony, connection, and meaning in the world. The Arts and Crafts movement in the late nineteenth and early twentieth centuries emerged as a response to industrialization and urbanization. The movement sought to revive traditional craftsmanship and celebrate the beauty of natural forms. Similarly, the mid-twentieth-century organic design movement was influenced by a desire to create more harmonious relationships between humans and their environment, countering the still lingering negative effects of industrialization.

The idea that nature can serve as an antidote to technology is a perspective that many people have held over the years. This perspective often arises from concerns about the potential negative effects of technology on various aspects of human life and society. But many designs inspired by nature benefit from the use of technology to replicate or adapt natural forms and structures. These designs often result in highly efficient, structurally logical, and innovative products, systems, or innovations. This concept remains an influential force in shaping contemporary art and design, offering new responses to our relationship with the natural world.

Natural analogs in architecture, art, and design evoke naturally occurring forms and patterns and aim to establish connections between humans and the natural world.¹ Architects, artists, and designers simulate nature's boundless shapes, structures, and organizing principles, expressed in a broad spectrum of forms and functions, from appropriating biomorphic forms to mimicking nature's underlying geometries and processes.

The following objects and projects from the fields of architecture, art, and design do not simply imitate nature but use it as a starting point for eclectic and innovative responses to our relationship with our environment. They highlight the uniqueness and dynamism that nature's forms and patterns have to affect us, tapping into our intimate, emotional, and spiritual connections with the natural world. Natural analogs foster a deeper appreciation for nature's aesthetics, stimulate feelings of wonder, and promote a sense of responsibility for preserving and coexisting with the natural environment.

Form

The appropriation of diverse natural forms can lead to the creation of aesthetically pleasing and emotionally satisfying objects. By capturing the beauty of nature in fixed form, artists and designers create captivating environments and imbue spaces with a sense of tranquility and wonder. While our brain knows that these objects are not living things, we describe them as symbolic representations of life.²



Ronan Bouroullec and Erwan Bouroullec, *Algues*, 2004.

Sandra Davolio's delicately handcrafted porcelain vessels take inspiration from the organic structures of coral typically found in the sunlit shallows of tropical seas. Achieving a diversity akin to their real-life counterparts, no two works are alike. Paperlike in texture, *Coral Flower IV* fans outward with organic ripples, its unglazed exterior retaining a finish and texture reminiscent of coral fragments washed onto the shore. Similarly, Ronan and Erwan Bouroullec's *Algues (Algae)* take cues from the diverse organisms that play crucial roles in our aquatic ecosystems (cat. xx). The interlocking plastic modules can be assembled into endless configurations to form partitions of varying sizes and densities, allowing light to filter through their lacy structure like algae's captivating translucency.

David Valner's *Fungus* vases and bowls conjure the peculiar forms found in the fascinating world of fungi: from delicate and elongated stalks to intricate and convoluted caps. Valner employs traditional glass-making techniques to create these functional objects (cat. xx). Their glass surfaces simulate the variable and complex colors observed on fungal bodies found in the damp recesses beneath our feet. Meanwhile, Front's *Curve Lamps* appear to grow and adapt to their surroundings. The lamps reimagine the iconic green-glass banker's lamps with a contemporary twist. Emerging from small yet sturdy

bases, the lamps stretch and bend upward like a plant or mushroom sprouting from the forest floor, seeking the nourishing rays of the sun.



David Valner, *Fungus Vases* and *Polypore Bowl*, 2018–23.



Andrés Reisinger, *Hortensia Armchair*, 2019.

Crafted by master glass blowers, Andreea Avram Rusu's *Botanica Chandelier* resemble the weighty and sculptural blossoms of banana plants in milky pastel hues (cat. xx). The surreal composition—the large, pendulous flowers and a series of overlapping leaves suspended from stems wrapped with leather—dynamically respond to the interplay of surrounding light. While Avram Rusu expresses her fascination with plant life in glass form, the lush banana fronds of PELLE's eye-catching *Nana Lure Chandelier* are made of cast-cotton paper (cat. xx). Illuminated from their undersides, the large, elongated leaves are sculpted and painted by hand. Each leaf is depicted with the accuracy of a botanical illustration, from the prominent vein that runs their length to the gentle wave-like pattern of their weathered edges.



Andreea Avram Rusu, *Botanica Chandelier*, 2023.



PELLE, *Nana Lure Chandelier*, 2021.

Marc Fish's *Ethereal Double Console* is made of paper-thin veneers of sycamore, which are laminated and manipulated into organic twists and curves and held together with translucent resin. By preserving the order of the veneers as they would be in the tree, the console appears as if the wood itself has grown into its shape. The innovative results resemble the lacy translucency of a skeletal leaf.

Fredrikson Stallard's *Species 1* expresses the chaotic energy of the earth's geological processes (cat. xx). Made from a block of polyurethane foam, the hand-carved sofa appears to have been shaped by natural phenomena such as tectonic movements and erosion over an immense period of time. *Species 1* suggests natural places to perch or recline, yet it resists mirroring the human body. Only when activated by a sitter does the functionality of the sofa's form emerge. Similarly, their *Rock #22* and *Rock #23* appear to be minerals extracted from the earth's surface but are, in fact, remnants from the production of the *Species* series. Supported by steel mounts, the sculptural objects resemble rock, mineral or meteorite specimens in a natural history museum or a cabinet of curiosities.



Fredrikson Stallard, *Species 1*, 2021.

Pattern

Patterns are a fundamental aspect of the natural world, and they can take on a wide range of forms, from the highly visible and repetitive to the subtle and chaotic. These patterns often emerge as a result of natural processes, physical laws, and interactions among various elements in the environment, but not all are visible to the naked eye. They often require microscopes, mathematical models, and visualizations for us to observe and understand them. Architects and designers often find inspiration in these diverse patterns to create visually captivating and conceptually profound structures.

In his renowned book from 1979, *The Sense of Order*, Austrian art historian Ernst Gombrich delves into the psychological aspects of human perception and appreciation of decorative art.³ Gombrich seeks to unravel the underlying reasons behind our fascination with and inclination towards order, symmetry, and geometric patterns in artistic expressions throughout various cultures and historical periods. He argues that the human mind possesses an inherent "sense of order," which drives our artistic creativity and preferences. This sense of order can be traced back to our evolutionary history, where the ability to identify patterns and regularities in the environment conferred survival advantages. As a result, the human brain developed a natural affinity for finding and creating order in the chaotic world. It is not just a study of art and aesthetics but an exploration of human psychology and cognition. By understanding the psychological foundations of our appreciation for order and symmetry, Gombrich sheds light on the fundamental aspects of human behavior and culture.

Fractals, in particular, seem to capture the human imagination. A term coined in 1975 by the mathematician Benoit Mandelbrot, fractals have effectively quantified the intricate underlying patterns found in many natural objects.⁴ Fractals are infinitely complex patterns, or mathematical forms, that exhibit self-similarity across different scales. When we look at a fractal, we often see intricate, repetitive patterns that continue to appear at different scales. Mandelbrot argued that fractals and fractal-like patterns that emerge during natural growth processes can be found in various natural phenomena, ranging from the micro- to the macroscale. These include vein patterns in leaves, the branching structure of trees, mountain ranges, river networks, coastlines, waves, and even cloud formations. The examples are nearly limitless. Described as both the "fingerprint of nature"⁵ and "the new aesthetics,"⁶ fractal patterns and forms have captured the imaginations of scientists and artists alike.

Fractals, among other geometrical patterns, have been proven to reduce physiological and emotional stress in humans, playing a significant role in evolutionary aesthetics and environmental psychology.⁷ Research consistently demonstrates correlations between fractal dimensions in nature and those in architecture, art, and design.⁸ As humans, we display a consistent aesthetic preference for fractal images, whether or not these images are generated by nature's processes, mathematical equations, or the human creativity.

Fashion design collective threeASFOUR's collection, *Human Plant*, explores the beauty and complexity of fractal-like structures found within the plant world (cats. xx–xx). Employing laser cutting, pleating, and other techniques, the studio creates exquisite plantlike details and textures. Patterns based on the complex network of leaf veins that branch and intersect are printed on skirts, pants, and jackets that wrap the body, such as *Autumn Leaf Suit*. Cut-out dresses, including *Eve Dress*, are assembled piece by piece out of components that mimic the intricate network of veins found in some leaves. The parts are laser cut, seemingly leaving behind only the leaves' structural support. Another ensemble, *Lily Dress*, captures the aquatic plant's distinctive circular leaves that rest on the water's surface. The collection beautifully evokes the harmonious geometries of nature's abundant foliage. By magnifying these diminutive patterns and distinct structures, threeASFOUR establishes an intimate connection between these geometries and the human body. Ultimately, *Human Plant* prompts us to look more closely and cherish the mesmerizing details that govern nature's beauty that often go unnoticed by the human eye.



threeASFOUR, *Autumn Leaf Suit*, from the *Human Plant Collection*, Spring/Summer 2020, Look 6.



threeASFOUR, *Eve Dress*, from the *Human Plant Collection*, Spring/Summer 2020, Look 19.



threeASFOUR, *Lily Dress*, from the *Human Plant Collection*, Spring/Summer 2020, Look 25.



J. MAYER H., Metropol Parasol, Seville, Spain, 2004–11.



J. MAYER H., Metropol Parasol, Seville, Spain, 2004–11.

Within the densely packed urban fabric of Seville, Spain, stands *Metropol Parasol*, a massive one-hundred-foot-high undulating structure designed by Berlin-based architecture firm J. MAYER H. (cat. xx). *Metropol's* six large timber columns rise from a concrete base to form a dendritic-like canopy that provides shade for the city's historic Plaza de la Encarnación. The parasols are constructed from an interweaving waffle-like timber lattice that creates continuously shifting shadows throughout the day (cat. xx). The structure creates a distinctive public space that offers shelter and areas to gather and evokes the sense of being under a forest canopy. Its public, open-air spaces feature permeable boundaries and provide spatial freedom reminiscent of nature while fostering a distinct sense of place within the city's dense historic center. By employing tree, or mushroom, metaphors architecturally, *Metropol Parasol* achieves a dual purpose: expressing a lamentation for nature's absence and symbolically inserting its presence.



Mathieu Lehanneur, *Ocean Memories (Circular Low Table Black XL)*, 2017. Nero Marquina marble, 15¾ × 43½ in. dia.

Besides the wonders of plant structures, another remarkable, clearly visible manifestation of fractals is the ocean and its complex types of waves.⁹ Mathieu Lehanneur's *Ocean Memories* captures the ripples and shimmers of ocean waves in fixed form (cat. xx). The collection of tables, benches, and stools resembles the captivating surface of the ocean and demonstrates how modern technology can be harnessed to mimic the fluid dynamics of waves as they rise and fall. Lehanneur and his team employed 3-D special effects

software typically used by the film industry to reproduce the complex geometry and movement of water into digital forms. Blocks of marble were then machine cut to replicate the digitally created patterns, before being hand polished to a glossy, liquid-like finish to create a surface that is as reflective as the ocean. *Ocean Memories* captures a surrealistic vision of an ocean frozen in time, reminding us of the immense power and beauty of nature.



Iris van Herpen, *Diatom Gown*, from the *Sensory Seas* Collection, Spring/Summer 2020.

Iris van Herpen's collection, *Sensory Seas*, dives into the fibrous marine ecology that thrives deep within the ocean (cat. xx). Suggesting the intricate and organic structures found in the mysterious regions of our aquatic environments, the *Diatom Gown* features translucent cellular patterns of what could be described as the exoskeletons of microalgae. Inky blues and greens are printed onto sheer silk organza and layered organically, forming a sea of fibrous structures. The dress evokes the ebb and flow often associated with underwater life (cat. xx). With its fluttering fabrics, use of color, and fantastic pattern, the dress holds a microscope above the ethereal marine world and the mesmerizing microorganisms it holds.



<https://vimeo.com/911666993>

Iris van Herpen, *Sensory Seas*, January 20, 2020. Presented at Cirque d'hiver Bouglione, Paris. Video by Blitzkickers.

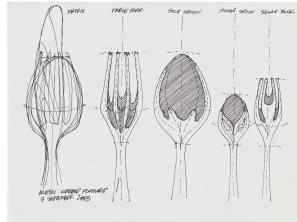
In today's computational world, architects and designers often utilize generative design approaches that leverage algorithms, simulations, and iterative processes to simulate complex biological phenomena or physical occurrences found in the natural world. In the latter part of the twentieth century, the quest to replicate nature's creative code took an astounding new turn. The simulation of nature's almost inexpressible patterns became possible through emerging computational technologies, such as generative, parametric, and algorithmic design tools. Geometries that were once extremely challenging or even impossible to fabricate are now realized with advanced computer-assisted production methods known as digital fabrication.



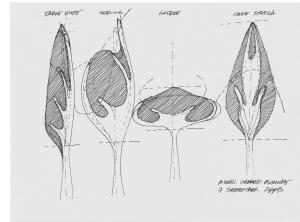
Greg Lynn, *Flatware Set*, 2007.

In his 1999 book *Animate Form*, architect and designer Greg Lynn explains his morphogenetic methodology, which leverages computational tools and digital technologies to create dynamic, adaptive, and generative forms.¹⁰ Lynn later applied this methodology to design a set of flatware for the Italian kitchenware company Alessi (cat. xx). Instead of starting with the spoon, from which Alessi would alter to create forks and knives, Lynn initiated the process by designing a primitive, yet-to-be-specified, beginning, or "seed," for the set: a bundle of tines as a handle with webbing (cat. xx).¹¹ This initial form served as a kind of DNA code

capable of generating an infinite array of utensils. "How do we design a generic starting point which is latent with all of that information that needs to unfold, which lets us make all of the components or all of the elements in the set part of this continuous family," Lynn wondered.¹² To achieve this, Lynn employed animation software, originally developed for the animated film industry, where the primitive form was combined and recombined in numerous ways, facilitating a wide range of configurations and variations for specific functions (cat.xx). Each individual utensil was articulated figuratively to reflect its specific function. At once familiar and uniquely strange, the resulting utensils are individually specialized yet collectively related as a family.



Greg Lynn, *Flatware Prototype Sketch*, 2003-2005.



Greg Lynn, *Flatware Prototype Sketch*, 2003-2005.



Joris Laarman, *Bone Armchair (prototype)*, 2008.

Designers Joris Laarman and Nervous System explore generative and parametric design processes. These approaches employ input parameters and constraints to advance a design towards a desired outcome, like an evolutionary process. Laarman's *Bone Chair* marked his first foray into using natural science to determine not only the formal appearance of an object but also the underlying structural logic that governs its engineering and construction (fig. xx). Laarman's *Adaptation Chair*, from the *Microstructures*

series, draws on the complex patterns of growing branches and roots to adjust its geometry (cat. xx). Laarman engineered the chair starting from the smallest structural and functional unit, or "cell," imitating nature's approach of creating the most efficient structures possible. The chair's legs appear to organically rise from the ground like a tree, redistributing their mass at specific points in response to physical stress. As the legs grow into branches, they fan out into increasingly smaller branches that eventually form and support the seat and back of the chair, akin to how a tree's branches support its leaf canopy (trees can add material where strength is needed). The final design simulates cellular structures to meet the needs of different areas of the chair. Each component of the chair is essential to the whole.



Joris Laarman, *Microstructures Adaptation Chair (Long Cell) Prototype*, 2014.

Nervous System is a generative design studio founded by Jessica Rosenkrantz and Jesse Louis-Rosenberg that creates products inspired by natural phenomena. Using advanced computer algorithms, the studio generates designs that mimic patterns found in nature. The *Floraform Chandelier* is an undulating flower-like surface composed of ten branching structures made of 3-D-printed nylon. The structure was grown by two generative algorithms created by Nervous System: Floraform and Hyphae. Floraform explores surface development through differential growth inspired by the biomechanics of growing leaves and blooming flowers. Hyphae is an iterative branching system based on how veins form in leaves. The large, yet airy, suspended light casts a

dense forest of shadows, enveloping the viewer in an immersive environment of algorithmically grown plant forms.



Nervous System, *Floraform Chandelier*, 2017. 3-D-printed nylon, 43½ in. dia. Produced by Shapeways, New York City.



Elena Manferdini, *Wall Flowers (Clover)*, 2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.

Architect and designer Elena Manferdini's installation, *Wall Flowers: Clover*, considers how nature's ordering systems might be represented today, when computational tools have greatly increased our ability to identify and understand these geometries. The flora depicted in *Wall Flowers: Clover* appears to have been extracted from the natural world; however, upon closer inspection, the intricate blooms take on a synthetic appearance, blurring the boundary between the real and the hyperdigital. When visitors engage with the installation, their images are reflected back on a series of mirrored panels. The viewer, then, becomes an integral part of the imaginary landscape. Manferdini's digital garden immerses the visitor in

a sense of natural order taken to an extreme. Manferdini's interchange between reality and the digital world raises questions about the fundamental uncertainty of our digital age and its impact upon the human race.

In their pursuit to replicate natural forms like tropical plants, construct fractal-like structures, or simulate plant growth, architects, artists, and designers harness the power of natural analogs to disrupt our mechanized expectations. They serve as a poignant reminder of the intricate relationships between our industrialized world and the natural environment. These creative endeavors prompt us to pause, reevaluate, and explore harmonious ways to navigate the realms of human innovation and the enduring beauty of the natural world, urging us towards a more balanced and sustainable coexistence.

Title image credit: PELLE, detail of *Nana Lure Chandelier*, 2021. Painted cast cotton paper, patinated steel, and LEDs; 96 x 82 in. diam. Courtesy of Jean and Oliver Pelle. © Jean & Oliver Pelle. Image courtesy of PELLE.

1. Stephen R. Kellert, Judith Heerwagen, and Martin Mador, eds., *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life* (Hoboken, NJ: John Wiley & Sons, 2011).
2. Studies have shown that figurative and abstract natural forms evoke strong emotional and aesthetic responses in the viewers. N Barsukova, "The Process of Transformation Natural Forms into an Associative Design Model," *IOP Conference Series: Materials Science and Engineering* 463, no. 2 (2018), <https://doi.org/10.1088/1757-899X/463/2/022044>.
3. E. H. Gombrich, *The Sense of Order: A Study in the Psychology of Decorative Art* (Ithaca, NY: Cornell University Press: 1979).
4. Benoit B. Mandelbrot, *The Fractal Geometry of Nature*, updated edition (1977; New York: W. H. Freeman, 1982).
5. Richard P. Taylor, Adam P. Micolich, and David Jonas, "Fractal Analysis of Pollock's Drip Paintings," *Nature* 399, 422 (1999), <https://doi.org/10.1038/20833>.
6. Ruth Richards, "A New Aesthetic for Environmental Awareness: Chaos Theory, the Beauty of Nature, and Our Broader Humanistic Identity," *Journal of Humanistic Psychology* 41, no. 2, <https://doi.org/10.1177/0022167801412006>.
7. Nikos A. Salingaros, "Fractal Art and Architecture Reduce Physiological Stress," *Journal of Biourbanism* 2, no. 2 (2012): 11–28.
8. The potential for incorporating fractals into the built environment as a novel approach to reducing stress is also discussed in Richard Taylor, "Reduction of Physiological Stress Using Fractal Art and Architecture," *Leonardo* 39, no. 3: 245–51, DOI:10.1162/leon.2006.39.3.245; Yannick Joye, "Architectural Lessons from Environmental Psychology: The Case of Biophilic Architecture," *Review of General Psychology* 11, no. 4 (2007): 305–28, <https://doi.org/10.1037/1089-2680.11.4.305>.
9. Emile F. Doungmo Goufo, "On the Fractal Dynamics for Higher Order Traveling Waves," *Chaos, Solitons & Fractals* 148 (July 2021),

<https://doi.org/10.1016/j.chaos.2021.111059>.

- 10.** Greg Lynn, *Animate Form* (New York: Princeton Architectural Press, 1999). The term morphogenetic combines the words *morphogenesis*, which refers to the biological (and geological) process that enables an organism (or landform) to take shape, and

genetic, which pertains to the underlying patterns of generation or development.

- 11.** Greg Lynn, "Machine Language," *Log 10* (Summer–Fall 2007): 61.
12. Greg Lynn, "You'll See It When You Know It" (lecture, SCI-Arc, Los Angeles, CA, April 8, 2008).

Sandra Davolio

Italian, born 1951, active in Copenhagen, Denmark

Coral Flower IV

2022

Porcelain

9¾ × 11 in. dia. (24.8 × 27.9 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2023.6. © Sandra Davolio. Photograph by Ole Akhøj with image editing by Lorie Reilly, courtesy of J. Lohmann Gallery.



Sandra Davolio, *Coral Flower IV*, 2022. Porcelain,
9¾ × 11 in. dia.



Joris Laarman, *Microstructures Adaptation Chair (Long Cell) Prototype*, 2014. 3-D printed polyamide and copper, $28\frac{1}{2} \times 27\frac{1}{2} \times 30\frac{1}{4}$ in.



Nervous System, *Floraform Chandelier*, 2017. 3-D-printed nylon, 43½ in. dia. Produced by Shapeways, New York City.

Joris Laarman

Dutch, born 1979, active in Amsterdam

Microstructures Adaptation Chair (Long Cell) Prototype

2014

3-D printed polyamide and copper

28⅓ × 27½ × 30¼ in. (72.1 × 69.9 × 76.8 cm.)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2015.263. © Joris Laarman.

Nervous System

Established 2007, Palenville, New York

Jessica Rosenkrantz, American, born 1983

Jesse Louis-Rosenberg, American, born 1986

Floraform Chandelier

2017

3-D-printed nylon and LED

43½ in. dia. (109.9 cm dia.)

Produced by Shapeways, New York City.

Denver Art Museum: Funds from the Architecture and Design Collectors' Council, 2022.57.
© Nervous System, Inc. Image courtesy of Nervous System.

Looking at the variability and seeming spontaneity of nature, it can be easy to forget that every flower and tree grows in accordance with mathematical and cellular systems. A single bloom is the result of thousands of cells dividing and multiplying, subtly adjusting their trajectories in response to stimuli such as light and temperature, to create something unique from a shared process. These two works by Dutch designer Joris Laarman, founder of Joris Laarman Lab, and the American design studio Nervous System translate those formulas of growth into objects that combine

design, technology, and natural forms.

Laarman's shimmering copper *Microstructures Adaptation Chair*, also referred to as the *Long Cell Chair*, features branch-like legs and a seat made of interconnecting loops. Light filters through the open spaces in the seat like it might through a leafy canopy. The chair's organic structure reflects the design process, which stemmed from a singular base component: a vertical "long cell." These cells stretch, compress, and subdivide from the foundational support of the legs to the concentrated



Elena Manferdini, *Wall Flowers (Clover)*, 2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.



Elena Manferdini, *Wall Flowers (Clover)*, 2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.

Elena Manferdini

Italian, born 1974, active in Venice, California

Wall Flowers (Clover)

2022

Vinyl on acrylic mirrors mounted on medium-density fiberboard and vinyl wall covering

Dimensions variable

Courtesy of and © Elena Manferdini



Architect and designer Elena Manferdini believes people are drawn to nature not by its pure beauty or arcadian symbolism but because it is a system made of recognizable patterns. In 1975, mathematician Benoit Mandelbrot coined the term *fractal* to describe the seemingly rough and irregular patterns found throughout nature, from the geographic features of coastlines and rivers to the minutiae of plant cells. Around the same time Mandelbrot was proposing theories of pattern in nature and geometry, art historian Ernst Gombrich was investigating patterns in decorative arts. He argued that symmetry and order in design stem from a biological impulse to find predictable rhythms in complex environments.¹ Recent science has supported that the human brain is uniquely drawn to these types of patterns, and over the last fifteen years researchers have found correlations between fractals, especially those found in nature, and stress reduction in study participants.²

Elena Manferdini, *Wall Flowers (Clover)*, 2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.



Elena Manferdini,
Wall Flowers (Clover),
2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.



Elena Manferdini,
Wall Flowers (Clover),
2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.



Elena Manferdini,
Wall Flowers (Clover),
2022.

This attraction to pattern becomes uncanny in Manferdini's hyperdigital reinterpretations of natural systems. From a distance, the multimedia installation *Wall Flowers: Clover* appears to be a lush expanse of floral wallpaper, as our brains fill in the expected pattern. Close looking destabilizes this impression, revealing globular and wildly colored blooms that intersect and intertwine in impossible ways (figs. 1–3). To generate the imagery, Manferdini designed a 3-D-modeled animation of a virtual meadow, swaying gently in a computerized breeze. (fig. 4) Stills, each captured at

A Forest Walk

An Audio-Guided Practice

Kimberly Ruffin

The effects of time in nature on humans' well-being have been thoroughly and scientifically investigated over the last few decades, with documented results including decreases in cortisol and heart rate. In Japan, people who spent time walking through forests also reported feeling comfortable, soothed, or refreshed afterward.¹ For certified nature and forest therapy guide Kimberly Ruffin, nature is also an experience of faith, which she defines in this forest walk as "a continuous exchange of belonging."

This audio-guided walk is an invitation to engage your senses and be present in your body and in place. While it's called a forest walk, it can be done in any outdoor setting, although it should be a site that's already familiar to you, such as a favorite hiking trail, a city park, or even your own backyard. Set aside about forty-five minutes for this experience, but you can take more time if you'd like. When you are ready, press play and let Kimberly guide you through nature and reflection.

Transcript

[NOTE: after "Introduction" the bold title is the name of the invitation; punctuation is reflective of speaking cues]

Introduction (3 minutes)

Welcome! My name is Kim, and I'm the Certified Nature and Forest Therapy Guide who's facilitating this experience. During this "walk of faith" the working definition of "faith" is a continuous exchange of belonging. The exchange occurs among you, an outdoor place you determine, and the other elements of nature there. In essence, it's an opportunity to let nature support you and to give a little of yourself in the support of the rest of nature.

Here are a few suggestions for getting ready:

- The walk will be about 45 minutes long, including the time when I am speaking and the timed silence included for you to connect with the natural world through your senses. I'll let you know good places to pause if you'd like more time.

- Connection to the ambient noise around you is important. So, I recommend that you disable notifications and use the speaker feature on your phone so that my voice can guide you throughout the walk. Alternatively, you might listen with only one earbud.
- Choose a site with which you're already familiar. "Forest" bathing can be done in most outdoor settings, even if they are not woodlands. Consider your backyard or even a city park that's not too heavily trafficked. This walk is not intended for areas that are new to you.
- The walk concludes with an opportunity to sit and reflect using an article of faith, a small, easily-carried item that has personal significance.

The outdoors can be a place that gives us comfort, speaks to our hearts, puts our minds at ease, and reminds us of all the other beings with which we share this home. We can let nature support us through our senses; all we have to do is drop into the interaction of our bodies with a place. I'm here to help you ease into this belonging. And, to assure you that, this will all unfold in the way it was meant to be. If there was a right way to do this, then you've already done it, because your body knows how to be here. All you need to do is to let it lead.

The prompts for you to let your senses lead are called "invitations". [CHIME SOUND] I'll be using this sound throughout the walk to mark the end of one invitation and the beginning of another. So, if you feel like taking more time with an invitation, just press "pause" at the sound of a chime and when you press "play" again, you'll be in the right spot to continue. If you finish before the sound of the chime, just take time to connect with your breath and enjoy being outside.

Are you ready? Even if you're almost ready, c'mon, let's get some outside!

Pleasures of Presence (15 minutes)

Move to where you want this experience to officially begin. Have a good spot? (If not, take a pause here and get situated.) All right, let's sink in...

Our first invitation is called Pleasures of Presence. Notice your breath wherever you feel it most vibrantly . . . your nose, your chest, your belly... take a few more breaths . . . notice how the air coming from you connects to the air around you . . . as you breathe plants and animals are also breathing and sharing this air . . . notice how the atmosphere holds you . . . holds you and the living things in this place where you belong . . . As you breathe fully, be fully present with this place.

Begin to shepherd your field of vision closer to you perhaps some point on the ground or directly in front of you. We will turn our attention to other senses, but feel free to keep a soft gaze going, or let your eyelids gently hover, or, if you feel comfortable, close your eyes completely.

Turn your attention to your sense of touch. . . our bodies are supported by incredible underground worlds beneath us... notice your body, how it feels to be supported by this place . . . I invite you to rock back and forth, shift your weight around if you like, until you find a pleasing position . . . let the earth help you feel centered . . . Let your cares be drawn to the feelings on your skin . . . on your bare skin... and sensations where you are clothed . . . what kinds of qualities are in the experience of touch . . . notice what touch sensations are giving you pleasure . . . invite that pleasure in...

Now I invite you to make a shift to your hearing... what sounds are around you? . . . notice the variety of sounds . . . notice any interaction of the sounds with each other...what are the rhythm of the sounds . . . Take a moment to connect with the furthest sound you can hear . . . now bring your attention to the closest sound you can hear . . . take a moment to tune into the sound of your own breathing . . . let it blend in with the sounds around you . .

. what is it like to be a part of the music of this place? What within the experience of sound is giving you pleasure... invite that pleasure in . . .

You'll now turn your attention to the two closely related senses of taste and smell . . . open your mouth and breathe through your mouth and nose together . . . just notice the textures of the air . . . Since taste receptors are all over the tongue, you may even want to stick your tongue out to better taste the biotic conversation going on (the earth's not going to take offense) . . . are there new scents that weren't apparent at first . . . Raise your head and smell the air . . . does scent seem different here . . . lower your head . . . again how does scent seem here . . . raise your head back to center and experience any other qualities the air has . . . and where in this experience of taste and smell does pleasure appear? . . . and invite that pleasure in also . . .

If you haven't done so already, if it feels right, you can have your eyes closed for the last part of this invitation. Imagine you're in the middle of a circle that has four directions marked . . . First, turn a quarter of this circle to the right to the first direction, don't worry about how accurate you are, just take this opportunity to feel . . . and with your hands out and your entire body sensing as one knowing organ . . . just feel the presence of this direction and notice what it is like . . .

And turning another quarter circle to your right, eyes in a soft gaze or closed, take in the presence of this direction and just notice what it is like, it's way of being present . . . How does it feel . . . sound . . . smell . . .

And once again, turn a quarter circle to your right. Do you feel qualities of this direction that are different than the qualities of the other directions? What are these qualities, and how are your senses letting you experience them . . .?

And turning a quarter circle to the right, give yourself the opportunity to feel this fourth direction . . . its presence . . . and how it touches into you . . . what is revealed by being present in this direction . . .

Holding your hands slightly out and palms forward, I invite you to get a second helping of one of these directions. Just slowly rotate your body in a circle until it arrives at a knowing of what direction it wants to face . . . and just find that place, where your body is saying "Yes" and . . . still with your eyes closed, breathe in this direction with your heart . . . in a moment, but not until I say so . . . you will open your eyes or focus your gaze . . . and when you do, I invite you to see what appears using your heart sense, like you were seeing for the first time . . . and now . . . open or focus your eyes . . . (give this a minute)

Is there a gesture you want to make toward that which you are seeing . . .? What are you noticing? Take a moment to honor your sensations at this moment. [Chime]

What's in Motion? (7 minutes)

Our bodies move in so many ways . . . run, jog, dance, walk . . . and . . . we . . . can . . . move . . . like . . . sloths . . . carefully . . . moseying up a tree . . . The next invitation is called "What's in Motion?" and this is an opportunity to explore an unhurried pace of movement that will let you sense, what's in motion, on the inside and the outside. Your mind is one part of who you are that might want to go faster and race around to this, that, and the other thing while you're walking leisurely. If that's going on, all you have to do is usher it back to the question "what's in motion?" So, maybe go a little slower than you usually do, and give this place that you've chosen a stroll or a saunter and take the question, "What's in motion?" with you . . . You'll hear the chime when it's time to continue.

[Timed Silence then Chime]

Blank As my Witness (6 minutes)

Witnesses are a part of Forest Therapy . . . they are nonjudgmental observers that summon relationship. There are a host of ways that more-than-human nature is acutely aware of what's going on around it. This place knows that you're here and is witnessing you right now. Some parts of nature see without eyes, smell without noses, and feel without hands. Some researchers have concluded that plants even remember. Through these sensations of nature, other living things serve as a witness to your presence in this place. So, the name of this invitation starts with a blank that you'll fill in. It's called "Blank As My Witness." Take a wander and use sight, sound, and touch, to notice all of the natural witnesses around you. For instance, you might look at the ground and say "Soil as my witness" or let yourself be drawn to a tree, touch it and utter in your mind "Tree as my Witness." Feel free to linger with any of these witnesses and yield your attention to their senses and yours. You'll hear the chime when it's time to continue.

[Timed Silence then Chime]

Where's Water? (6 minutes)

How are you feeling? Ready? If not, take a pause here before we continue.

For this next invitation, I ask that you let your body lead you to something very old: WATER. So, this invitation is called "Where's Water?" Of course, there is no new water, so the raindrop that dripped down a dinosaur's forehead is still on Earth somewhere. Even if you're not near a pond or a puddle, water is where you are. And, you have more than your vision to help you find it. Let the water in you be drawn to the water outside. In whatever form you find it, take a moment to sense where this water has been, any of its past places. You might even want to name these places out loud and use sound to connect you with the water of this place. "A waterfall, Cleopatra's cup, deep inside a tree . . ." Take some time now to sense Where's Water? You'll hear my chime again, when it's time to move on.

[Timed Silence then Chime]

Skywalker (8 minutes)

The sky reaches all the way to the ground and at this very moment, it is hovering over what connects you to the earth. With this invitation called "Skywalker," take some time to skywalk and sense how it feels to be where the sky and earth meet. This is our next to last invitation, so you can use this opportunity to make your way to where you'd like to sit and end the walk. As you're skywalking there, let your body's attention float to what you feel as you move within the lowest layer of sky.

[Timed Silence then Chime]

Closing Ceremony—An Article of Faith (5 minutes total)

You've come this far by faith: the continuous exchange among you, the place you're in, and all the nature there. This last invitation is called "An Article of Faith", and it's an opportunity to deepen your memories of this experience as you begin to move back into your regular tasks with the walk coursing through your body.

If you wish to sit, please do so now. Here's a little time to get better situated. You'll hear my voice again for the close.

[Chime then Timed silence here: 3 minutes]

Remember that object I asked you to bring? Now it's time to take out your Article of Faith and hold it . . . As you hold it, take some time to let the memories you want to keep of your walk surface. Imbue your memories on this special item as you hold this article of

faith or simply put your memories in the pockets of your mind. To help this along, I'm going to recount slowly the names of the invitations: Pleasures of Presence . . . As My Witness... Where's Water . . . Skywalker . . . An Article of Faith

Now as you take some final moments to reflect, feel free to write, draw, or imprint with any materials you brought. Relax and refresh with water and a snack, as you like. Finally, I'd like to thank the place you chose to do this walk, and you for taking this walk of faith. And to end this experience, with three notes of this chime, we will close our time.

[Concluding, three note Chime]

[END of script]

1. Bum-Jin PARK et al., "Physiological and Psychological Effects of Walking in Stay-in Forest Therapy,"

日衛誌 (Jpn. J. Hyg.), no. 69 (2014): 98-103,

https://www.jstage.jst.go.jp/article/ijjh/69/2/69_98/_pdf/-char/ja.

Natural Systems

Processes and Phenomena

Natural systems describe nature's processes and phenomena, especially seasonal and temporal changes characteristic of a healthy ecosystem, such as climate and weather patterns, hydrology, and plant receptivity and cycles. Social ecologist Stephen Kellert, whose research and writing advanced the understanding of the connection between humans and the natural world, pointed to biophilia as "the inherent human inclination to affiliate with natural systems and processes, most particularly life and life-like (e.g., ecosystems) features of the nonhuman environment."¹ There is limited, but growing, scientific documentation of the health impacts associated with access to natural systems. These systems, or at least their observable characteristics, are believed to enhance positive health responses. Kellert acknowledged that seeing and understanding the processes of nature can create a perceptual shift in what's being seen and experienced.² This relationship has a strong temporal element, which can be expressed culturally. Japanese culture celebrates the ephemerality of cherry blossoms, and in some Indigenous cultures, the auroras—natural light displays in the earth's sky—are seen as the spirits of ancestors or celestial dancers.

Over the past twenty years, technology has greatly reshaped our world and our relationship to it. The proliferation of technology, like the rapid advancements in artificial intelligence, continues, distracting us from other relationships, including our connection with natural systems. But what if it could reconnect us instead? It is perhaps no surprise that the use of cutting-edge technologies to manifest the wonders of nature is burgeoning among contemporary artists and designers who meditate on how humans and the natural world are intricately intertwined and interdependent.

The following artworks go beyond making use of nature's forms or patterns to evoke the natural rhythms of life—the fundamental exchange of energy between organisms and their environments. These experiences, sometimes immersive or interactive, create meaningful, direct connections with natural processes and phenomena, particularly through movement and multisensory interactions. They invite us to slow down, pay attention, and trust what our bodies already understand. They evoke a relationship to a greater whole, triggering a deeper awareness of the nature of life and the sense of awe and wonder we can experience being immersed in it. While they are not a replacement for the real thing, these encounters can cultivate surprise, delight, and even empathy. They may even inspire stewardship of the ecosystems within which we all exist.



DRIFT, *Shylight*, 2006.

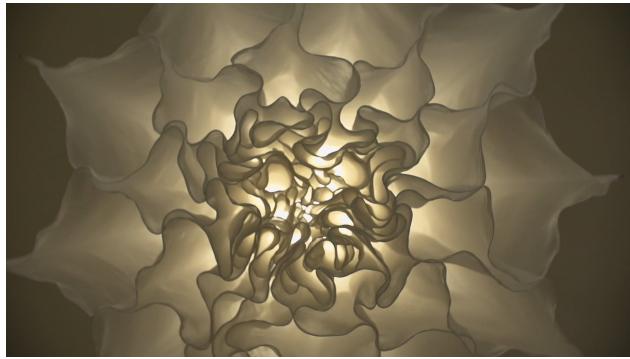
Cofounded by artists Lonneke Gordijn and Ralph Nauta, the Amsterdam-based multidisciplinary studio DRIFT creates experiential sculptures, installations, and performances that reawaken our connection to the natural world. DRIFT manifests the phenomena and hidden properties of nature with the use of technology to reestablish our connection to it. "DRIFT reconnects people with nature through art," according to Nauta. "We create spaces where the viewer is tuned into rhythms resembling natural movements such as the blossoming of flowers, flocks of flying birds, and sea waves."³

DRIFT's *Shylight* and *Meadow* examine how a man-made object can mirror and amplify nature's subtle wonders (fig. 1 and cat. xx). The kinetic installations feature mechanical flowers made from layers of diaphanous silk, and integrated LED lights illuminate them from within (fig. 3). Suspended from above, each fixture is programmed to mimic the nastic movement of blossoms that open and close in reaction to changing light. *Shylight* and *Meadow* emulate the biological behavior of nyctinasty but do not strictly copy it. Going beyond mere imitation, DRIFT's flowers are oversized, and the speed of their movement is accelerated. The results give the impression of experiencing the phenomena under a magnifying glass and at a quickened pace.



DRIFT, *Meadow*, 2017. Aluminum, stainless steel, printed fabric, LEDs, and robotics; variable dimensions.

Produced in 2006, *Shylight* features white flowers that descend and unfurl to bloom above the viewer's head, before retreating upward and closing again (fig. 2). The installation's ethereal appearance contradicts the complex technical components and custom software that took the studio years to develop. *Shylight* feels alive due to its carefully choreographed movements that are based on natural human rhythms, such as heartbeats and breathing. While the blossoms in *Shylight* appear to move individually and independently from one another, *Meadow* could be understood as a single organism—an interconnected field of colorful flowers that perpetually open and close in sequence. *Meadow*'s rhythmic and persistent change awakens not only the senses but also the imagination, as it delves into the uncanny nature of a sentient environment (fig. 3). We experience *Meadow* more like we see ourselves: with character, body language, and a collective story.



<https://vimeo.com/911666928>

DRIFT, *Shylight*, 2006. Aluminum, polished stainless steel, silk, LEDs, and robotics. © 2023 DRIFT. Video by Xinix Films / Arjen van Eijk.

Meadow's fabric flowers are printed in gradient shades that harmonize with colored LED lights to evoke the changing tones of a skyscape as dawn transitions to dusk. Its unique

colors and ever-changing choreography imbue the artwork with an organic beauty. According to DRIFT, the artwork is "inspired by the impermanence of the ever-changing seasons, the sensational character of natural growth processes, and the insight that plant life often functions as a colony, rather than as a group of individuals."⁴ *Meadow* evokes the ephemerality of nature and the sense of awe that comes from being immersed in it.



<https://vimeo.com/911666976>

DRIFT, *Meadow*, 2017. Aluminum, stainless steel, printed fabric, LEDs, and robotics. Indianapolis Museum of Art Galleries at Newfields. © 2023 DRIFT, represented by Pace Gallery. Video courtesy of DRIFT.

Although *Meadow* evokes nyctinasty, its choreography can be described as a Heraclitean motion, a soft pattern of movement associated with safety and comfort that "is always changing but always remaining the same," like waves lapping on a shore or grass rippling in the breeze.⁵ As both a constantly changing light source and a field of mechanical blossoms, *Meadow* captures our attention effortlessly. The overall effect encourages "soft fascination," allowing the mind to relax and recover while watching the hypnotic motion of the lamps.⁶ The cathartic, quiet pace of *Meadow* invites us to collectively explore the complexities of the natural world.



Mathieu Lehanneur, *Tomorrow Is Another Day (Demain est un autre jour)*, 2011.

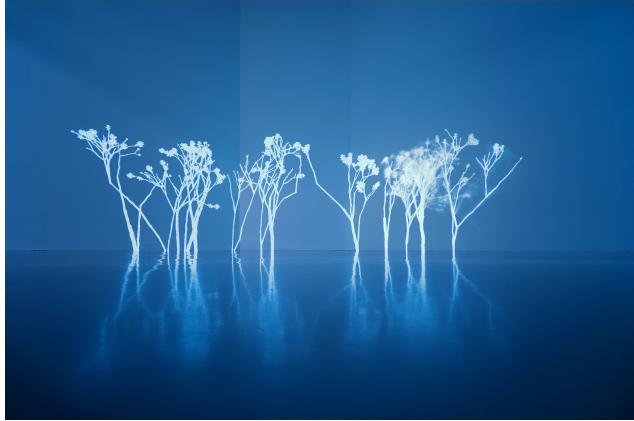
French multidisciplinary designer Mathieu Lehanneur combines art, design, science, and technology in projects that interpret natural systems and replicates them into human-centered solutions that benefit society. Originally conceived for the palliative care units at the Diaconesses Croix Saint-Simon Hospital Group in Paris, Lehanneur's *Tomorrow Is Another Day (Demain est un Autre Jour)* generates a digital animation of tomorrow's sky (cat. xx). Installed on the wall of a patient's room, *Tomorrow Is Another Day* broadcasts a slowly and continuously moving image of the atmosphere through its circular screen. "It's not a video that plays the same images of the same sky over and over again," Lehanneur explains.⁷ The designer worked with a computer programmer to create custom software that aggregates meteorological and atmospheric data, such as the time of day, color of the sky, speed and transparency of clouds, and humidity, from the internet in real time to create an animation of tomorrow's sky. The aperture can be customized to reflect specific locations, providing a sense of familiarity and personalization.

Lehanneur's concept purposely fosters a profound therapeutic and poetic experience for the patients who observe it, aiming to reestablish their connection with the ever-changing weather patterns of the natural world. According to Lehanneur, "There were infinite variations of grays, cloudy silhouettes, and light intensity that had to be reproduced. Paradoxically, it was necessary to reach this level of sophistication so that the patient could let their mind go, as if lying in a field, eyes turned to the sky."⁸ It's a reminder that no two clouds or skies are ever the same.

These vital aspects of nature often remain concealed from patients and other individuals in healthcare facilities, yet passive visual experiences hold the potential to offer profound benefits through diverse encounters with nature. Stress recovery theory (SRT) proposes that contact with natural environments reduces the psychophysiological stress level of individuals, while attention restoration theory (ART) suggests that mental fatigue and concentration can be improved by time spent in, or looking at, nature.⁹ *Tomorrow Is Another Day* not only captures these elusive natural phenomena but also transforms them into spiritual experiences for patients and their families. It prompts contemplation on the concepts of permanence and impermanence, the fundamental principles of uncertainty, and spirituality. Ultimately, the artwork offers a unique opportunity to transcend the confines of time itself.

Works like Lehanneur's *Tomorrow Is Another Day*, DRIFT's *Meadow*, or J. MAYER H.'s *Metropol Parasol* (see Natural Analogs), conjure dynamic and diffuse natural light conditions that change from moment to moment because of varying atmospheric conditions or the fluttering of leaves in a canopy of a stand of aspen trees.¹⁰ The fractal patterns of light and shadow on a surface are an expression of time and motion that can attract our attention, evoke a sense of calm, and help connect us with the rhythms of life.

London-based, Dutch artist Simon Heijdens reinterprets natural processes with unique technologies, embedding them in man-made surroundings to uncover the hidden essence of a place. Meteorological conditions, including sunlight and wind, along with custom algorithms and human interactions, dynamically transform the artist's responsive artworks in real time, giving rise to ever-changing forms. Despite their technical complexity, Heijdens's installations possess a restrained and poetic appearance, seamlessly integrated into their respective settings. They provoke contemplation on the significance of nature and coincidence in an increasingly developed world while offering moments of exploration, wonder, and introspection.

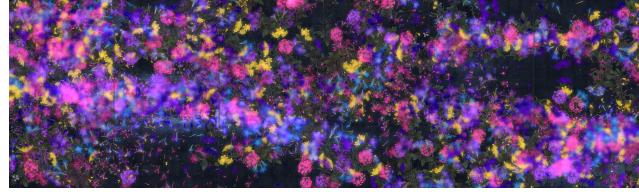


Simon Heijdens, *Lightweeds*, 2005.

Heijdens's *Lightweeds* is a living digital organism that reintroduces us to nature's element of surprise (cat. xx). These virtual plants grow indoors but depend closely on actual rain and sunlight, swaying with the wind. *Lightweeds* responds directly to the ever-changing conditions of the outside world, as measured through sensors placed on the exterior of the building. As people pass by, the willowy weeds shudder and sway, eventually pollinating. Their seeds trail passers-by before dispersing throughout the space. With their continuous cycle of growth and decay, the plants' location and density reveal insights into the way the building is utilized.

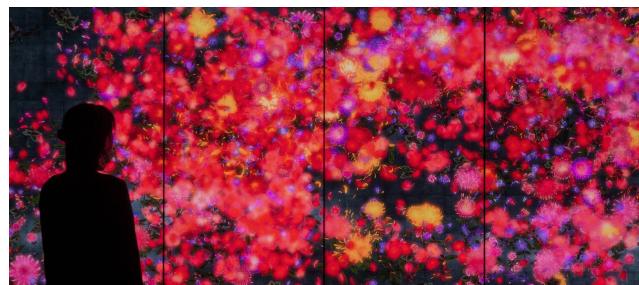
Lightweeds not only chronicles the passage of time but also captures the evolution of the natural surroundings. Generated from a specific locality and in a state of constant flux, the digital projection introduces an element of chance and time into the built environment. By doing so, it unveils the natural processes and phenomena that are gradually disappearing from our increasingly conditioned, static, and climate-controlled urban lives. *Lightweeds* serves as a visual reminder to reengage with the inherent beauty and vitality of the natural world that surrounds us.

Flowers and People—A Whole Year per Hour addresses the fleeting nature of the seasons and the interactional relationship between humans and the natural world (cat. xx). The interactive digital artwork vividly depicts a year's worth of seasonal flowers that continuously change. The flowers gradually and repeatedly sprout, grow, bud, and blossom until their petals eventually scatter and fade across the artwork's multiple screens. The cycles of growth and efflorescence within this digital garden advance through spring, summer, fall, and winter at an accelerated pace. As the title suggests, one year passes in the span of an hour.



teamLab, *Flowers and People – A Whole Year per Hour*, 2020.

Created by teamLab, a Tokyo-based collective of artists, programmers, engineers, CG animators, mathematicians, and architects who collaboratively navigate the confluence of art, technology, design, and the natural world, *Flowers and People* is generated by a computer program that continuously presents the work, but the interaction between people and the artwork causes continuous changes. When people move in front of the screens, the flowers' petals scatter all at once. But when they stand still, flowers grow and bloom more profusely. *Flowers and People*'s surreal, yet sensuous, components form an artificial ecosystem, gently flexing and responding to time and the viewer, that can never be replicated. *People* become active participants, cocreating and establishing collective resonance.¹¹ This approach casts visitors and their relationships to one another as integral to the ultimate form of the work—underscoring their collective presence as a positive means of creation and serving as a metaphor for the integrated systems of nature itself, where distinctive parts interact to become a unified whole (cat. xx*).



teamLab, *Flowers and People – A Whole Year per Hour*, 2020.

Long fascinated by humans' engagement with the natural world, teamLab wants users to see in real time their impact on nature. "We have given form to what we in the modern era consider to be life," teamLab explains. "Digital technology has made it possible, more than any other man-made artifacts, to express these subtle transformations and interactions that nature has. It also has enabled us to create the expression that gives us a deeper sense of unity with artworks. We think this brings the viewers an opportunity to redefine the relationship between nature and humans."¹² *Flowers and People* heightens the participants' awareness of the world they inhabit and can inspire a reconsideration of their own impact upon shared ecosystems. In an increasingly divisive

world in which feelings of alienation and isolation are replacing those of relationship and community, such experiences are fundamental to our well-being.

In an era dominated by technology and a growing disconnection from nature, it is crucial to find ways to reconnect with the natural world. The use of cutting-edge technologies in art and design offers a unique opportunity to bridge this gap and evoke a sense of wonder and awe through immersive experiences. Artists and designers utilize technology to manifest the beauty and intricacies of natural systems, reminding us of our inherent connection to the environment. These artworks invite us to slow down, pay attention, and engage with the rhythms of life. By experiencing these digital representations of nature's systems and processes, we can cultivate a deeper appreciation and understanding of the ecosystems that surround us, fostering a sense of stewardship and inspiring positive change. Through art, technology, and our own active participation, we have the power to rekindle our relationship with the natural world and forge a harmonious future.

Title image credit: Mathieu Lehanneur, detail of *Tomorrow is Another Day (Demain est un Autre Jour)*, 2011. Digital weather station; 10 × 37 1/8 in. diam. Courtesy of the artist. © Mathieu Lehanneur. Image © Felipe Ribon, courtesy of Mathieu Lehanneur.

- 1.** Stephen R. Kellert, "Biophilia," in *Encyclopedia of Ecology*, ed. Sven Erik Jørgensen and Brian D. Fath (n.p.: Elsevier B. V., 2008), 462.

Since the 1990s, the concerns of biophilia theory have shifted from its initial focus on life or living organisms to exploring the relationship between humans and the natural environment.

- 2.** Stephen R. Kellert, Judith Heerwagen, and Martin Mador, eds. *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life* (Hoboken, NJ: John Wiley & Sons, 2011).

- 3.** TDE Editorial Team, "Design Duos / DRIFT," The Design Edit, September 9, 2021, <https://thedesignedit.com/people/design-duos/design-duos-drift>.

- 4.** Katy Donoghue, "Meadow by DRIFT: The Poetic Installation Engaging Visitors at Superblue," Whitewall, December 1, 2021, <https://whitewall.art/art/meadow-by-drift-the-poetic-installation-engaging-visitors-at-superblue>.

- 5.** Aaron Katcher and Gregory Wilkins, "Dialogue with Animals: Its Nature and Culture," in *The Biophilia Hypothesis*, ed. Stephen R. Kellert and Edward O. Wilson (Washington, DC: Island Press, 1993), 176.

- 6.** Rachel Kaplan and Stephen Kaplan, *The Experience of Nature: A Psychological Perspective* (Cambridge, UK: Cambridge University Press, 1989). A core premise of Rachel and Stephen Kaplan's Attention Restoration Theory (ART) suggests that mental fatigue and concentration can be improved by time spent in, or looking at, nature. There are certain types of restorative experiences that seem to transcend others and produce multiple benefits, not just the benefit of escape from stress alone. One of these states is the "soft fascination" that occurs when a person is immersed in nature, a stimulus that initiates the use of involuntary attention, or attention that requires no effort.

- 7.** Celia Sampol, "Spotlight on a Spiritual Work Questioning Time Dedicated to Palliative Care," E-Magazine by MedicalExpo, July 11, 2022, <https://emag.medicaexpo.com/spotlight-on-a-spiritual-work-questioning-time-and-dedicated-to-palliative-care/>.

- 8.** Ibid.

- 9.** Roger S. Ulrich, Robert F. Simons, Barbara D. Losito, Evelyn Fiorito, Mark A. Miles, and Michael Zelson, "Stress Recovery during Exposure to Natural and Urban Environments," *Journal of Environmental Psychology*, 11, no. 3 (1991): 201–30, [https://doi.org/10.1016/S0272-4944\(05\)80184-7](https://doi.org/10.1016/S0272-4944(05)80184-7); Stephen Kaplan, "The Restorative Benefits of Nature: Toward an Integrated Framework," *Journal of Environmental Psychology*, 15, no. 3 (September 1995): 169–82, [https://doi.org/10.1016/0272-4944\(95\)90001-2](https://doi.org/10.1016/0272-4944(95)90001-2).

- 10.** William Browning, Catherine Ryan, and Joseph Clancy. *14 Patterns of Biophilic Design: Improving Health & Well-Being in the Built Environment* (New York: Terrapin Bright Green, 2014). <https://www.terrapinbrightgreen.com/reports/14-patterns/>.

- 11.** Collective resonance has been defined as "a felt physical and energetic sense of connection that occurs in a group of human beings that positively influences the way they interact toward a common purpose." Renee A. Levi. "Group Magic: An Inquiry into Experiences of Collective Resonance" (PhD diss., Saybrook Graduate School and Research Center), 2.

- 12.** Katy Donoghue, "Superblue is Changing how the World Experiences Art," Whitewall, April 30, 2021, <https://whitewall.art/art/superblue-is-changing-how-the-world-experiences-art>.



DRIFT, *Meadow*, 2017. Aluminum, stainless steel, printed fabric, LEDs, and robotics; variable dimensions.

DRIFT

Established 2007, Amsterdam

Meadow

2017

Site-specific kinetic sculpture with aluminum, stainless steel, printed fabric, LEDs, and robotics

Dimensions variable

Represented by Pace Gallery. © 2023 DRIFT. Photo by Oriol Tarridas, courtesy Superblue Miami.



In the spring and summer, vibrant fields of wildflowers erupt across the Rocky Mountains. Although the high altitude and volatile weather limit the variety of flowers that can grow, each meadow is still unique, responding to its environment and surrounding life with true site specificity. This is also the case with Amsterdam-based studio DRIFT's *Meadow*, a kinetic sculpture of massive fabric flowers suspended on armatures that open and close hypnotically. These base components are never the same twice: the flowers' colors, arrangement, and motion are influenced by locality just as much as their natural counterparts.



Wildflowers in the Gore Range, Colorado.

For the Denver Art Museum, the sweeping colors were inspired by flora native to Colorado, including the iconic columbine. The bright blues, yellows, and oranges of alpine wildflowers are meticulously

color matched and printed on fabric, as well as translated to a digital gradient of light that emanates from within each flower as it opens (fig. 1). This "choreography," as DRIFT calls it, is inspired not just by the surrounding natural landscape but also by *Meadow*'s location within the built environment.¹ Between the sharp, angular walls of the museum's Frederick C. Hamilton Building, the cluster of oversized flowers widens and intensifies as the space opens, as a mass of mountain blooms might grow between two rocky outcroppings.

Using custom robotics and complex software, the flowers in *Meadow* replicate the motion of nyctinastic plants, which close their petals at night and open in the morning in response to the light and temperature of the sun. As the colossal flowers open above visitors' upturned faces, viewers fulfill the sun's role, becoming the sustaining force of life for this ecosystem. Just as *Meadow* flourishes between technological and natural processes, experiencing its meditative rhythm places us at the convergence of many different scales and spaces,

DRIFT, *Meadow*, 2017. Aluminum, stainless steel, printed fabric, LEDs, and robotics; variable dimensions.

Mathieu Lehanneur

French, born 1974, active in Paris

Tomorrow Is Another Day (Demain est un Autre Jour)

2011

Digital weather station with steel, resin, and light fittings

10 × 37½ in. dia. (25.4 × 94.3 cm dia.)

Courtesy of the designer. © Mathieu Lehanneur. Image © Felipe Ribon, courtesy of Mathieu Lehanneur.



Weather is often labeled as small talk's last resort, a dreaded part of a conversation. However, it is also many people's closest and most direct engagement with the rhythms and patterns of nature. This combined banality and universality is what inspired multidisciplinary designer Mathieu Lehanneur to evoke weather patterns in his project *Tomorrow is Another Day (Demain est un Autre Jour)*, commissioned and designed in 2011 for Diaconesses Croix Saint-Simon Hospital in Paris.* The porthole-like object glows softly as a honeycomb-structured screen displays gently moving clouds and color-shifting skies: a projection of the weather for the following day gathered from real-time meteorological data. A screen, a sculpture, and a celestial globe all in one, *Tomorrow is Another Day* expresses the ethereal and profound aspects of natural phenomena (figs. 1 and 2).

Mathieu Lehanneur, *Tomorrow is Another Day (Demain est un autre jour)*, 2011. Digital weather station with steel, resin, and light fittings; 10 × 37½ in. dia.



Mathieu Lehanneur,
Tomorrow is Another Day (Demain est un autre jour), 2011.
Digital weather station with steel, resin, and light fittings; 10 × 37½ in. dia.

Scientists and medical professionals have long been interested in the benefits of nature, particularly natural views, on hospital patients. In 1984, psychologist and architect Roger Ulrich published a study that found gallbladder-surgery patients who could see trees through their windows were recorded as requesting less pain medication and described by hospital staff as having better attitudes than patients in rooms without green views.¹ In an important distinction, however, *Tomorrow is Another Day* was designed for a palliative care

teamLab

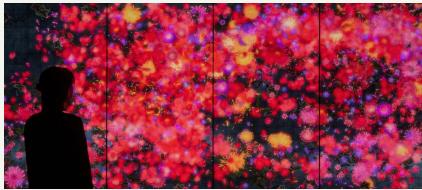
Established 2001, Tokyo

Flowers and People – A Whole Year per Hour

2020

Six-channel interactive digital installation, endless loop.

Courtesy of the artist and Pace Gallery. Sound by Hideaki Takahashi. © teamLab, courtesy Pace Gallery.



Art collective teamLab considers their work to exist outside of boundaries. In form, it incorporates elements of fine art, technology, immersive spectacle, and natural imagery. More importantly to the artists, however, it seeks to transverse the barriers that exist between people and the natural world or each other. In *Flowers and People—A Whole Year per Hour*, vibrant blossoms erupt and fade across multiple screens. Resembling illuminated paper cutouts, the flowers grow and dissolve in response to programming that continuously renders the imagery in response to real time actions of visitors. As people spend time with the work, flowers bloom abundantly in front of them; when they move away, the petals scatter and disappear. *Flowers and People* transforms through visitor presence, expressing the fundamental effects of human action on nature. In this case, humans are the catalyst for beauty and growth, and their absence creates a void, aligning with teamLab's ultimate thematic goal to "create an experience where the relationship between the world and oneself is borderless and continuous."¹

teamLab, *Flowers and People – A Whole Year per Hour*, 2020.

The movement and colors of *Flowers and People* become more dramatic as more people interact with it, encouraging affiliation with the actions of other viewers. By inspiring a sense of awe through a community encounter, teamLab hopes that visitors will begin to think of the presence of other people as beautiful or beneficial, rather than a hindrance to one's own experience.² Recent scientific and psychological studies of awe suggest that this could be correct: people who report feelings of awe, wonder, or transcendence were recorded as behaving more generously, being more curious, and wanting to connect more with others afterward.³ It is fitting that both nouns in the title of the work are plural: much like life itself, *Flowers and People* is meant to be a shared event.

Kit Bernal

1. "When Art Meets Technology," The Archive, accessed August 8, 2023, <https://thearchivemagazine.com/teamlab-art-collective-interview-when-art-meets-technology/>.

2. Tobias van Schneider, "The Sensory and Surreal Worlds of teamLab," vanschneider.com, March 30, 2020, <https://vanschneider.com/blog/sensory-surreal-worlds-teamlab/>.

Big Nature, Big Art, and the Necessary Euphoria of Awe

In the winter of 2019, Dacher Keltner visited his dying younger brother. In his mid-50s, Rolf Keltner was losing his battle with cancer. The older brother rested his hand on Rolf's shoulder. He sensed a light radiating from his brother, a force around his body, pulling him away. He felt immense sorrow but also the enormity of the mysteries of life and death. In the presence of his brother and these immemorial forces of time, he briefly lost his sense of being an embodied individual.¹

Keltner, a psychologist at the University of California, Berkeley, later understood exactly what he'd experienced in that moment: awe. Keltner had been studying this emotion for years, usually in his lab, elicited in volunteers watching videos of things like the Earth from space. But occasionally Keltner and his colleagues would take subjects out into the real world to stand under giant trees or raft in the wilderness or look at dinosaur skeletons in a museum while filling out questionnaires or offering up saliva to test hormones.

A child of a painter and a poet growing up in the '60s, Keltner was in some ways primed to study this emotion.² Natural beauty was all around: Men were landing on the moon. His neighbors in Topanga Canyon included some of the decade's most enduring musicians. Until Keltner was out of graduate school, the emotion of awe had hardly been studied by academics, even those who specialize in emotions. And yet, argued Keltner, it lay at the very heart of what it means to be human.

Closely linked to mysticism and other transcendental feelings, awe has been shown to foster cooperation, humility, reverence, caretaking, emotional wellbeing, and physical health.³

It may be the defining emotion of our species.

Perhaps it's no coincidence that as so much in our world seems to be teetering on the edge of instability—environmental change, social fragmentation, technological distrust, postpandemic malaise, anxiety, and disease—awe is enjoying something of a moment. As scientific studies elevate the status of this emotion, as more clinicians recommend it to patients, as more people on their own seem to be craving analog experiences and connections to each other, to art, and to the natural world, awe is now, in some circles, touted as a plausible and necessary corrective to despair.

But what exactly is awe? And why does it sometimes precipitate dramatic mental and physical effects?

In attempting to define this somewhat ineffable emotion, Keltner and fellow psychologist Jonathan Haidt wrote a

groundbreaking paper on the topic in 2003. Titled "Approaching Awe, a Moral, Spiritual, and Aesthetic Emotion," it surveys the writings of mystics, poets, and philosophers, including Edmund Burke, who in 1757 described the sublime, in Keltner and Haidt's words, "as the feeling of expanded thought and greatness of mind that is produced by literature, poetry, painting and viewing landscapes."⁴

The paper goes on to explain that people often feel awe in the presence of vast natural features such as sweeping views, mountains, storms, and oceans. But the authors noted that "vastness" can refer to conceptual vastness as well, such as quantum physics or evolution or any idea that blows your mind. People can also feel awe in response to objects with infinite, or just alluring, repetition, such as fractal patterns found in forests, along coastlines, and in clouds formations. Fractal patterns, according to mathematician Benoit Mandelbrot, are patterns that repeat at different scales and express some principals of unity, symmetry, and self-similarity.⁵ It's no wonder that nature facilitates states of awe.

But vastness is not the only ingredient. Awe requires something of a double take. While encountering awe, we are jolted—even momentarily—out of the ordinary. We may be a little surprised, a little confused, certainly fully absorbed. Keltner and Haidt conclude that a classic awe experience must encompass two main components: a sense of vastness and a little bit of mystery to the point that we seek to adjust our mental maps.

In his 2023 book, *Awe: The New Science of Everyday Wonder and How It Can Transform Your Life*, Keltner expands on this earlier definition to include a third component: a feeling that we are part of systems larger than the self. This is ultimately what makes awe a transcendent—and healing—emotion.

To figure out how often people experience awe and under what conditions, Keltner and colleagues gathered thousands of narratives from twenty-six countries. They broke the results into eight major categories of awe, or as Keltner puts it, "wonders of life":

Moral Beauty

People around the world are most moved to awe by witnessing other people in acts of courage, love, strength, kindness, and overcoming.

Collective Effervescence

A phrase coined by French sociologist Émile Durkheim, it refers to shared experiences leading to an electric and powerful sense of "we," including weddings, funerals, political rallies, dancing, singing, or marching together, and watching an eclipse in a group, and so on.

Nature

Nature-elicited awe, such as from viewing impressive features or encountering wildlife, accounts for about a quarter of contemporary awe experiences.

Music

Hearing music, playing music, chanting, and singing can transport us, fill us with vibrations, and make us feel connected to something beyond ourselves through symbols and physical sensation.

Visual Design

From patterns to colors to hallucinations to architectural grandeur, visual design can open, in Aldous Huxley's famous phrase, the "doors of perception."

Spirituality and Religion

Whether through dramatic conversions and visitation or simple meditative practice, the very definition of spiritual means connecting with forces larger than the self.

Life and Death

Few things move us as profoundly as witnessing these fundamental and universal passages.

Epiphany

A classic feature of conceptual awe, this is the moment we achieve insight or view an idea in a wholly new way.⁶

For those of us who love museums, it's no wonder that visual design and other sensory encounters can lead to feelings of being transported outside the self. Museums can offer several types of awe at once: Visual exhibits may incorporate music or images of nature. Being surrounded by others creates a collective experience. Perhaps we achieve new insight from seeing emotions or ideas represented artistically. And large sculptures and earthworks offer opportunities to encounter the vastness of scale, not to mention the technical and creative wonders of human ingenuity.

Consider the installation *Clay Houses* by Andy Goldsworthy at the Glenstone Museum outside of Washington, DC.



Andy Goldsworthy, *Clay Houses (Boulder-Room-Holes)*, 2007. Mica-schist, clay, hair, and slate, exterior of each house 196 $\frac{1}{2}$ x 192 $\frac{1}{2}$ x 228 $\frac{1}{2}$ in.



Andy Goldsworthy, *Clay Houses (Boulder-Room-Holes)*, 2007. Mica-schist, clay, hair, and slate, exterior of each house 196 $\frac{1}{2}$ x 192 $\frac{1}{2}$ x 228 $\frac{1}{2}$ in.

The small stone cabins arise without fanfare alongside a wooded trail. Handcrafted from small stones, they look like something you might stumble upon on a desolate Scottish moor. (fig. 1) From the outside, they appear the same: approximately thirteen feet high, sixteen feet wide, and nineteen feet long, topped by a simple pointed slate roof. You

walk in through the first cabin's wooden door, and it takes your eyes a moment to adjust to the dark interior. You might let out a small squeal of delight or surprise as your eyes settle on a large perfectly round earthen orb in the middle of the otherwise empty room. (fig. 2) The orb is much larger than the doorway, substantially taller than a person, cracked and slightly desiccated. How did it get here? Why doesn't it crumble? Further investigation reveals that it's made of brown clay from the site mixed with horsehair, human hair, and sheep's wool. People around you take selfies in front of the orb as if they have just emerged from a giant dirt bubble. You smile at each other. The room is called simply *Boulder*.

"What could possibly be in the next hut," you wonder. This is the artist's intention. In his statement for the museum, Goldsworthy wrote, "I don't want to give anything away. Finding the work inside is part of the sculpture's nature. If you let it be known they are art, it takes away from the art."⁷



Andy Goldsworthy, *Clay Houses (Boulder-Room-Holes)*, 2007. Mica-schist, clay, hair, and slate, exterior of each house 196 $\frac{1}{2}$ x 192 $\frac{1}{2}$ x 228 $\frac{1}{2}$ in.

And so you amble over to that entrance. Only a few people are allowed in at one time. You step over the threshold. This room contains no object. Titled *Room*, it is simply plastered with the earthen material on every wall, ceiling, and floor surface, giving the space an ancient, cave-like quality. (fig. 3) It absorbs sound and light. Is it a house? A mud-covered church? A gremlin's secret lair? If it rains, will it wash away? A stone exterior, a mud interior. It is unlike anything you have ever seen. You stop to take it in, to consider. In the stopping

and sensing, there is a feeling of alertness, and then peace. Time slows down.

And finally: the third stone cottage. This one also contains no object, but it holds another surprise. The small room's back wall recedes in a series of concentric circles that telescope away from the viewer into a false rear wall. (fig. 4) The symmetry is perfect, but organic. Circles inside a Euclidean room. The pleasing shapes are universal, mysterious, and safe at the same time. This could be the site of a primeval ritual, harkening back to a womb or a giant owl's eye or a cosmic wormhole. The room is titled *Holes*.



Andy Goldsworthy, *Clay Houses (Boulder-Room-Holes)*, 2007. Mica-schist, clay, hair, and slate, exterior of each house 196 $\frac{1}{2}$ x 192 $\frac{1}{2}$ x 228 $\frac{1}{2}$ in.

You step out into the forest. You feel lighter. Amused. Curious. Tender.

But did you experience awe?

Let's break it down.

Did you experience a sense of surprise and the feeling that this is something out of the ordinary? Decidedly so. What about a sense of mystery? Probably so. Many questions likely arose about both the artistic intention and the technical fabrication. The rooms are made from mud, and yet while much of Goldsworthy's work is ephemeral, *Clay Houses* is deceptively sturdy. On a deeper level, you may very well have sensed the mystery behind the human desire to affiliate with biophilic materials and the universal shapes represented. What about vastness? In these rooms, you may have marveled at the time required to hand build the stone structures and the installations within. You may have even subconsciously connected to a deeply evolved sense of human pleasure in these shapes and materials, something that ties you by an invisible thread to your ancient ancestors and to all people. The installation speaks to time, to space, to collective memory. In the presence of this art, perhaps you feel your individual self to be slightly less significant.

In case you're wondering if similar experiences have led you to a classic encounter with awe, researchers from the University of Pennsylvania along with Italian colleagues developed an "Awe Experience Scale" that encompasses six domains.⁸ In it, viewers rate their responses to such statements as "I noticed time slowing," "I felt my sense of self was diminished," "I had the sense of being connected to everything," "I experienced something greater than myself," "I had goosebumps, or felt my jaw drop," and "I felt challenged to mentally process what I was experiencing." You can add up your scores and see how you fared.

It's important to acknowledge, though, that not everyone experiences awe in the same way. As individuals, we have different capacities for awe, just as we have different dispositions to feel optimism or fear.⁹ Some of us are more jaded, less playful, less open to mysteries, and less prone to having goosebumps or a tingly feeling when encountering aesthetic stimuli. According to research in the emerging field of neuroaesthetics, about half of the population generates goosebumps in response to art and poetry (nature, music, and other stimuli aren't typically measured).¹⁰ The personality trait most closely associated with this tendency is openness, characterized by curiosity, exploration, and comfort with novel experiences.¹¹

Several years ago, University of Utah psychologist Paula Williams and colleagues made an interesting discovery. They already knew that "aesthetic sensitivity," i.e., the capacity to be moved by beauty, is associated with prosocial engagement, pro-environmental attitudes, and a sense of connection to the living world. Using brain-imaging data from the Human Connectome Project, Williams's lab discovered that people who responded positively to the goosebumps question also show greater resting-state connectivity in the white matter in their brains. They show strong neural connections between the sensory-motor parts of their brains and the parts that make up the default mode network, sometimes considered the seat of the self.¹² The goosebump people are also the ones who report being the most resilient after stressful life events.¹³

Williams was interested to know why. What was the relationship between being awe prone and being resilient? The brain connectivity itself could be part of the answer. People who are moved by art appear to have an ability to take the sensory stimulation—the chords of a sad song, the vastness of the Milky Way, the pleasure of biophilia—and reflect on their own lives and journeys. When we feel connected to our ancestors or to living plants and animals, we feel less lonely. We gain perspective on our problems. We feel the universality of our plight.

Experiencing awe through art amplifies our narrative tendencies, enabling us to connect with the stories being told.

We become active participants, cocreating meaning and finding personal resonance. We may find metaphors in the art or build on the artist's creation to tell ourselves stories about our values, our own growth, or our place in a larger world.

The meaning-making theory sounds grand, but Williams has another, more physiologically grounded explanation tied to the slight discomfort we feel when we encounter a novel mystery. The goosebumps themselves—similar to the raised hackles on a dog's back when facing danger—may be a mini version of a threat response. When we experience something we don't understand, our nervous system pays close attention. Is this safe? What is happening here? Think of sitting near the horn section during a performance of Beethoven's Symphony no. 5 in C Minor. The second phrase of the first movement ends with a climactic horn solo in which the sound wave vibrations enter the listener's body in a dramatic, unfamiliar, even unnerving way. And yet, soon, the listener is wholly caught up in the emotional height of the music followed by the resolution of tension. It's not an easy or mild experience. As the late neurologist Oliver Sacks put it, "music can pierce the heart directly."¹⁴

Awe thrives in the face of mystery and the unknown. Experiencing aesthetic awe in this way may be a sort of practice for the stresses of life, argues Williams. "The term I've come to use is that it's a kind of stress inoculation," she says. "If you do it a lot, then you are always challenging your system a bit and perhaps training yourself to have comfort with novelty and things that are challenging."¹⁵

Of course, not all awe makes us uncomfortable, or at least not for long. Many things that are novel are also highly pleasurable. Accordingly, there are other neurological and endocrinological bases for why we feel good when we encounter awe. One study indicated that while watching videos depicting acts of moral courage, subjects produced more oxytocin, a neurotransmitter linked to emotional bonding, a sense of unity with others, and overall positive well-being.¹⁶ Encounters with awe may also release dopamine and activate reward networks in the brain.¹⁷

For a paper published in the journal *Emotion* in 2015, researchers in Keltner's lab at UC Berkeley asked one hundred undergraduates to fill out questionnaires assessing their levels of different positive emotions such as amusement, contentment, joy, pride, love, compassion, and awe.¹⁸ The subjects also supplied saliva samples to measure an inflammatory cytokine called IL-6. Chronically elevated levels of this molecule are associated with stress as well as numerous illnesses including diabetes, cardiovascular disease, and depression. In the study, those who recently experienced awe had healthier levels of IL-6, and awe was the only positive emotion predicting lower levels.

Neuroscience studies suggest that awe also quiets down activation in the self-referential default mode network as we either think less about our own dramas in moments of amazement or we connect our problems in a more holistic way to the external stimuli.¹⁹

Real-world studies in the field confirm awe's tendency to diminish our egos. In one, researchers asked tourists at both Fisherman's Wharf (a commercial destination in the city of San Francisco) and a scenic overlook at Yosemite National Park to rate their experiences of awe and draw a picture of themselves on graph paper. The Yosemite tourists experienced far more awe, and they also drew their bodies as 33 percent smaller than the urban tourists. They also wrote their signatures in smaller penmanship.²⁰

After the spectacular solar eclipse in the summer of 2017, psychologists at the University of California, Irvine, analyzed the language of seven million Tweets.²¹ Tweets sent from the cone of totality used significantly more universal words like "we" and fewer individual words like "I."

Hermann Hesse said it well, if a bit verbosely, in 1926:

[W]henever I experience part of nature, whether with my eyes or another of the five senses, whenever I feel drawn in, enchanted, opening myself momentarily to its existence and epiphanies, that very moment allows me to forget the avaricious, blind world of human need, and rather than thinking of issuing orders, rather than acquiring or exploiting, fighting or organizing, all I do that moment is "wonder," like Goethe, and not only does this wonderment establish my brotherhood with him, other poets, and sages, it also makes me a brother to those wondrous things I behold and experience as the living world: butterflies and moths, beetles, clouds, rivers and mountains, because while wandering down the path of wonder, I briefly escape the world of separation and enter the world of unity.²²

Those feelings of noninvolvement, even when brief, are very good for our mental health. In lab experiments that induce awe, volunteers report a reduced awareness of day-to-day stress and feelings of being less hassled. Either because of improved moods or because of something particular to awe itself, volunteers engage in more generous behaviors, for example sharing money earned in computer games or folding more paper cranes for tsunami victims.²³

As Keltner puts it, "Awe is about as good for your mind and body as anything. It reduces inflammation, so it's good for your immune system. It activates the vagus nerve, which is good for your cardiovascular system. It's good for your basic digestive processes. And it's good for your mind. Even ten minutes of awe makes you feel less self-critical, less stressed,

less in pain, more creative, and more of just about all the things we care about in the well-being literature."²⁴

It's one thing to feel good in the moments during or right after awe. But emerging science also suggests that awe may be the primary mechanism by which people achieve long-term improvements in symptoms of PTSD, in addictive behaviors, and in feelings of fear around terminal illness.²⁵ Nowhere are these results more apparent than around the therapeutic use of psychedelics. In an extensive series of case-controlled studies at Johns Hopkins Center for Psychedelic & Consciousness Research, where patients are administered psilocybin (a derivative of "magic mushrooms"), more than half of them report cessation of clinical symptoms a year after treatment.²⁶ They also report enduring feelings of gratitude, life satisfaction, humility, and well-being. In the high-dose groups, most patients encounter a scientifically assessed "mystical" experience, which is very similar to high scores on the Awe Experience Scale. They see visual patterns, feel that time is suspended, believe they are receiving epiphanic truths, and experience feelings of unity together with a loss of ego. It is, essentially, awe on Miracle-Gro.

In a 2018 paper in the *International Review of Psychiatry*, Professor Peter Hendricks of the University of Alabama speculates that intense or "big" awe is transformative because it breaks down established patterns and narratives of self-concept. What's left in their place are new valuations of the self and a profound sense of belonging and connection. "For those suffering from depression, end-of-life distress, or other conditions marked by rumination," writes Hendricks, "attention diverted away from the self and toward the transcendent (e.g., family, community, the external universe, a belief system) is likely experienced as liberating if not sublime."²⁷

As Keltner and Haidt put in their 2003 paper, "awe-inducing events may be one of the fastest and most powerful methods of personal change and growth."²⁸

Awe researcher Michelle Shiota at Arizona State University agrees, believing that awe opens a rare window of opportunity to change our belief systems about the world and about ourselves. In those moments of amazement, we can reconsider everything we thought we knew. We can form new allegiances and beliefs. But this isn't always a good thing, she points out. Cult leaders, religious figureheads, celebrities, and politicians utilize the trappings of vastness and physical and moral beauty to gain or indoctrinate new followers.

As Shiota wrote in a 2021 paper, "Awe seems to produce a little earthquake in the mind, a moment of cognitive malleability offering a chance to expand and reconstruct one's mental model of the world. The model that emerges depends on what happens in the moments during and after

encountering the awe stimulus. We still know far too little about that phase of awe.”²⁹

Nevertheless, she recommends we go out of our way to experience awe, on our terms, often. “Keep your eyes open; notice the unexpected,” she suggests. “Seek out new music, literature, visual art, dance, or drama, and learn to appreciate these art forms more deeply . . . the goal is to deepen your understanding of the art form so that you recognize the revolution, the extraordinary achievement, when you encounter it.”³⁰

If big awe can be transformative, what about small awe, the kind we are more likely to run into on a regular basis?

Many psychologists say yes. While grieving his brother, Keltner sought out narratives of moral beauty, reading biographies of Gandhi. He made an effort to regularly lose himself in music, listening at home and occasionally attending symphonies. Hofstra University PhD student and awe researcher Marianna Graziosi sought relief over the death of a loved one by watching her toddler niece play in the gentle surf of the ocean.³¹ Michael Amster, a medical doctor and the coauthor of 2023’s *The Power of Awe*, writes of resolving his depression through finding small moments of natural beauty throughout the day. He calls this practice “micro-dosing awe.” He now prescribes daily awe to his patients suffering from mood disorders and chronic pain***.³²

In fact, says Amster, beauty is all around us. But we need to pay attention and look for it. As Walt Whitman, the patron saint of awe-seekers, wrote, “a leaf of grass is no less than the journey-work of the stars.”³³

When we practice tuning into daily moments of beauty, we can learn to get better at cultivating awe. At the same time, we’ll be cultivating a more resilient mindset grounded in curiosity, cognitive flexibility, mindfulness, and creativity, says Utah’s Paula Williams.³⁴

Once upon a time, it was easy to find awe. Our ancestors looked up at the sky every night. They sat around a fire and told stories of courage. They danced and sang together. They regularly encountered wild animals. They searched for and cherished fresh water and living plants. They worshipped and contemplated cycles of nature. Our capacity to experience awe no doubt helped our species survive, as it allowed individuals to recover from stress. Moreover, it helped bond us to each other to forge the cooperation necessary for our evolution.

If experiencing the sacred and the awesome are so good for us, and so good for our social fabric, what does it mean that we are living in a manner so disconnected from nature, and increasingly, from face-to-face interactions?

It means this: the burden now falls upon art and culture to help replace the daily awe we used to receive from the natural world and from each other. While the Milky Way is now less accessible, art has in some ways become more accessible than ever before. Online platforms and virtual exhibitions allow individuals from diverse backgrounds to encounter awe-inspiring creations regardless of their geographical location. The intersection of art and science has given rise to awe-inspiring installations that merge aesthetics, technology, and scientific principles. Viewers can experience full-sensory immersive wonders that offer windows into the mysteries of the universe and the complexity of ecological and human systems.

As a society, though, we need to keep improving access to the arts. Opportunities to experience awe should be more equitably distributed across race and class. To be our best human civilization, we should be expanding arts education not shrinking it. We should be teaching children how the natural world works and allowing them to spend more time in outdoor classrooms.

Encountering awe is central to the emotional and creative core of being human.

As Goethe once wrote, “I am here, that I may wonder.”³⁵ Mary Oliver agreed, writing, “Let me / keep my mind on what matters, / . . . which is mostly standing still and learning to be / astonished.”³⁶

1. This story is recounted in Dacher Keltner, *Awe: The New Science of Everyday Wonder and How It Can Transform Your Life* (New York: Penguin Press, 2023), xx–xxiv.

2. Dacher Keltner, personal communication with the author, April 2023.

3. Keltner, *Awe*, 36, 39–41.

4. Dacher Keltner and Jonathan Haidt, “Approaching Awe, a Moral, Spiritual, and Aesthetic Emotion,” *Cognition and Emotion* 17, no. 2 (March 2003): 300.

5. John Horgan, “Who Discovered the Mandelbrot Set,” *Scientific American*, March 13, 2009,
<https://www.scientificamerican.com/article/mandelbrot-set-1990-horgan/>.

6. Keltner, *Awe*, 10–18.

7. “Clay Houses: Boulder-Room-Holes (2007–2008),” Glenstone Museum, https://www.glenstone.org/wp-content/uploads/2021/11/QR-Code-Sheet_Goldsworthy_11-18-2021.pdf.

8. David B. Yaden et al., “The Development of the Awe Experience Scale (AWE-S): A Multifactorial Measure for A Complex Emotion,” *The Journal of Positive Psychology* 14, no. 4 (July 2018): 474–88.

9. ^9^ Paula G. Williams, personal communication with the author, February 2020.

- 10.** Ibid.
- 11.** Paula G. Williams et al. "Individual Differences in Aesthetic Engagement Are Reflected in Resting-State fMRI Connectivity: Implications for Stress Resilience," *NeuroImage* 179 (October 2018): 156–65, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6410354/>.
- 12.** Ibid.
- 13.** Paula G. Williams, personal communication with the author, April 2023.
- 14.** Oliver Sacks quoted in Ana Sandoiu, "How Music Helps the Heart Find Its Beat," *MedicalNewsToday*, April 17, 2018, <https://www.medicalnewstoday.com/articles/321535>.
- 15.** Williams, personal communication with author, April 2023.
- 16.** Andrew L. Thomson and Jaston T. Siegel, "Elevation: A Review of Scholarship on a Moral and Other-Praising Emotion," *The Journal of Positive Psychology* 12, no. 6 (2017): 628–38.
- 17.** Jake Eagle and Michael Amster, *The Power of Awe* (New York: Hachette Go, 2023), 79–80.
- 18.** Jennifer E. Stellar et al., "Positive Affect and Markers of Inflammation: Discrete Positive Emotions Predict Lower Levels of Inflammatory Cytokines," *Emotion* 15, no. 2 (April 2015).
- 19.** Maria Monroy and Dacher Keltner, "Awe as a Pathway to Mental and Physical Health," *Perspectives on Psychological Science* 18, no. 2 (2023): 309–20, doi: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10018061/>.
- 20.** Y. Bai et al., "Awe, the Diminished Self, and Collective Engagement: Universals and Cultural Variations in the Small Self," *Journal of Personality and Social Psychology* 113, no. 2 (August 2017): 185–209.
- 21.** Sean P. Goldy, Nickolas M. Jones, and Paul K. Piff, "The Social Effects of an Awesome Solar Eclipse," *Psychological Science* 33, no. 9 (2022): 1452–62, <https://doi.org/10.1177/09567976221085501>.
- 22.** Hermann Hesse, quoted in Maria Popova, "How to Be More Alive: Hermann Hesse on Wonder and the Proper Aim of Education," The Marginalian, accessed August 15, 2023, <https://www.themarginalian.org/2023/07/06/hermann-hesse-wonder-butterflies/>.
- 23.** Monroy and Keltner, "Awe as a Pathway to Mental and Physical Health."
- 24.** Keltner, personal communication with author, April 2023.
- 25.** Tingying Chi and Jessica A. Gold, "A Review of Emerging Therapeutic Potential of Psychedelic Drugs in the Treatment of Psychiatric Illnesses," *Journal of the Neurological Sciences* 411 (April 2020), article 116715.
- 26.** Albert Perez Garcia-Romeu, Assistant Professor, Johns Hopkins University School of Medicine, personal communication with the author, April 2023.
- 27.** Peter S. Hendricks, "Awe: A Putative Mechanism Underlying the Effects of Classic Psychedelic-Assisted Psychotherapy," *International Review of Psychiatry* 30, no. 4 (2018): 337.
- 28.** Keltner and Haidt, "Approaching Awe," 312.
- 29.** Michelle N. Shiota, "Awe, Wonder, and the Human Mind," *Annals of the New York Academy of Sciences* 1501 (October 2021): 87.
- 30.** Ibid., 88.
- 31.** Marianna Graziosi, PhD candidate, Hofstra University, personal communication with the author, April 2023.
- 32.** Eagle and Amster, *The Power of Awe*, 29.
- 33.** Walt Whitman, "Song of Myself," section 31 (1892), Poetry Foundation, accessed August 15, 2023, <https://www.poetryfoundation.org/poems/45477/song-of-myself-1892-version>.
- 34.** Paula G. Williams, personal communication with author, February 2020.
- 35.** Johann Wolfgang von Goethe quoted in Popova, "How to Be More Alive."
- 36.** Mary Oliver, "Messenger," in *Thirst* (Boston: Beacon Press, 2006), 1.

Topophilia

People and Place

Popularized by the Chinese-born American geographer Yi-Fu Tuan in 1974, the term *topophilia* describes the affective bond between people and place or physical environment.¹ Topophilia, Tuan wrote, "varies greatly in emotional range and intensity," such as fleeting visual pleasure, a sensual connection that delights the senses, a fondness for that which we call home, and joy on account of well-being and vitality.² Topophilia emphasizes our attachment to place and the symbolic meanings that underlie this attachment. It encompasses both the physical and psychological dimensions of our relationship with the environment we live in.

One powerful manifestation of topophilia is the connection between individuals and their homeland. More than just a physical location, homeland embodies a complex web of personal and collective identities, cultural values, and historical narratives. It frequently evokes a deeper set of attachments than those predicated purely on the visual. The bond between people and their native land is often forged through generations, shaped by shared experiences, traditions, and a sense of continuity.

One's homeland can act as a source of inspiration, shaping an individual's perception of themselves and the world around them. It provides a sense of rootedness, a place where one feels deeply connected, understood, and welcomed. The connection to homeland nurtures a profound sense of attachment, fostering a longing for the familiar and a desire to protect and preserve the essence of one's cultural and geographical origins. It is a fundamental part of human existence, contributing to a sense of identity and shaping our relationship with the world. The following projects explore the connection between people and places. Each reflects a native ecology or landscape, conveys a distinct sense of one's culture or homeland, and supports a deeper understanding of the multiple manifestations of biophilia.

A collaboration between Terrol Dew Johnson, a Tohono O'odham artist and the New York- and Tucson-based design studio Aranda\Lasch, the *Desert Paper* series embodies the rich material history of the vast Sonoran Desert (cats. xx-xx). This unique ecosystem, abundant with biologically diverse resources, has been inhabited by Indigenous peoples for millennia and holds significant cultural and historical importance to the Tohono O'odham Nation.³ To create the paper baskets, Johnson gathers vegetation and other natural materials, including agave fiber, copper, creosote, jute, mesquite bark, volcanic rock, and wildflowers, among others, that are endemic to the Sonoran Desert from various locations around Tucson, and Sells, Arizona. Johnson skillfully combines these various elements with a natural pulp paper, which is then carefully draped over bent screens to form expressive and irregularly shaped baskets. Each vessel in the series is a unique work of art, characterized by its distinct texture, color, and appearance.



Aranda\Lasch and Terrol Dew Johnson,
Desert Paper 05, 2022.



McDowell Sonoran Sunset.

Desert Paper celebrates the rugged, yet fragile, beauty of the Sonoran Desert, the very landscape from which it is created, while also honoring the profound human connections to this environment (fig. 1). For Johnson, utilizing these regional and culturally traditional materials is a way of reaffirming the Native identity, specifically that of the Tohono O'odham people, of these baskets, while forging a connection between these experimentally shaped vessels and the ongoing tradition of Native craft and knowledge-sharing.



gt2P (great things to People), *Remolten N1: Revolution Stools and Aux Table*, 2016-17.



Osorno Volcano, Chile.

The work of Santiago-based design collective gt2P (great things to People) often reflects the natural landscapes of their home country, Chile. Bordered by the majestic Andes Mountains in the east and the vast Pacific Ocean in the west, Chile lays claim to the second largest and most active chain of volcanoes in the world. The *Remolten N1: Revolution* series by gt2P pays homage to Chile's volcanic landscapes and celebrates nature's ability to create beauty through volcanic activity (cat. xx). With each eruption, magma emerges from the earth's surface. Molten lava transforms the existing terrain and cools to form an entirely new landscape until the next eruption occurs. Within the confines of their studio, gt2P replicates this dynamic natural activity. The process begins with the harvesting of basaltic andesite, a lightweight and porous black rock, from Chile's Osorno Volcano, located in the Andes Mountain range roughly 650 miles south of Santiago (fig. 2). A landmark of the Los Lagos region, the 8,700-foot-high snow-topped landform towers over Todo los Santos and the shores of Llanquihue Lake. While Osorno is one of the most active volcanoes of the southern Chilean Andes, it has not erupted since 1869. Osorno's activity is dominantly effusive, with magma rising through its surface and flowing out as viscous lava.

After collecting the volcanic stone, gt2P grinds it into a powder, applies it by hand to the surface of stoneware structures, and then fires the objects in a kiln, treating the volcanic powder as a ceramic glaze. Through extensive experimentation, gt2P discovered that the melting points of certain volcanic rock perfectly coincide with the firing temperature of porcelain. This convergence enables the lava to melt as the ceramic hardens within a specific temperature range. By adjusting the firing process at various temperature curves, they control the resulting colors, resistance, and surface texture, yielding an array of unique objects such as planters, side tables, stools, mirrors, and chairs. Each piece showcases distinctive tactile characteristics, ranging from smooth to dripped and rough finishes (fig. 3).



<https://vimeo.com/911666952>
gt2P, *Remolten* process, 2016. © Gt2P Spa.

Imbued with emotion and the spirit of the natural world, artist Alexandra Kehayoglou's lush and tactile carpets depict the disappearing and decimated ecosystems of her native Argentina. Kehayoglou's hand-tufted landscapes also draw attention to the beauty and importance of safeguarding her homeland's fragile ecological resources. "If activism has the task of ringing the alarm, art and design can offer ways to connect us with something beyond. Something more spiritual," Kehayoglou explains. "We must hold on to hope . . . hope offers a path forward."⁴

Many of Kehayoglou's carpets examine Argentina's *pastizales*, or grasslands, a once vast and fertile plain that covered a significant expanse of the country, from the Atlantic Ocean to the Andes Mountains. Argentina's grasslands biome has been severely transformed by human development, including the long-forgotten region buried beneath bustling Buenos Aires. Kehayoglou began portraying the pastizales as a way of recounting and acknowledging the past. *Bajo* corresponds to a small fragment of the Paraná Delta, an exceptionally biodiverse landscape in eastern Argentina that lies near the country's largest metropolitan areas (cat. xx). The Paraná Delta faces irreversible ecological change due to urban growth, unsustainable agricultural practices, and the

consequences of climate change. The carpet is especially personal, as it documents an island in the Paraná wetlands where Kehayoglou lived with her family during the COVID-19 pandemic.



Alexandra Kehayoglou, *Bajío*, 2024. Hand tufted wool, 118 × 147½ in.

Kehayoglou's connection with her homeland, however, is both natural—drawn from the landscape—and manmade, a product of her family's multigenerational manufacturing presence in Argentina. Kehayoglou's family has operated a factory that has been making industrial carpets for more than sixty years. In this way, her work represents the reciprocal dynamics of human ecology theory. Both halves come together as Kehayoglou recreates ephemeral native landscapes with a physical manifestation of her family's history. Tuan's concept of topophilia exemplifies the complex dynamic of Kehayoglou's artistic practice: "the affective bond between people and place or setting. Diffuse as concept, vivid and concrete as personal experience."⁵

Spanish artist and designer Nacho Carbonell's *One-Seater Concrete Tree* pays tribute to the sun-soaked Mediterranean landscape of his childhood home (cat. xx). Born in Spain,

Carbonell spent his formative years with his family in Valencia before moving to Eindhoven in 2005 to pursue his studies. It was only after leaving Valencia that Carbonell discovered the fundamental role the region's natural environment played in shaping his identity. In response, Carbonell created a body of work that explores his memories of the geography that defines his previous home, from the picturesque Mediterranean coastline to the rugged mountain ranges. Carbonell explains the influence of these natural elements, "I just take them, and I appropriate them because they are part of me, and I use them. I feel entitled to say, 'Okay, because we grew together, I can use you in my work to create this narrative for others, to let them know that you exist here.'"⁶



Nacho Carbonell, *One-Seater Concrete Tree*, 2022. Metal mesh, cork, steel, concrete, and light fittings, 139¾ × 74¾ × 112¼ in.

One-Seater Concrete Tree is a large-scale light sculpture shaped as a sinuous tree. Its highly textured, bulbous metal mesh canopy appears to have organically sprouted from the rugged concrete seat designed for one person. Organic and tactile, *One-Seater Concrete Tree* possesses a vitality that suggests a living organism, achieved through Carbonell's use of various textures and man-made materials such as metal mesh, steel, and concrete. As viewers take a seat, the functional sculpture comes alive, arousing their imagination and transporting them to the semiarid Mediterranean landscape that Carbonell vividly remembers, or perhaps triggering memories of their own. Carbonell clarifies, "I want them to look at their own context, to open the door and they are able to see that beauty exists in any other part of the world. We only need to look outside."⁷ Ultimately, Carbonell's artistic vision is an emotional response to his own past, expressed through experimental forms and materials. Drawing from his cherished memories of his family home, he has created a tactile and functional self-portrait, which serves as a physical manifestation of the natural beauty that characterizes eastern Spain.

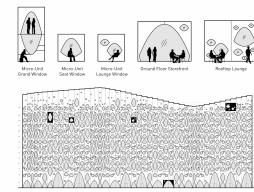


Studio Gang, Populus, Denver, Colorado, digital rendering, 2020.

Located in downtown Denver, Studio Gang's Populus evokes the alluring features of a stand of aspen trees (cat. xx and detail below). The architecture firm's thirteen-story, 135,000-square-foot hotel takes its name from *Populus tremuloides*, commonly known as quaking aspen, which is the most widely distributed tree in North America and an instantly recognizable symbol of Colorado. The texture and rhythm of the hotel's sculptural façade are strongly tied to its function. A series of forty-six thin vertical scallops, each as wide as a typical guest room, envelop the entire structure. A captivating array of five distinctive window types, from dramatic ground level arches to smaller openings, punctuate the hotel's exterior surface (fig. 4). Their shapes are inspired by the distinguishing patterns found on aspen trunks. As the trees grow, they shed their lower branches, leaving behind peculiar eye-shaped marks on their thin, papery bark. The windows are also designed to respond to the interior spaces and functions. Some rooms feature windowsills that integrate seating or desks, while at the building's base, thirty-foot-high openings frame entrances and provide views into public spaces. As Finnish architect Juhani Pallasmaa once remarked, "Architecture is essentially an extension of nature into the man-made realm."⁸ Studio Gang's Populus captures the essential attributes of a serene grove of majestic, straight, white-barked aspen trees, right in the heart of the city of Denver.



Studio Gang, Populus, Denver, Colorado, digital rendering, 2020.



Studio Gang, Populus, Denver, Colorado, digital rendering, 2020.

Completed in 2021, the Nanjing Zendai Himalayas Center by Beijing-based MAD Architects, combines urban life with the emotional resonance of *shan shui*, a traditional style of Chinese landscape painting (cat. xx and detail). *Shan shui* paintings often depict misty mountains and flowing rivers with delicate brushwork to convey a sense of tranquility and contemplation. The goal of *shan shui* painting is not to create a realistic representation but to capture the essence and spirit of the natural world. It is not important whether the painted colors and shapes look exactly like the real object.



MAD Architects, Nanjing Zendai Himalayas Center, Nanjing, China, 2012–2021.



MAD Architects, Nanjing Zendai Himalayas Center, Nanjing, China, 2012–2021.

Located in the capital of China's eastern Jiangsu province, the Nanjing Zendai Himalayas Center is a 138-acre urban development consisting of commercial, hotel, office, and residential spaces. The complex is made up of thirteen mountainous towers intended to evoke a natural landscape. Placed along the edge of the site, the lofty structures are delineated by their vertical white glass fins that flow like waterfalls. The development's elevated vertical park features meandering pathways that serve as an invitation for people to wander among water features, gardens, and buildings. At the center of the site is a village-like community of low buildings, connected by footbridges and nestled into the landscape. By bringing people up from the busy street level, MAD has created an inviting landscape integrating the different elements (fig. 5).

The Nanjing Zendai Himalayas Center seeks to challenge the prevailing typology of rectangular, homogenous, linear structures that have shaped our urban environment. In describing cities as "steel concrete forests," Ma suggests that our urban environments fail to match the thriving ecosystem of a forest and argues that a forest requires a state of symbiosis between every organism.⁹



<https://vimeo.com/911666850>

MAD Architects, Nanjing Zendai Himalayas Center, Nanjing, China, 2012–21. Courtesy of the artists. © MAD Architects. Video by Blackstation, 2022.

In today's increasingly urbanized and globalized world, the concept of topophilia takes on renewed significance. As individuals and communities become more disconnected from the natural environment and uprooted from their traditional homelands, the need for a sense of place and belonging

grows stronger. Topophilia offers a framework for understanding and nurturing our emotional connection to the physical spaces we inhabit. It reminds us of the profound impact that our surroundings have on our well-being, identity, and sense of rootedness. By exploring the diverse manifestations of topophilia through art, design, and architecture, we can foster a deeper appreciation for the places we call home and cultivate a more sustainable and harmonious relationship with our environment.

Title image credit: gt2P (great things to People), detail of *Remolten N1: Revolution Stools and Aux Table*, 2016–17. Stoneware and volcanic lava, variable dimensions. Denver Art Museum: Funds from Alianza de las Artes Americanas and Design Council of the Denver Art Museum, 2017.89–91. Photograph courtesy of and © Denver Art Museum.

1. Yi-Fu Tuan, *Topophilia: A Study of Environmental Perception, Attitudes, and Values* (New York: Columbia University Press, 1974).
2. Tuan, *Topophilia*, 247.
3. Historically, the Tohono O'odham inhabited an enormous area of land in the Southwest, extending south to Sonora, Mexico, north to central Arizona, west to the Gulf of California, and east to the San Pedro River. This land was known as the Papagueria, and it had been home to the O'odham for thousands of years. Today, the federally recognized Tohono O'odham Nation occupies 2.8 million acres of tribal land within the Sonoran Desert in south central Arizona. Official Web Site of the Tohono O'odham Nation, accessed August 8, 2023, <http://www.tonation-nsn.gov>.
4. Anna Carnick, "Alexandra Kehayoglou on Design & Nature," Design Miami, September 24, 2021, <https://shop.designmiami.com/blogs/news/alexandra-kehayoglou-on-design-nature>.
5. Tuan, *Topophilia*, 4.
6. Carpenters Workshop Gallery, "Nacho Carbonell's Inaugural Exhibition for Carpenters Workshop Gallery in Los Angeles," September 26, 2022, video, 2:08, <https://youtu.be/yWQr6jebkrQ>.
7. Ibid, 2:29.
8. Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses* (Hoboken, NJ: John Wiley & Sons, 2012), 44.
9. "MAD Architects: Absolute Towers Completed," Designboom, December 12, 2012, <https://www.designboom.com/architecture/mad-architects-absolute-towers-nearing-completion/>.



Aranda\Lasch and Terrol Dew Johnson, *Desert Paper 02*, 2022. Desert globemallow, agave fiber, and jute, 16 × 11 × 9½ in.



Aranda\Lasch and Terrol Dew Johnson, *Desert Paper 05*, 2022. Desert marigold, jute, and abaca; 19½ × 13 × 10 in.



Aranda\Lasch and Terrol Dew Johnson

Aranda\Lasch

Established 2003, New York and Tucson, Arizona
Benjamin Aranda, American, born 1973
Chris Lasch, American, born 1972

Terrol Dew Johnson

Tohono O'odham, born 1973, active in Sells, Arizona

Desert Paper 02

2022

Desert globemallow, agave fiber, and jute

16 × 11 × 9¾ in. (40.6 × 27.9 × 24.8 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2022.160. © Aranda\Lasch and Terrol Dew Johnson. Photo courtesy of Volume Gallery.

Aranda\Lasch and Terrol Dew Johnson

Aranda\Lasch

Established 2003, New York and Tucson, Arizona
Benjamin Aranda, American, born 1973
Chris Lasch, American, born 1972

Terrol Dew Johnson

Tohono O'odham, born 1973, active in Sells, Arizona

Desert Paper 05

2022

Desert marigold, jute, and abaca

19½ × 10½ × 10 in. (48.6 × 27.6 × 25.4 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2022.161. © Aranda\Lasch and Terrol Dew Johnson. Photo courtesy of Volume Gallery.

Aranda\Lasch and Terrol Dew Johnson

Aranda\Lasch

Established 2003, New York and Tucson, Arizona
Benjamin Aranda, American, born 1973
Chris Lasch, American, born 1972

Terrol Dew Johnson

Tohono O'odham, born 1973, active in Sells, Arizona

Desert Paper 09

2022

Creosote and jute

Aranda\Lasch and Terrol Dew Johnson, *Desert Paper 09*, 2022. Creosote and jute, 15 × 9 × 9 in.

Alexandra Kehayoglou

Argentine, born 1981, active in Buenos Aires, Argentina, and Athens, Greece

Santa Cruz River

2017

Wool

382½ × 165¾ in.

National Gallery of Victoria, Melbourne: Purchased NGV Foundation with the assistance of Michael and Andrew Buxton from MAB Corporation Pty Ltd, and the Andrew and Geraldine Buxton Foundation, 2018. © Alexandra Kehayoglou. Photograph by National Gallery of Victoria, Melbourne



Alexandra Kehayoglou's hand-tufted, textural rugs are slow and intimate representations of history and landscape, ranging in size from individual prayer rugs to carpeting entire rooms. Kehayoglou considers her laborious and precise weaving process a connection to an extensive ancestral tradition, especially to her grandmother, who immigrated to Buenos Aires from Isparta, in present-day Turkey, with few possessions and a loom. Simultaneously, the lush terrains of Kehayoglou's textiles connect both the artist and the viewer to nature in her translation of topography, water, vegetation, and memory into tactile piles of richly colored wool yarn.

economic and industrial pressures and exploitation, and her rugs function as both a memorial and a call for environmental awareness. One of her most monumental works depicts the Santa Cruz River, Argentina's last glacial river and a sacred space for the Mapuche people, where two hydroelectric dams are planned for construction (fig. 1). To become familiar with these landscapes Kehayoglou embarks on extended research trips where she takes photographs, makes sketches, and color matches yarn samples.¹ For 2023's *Bajío*, the artist drew on a more prolonged and encompassing type of research: Kehayoglou and her family moved to a small island in the wetlands during the COVID-19 pandemic. Immersed in the landscape, Kehayoglou witnessed firsthand the ecological disturbances in the region, as well as the perseverance of nature. The specific area represented by *Bajío* exemplifies this, as the river carries seeds of plants from the denser northern wetlands, depositing them into a changing landscape. The patches of texture and color in *Bajío*, recreated in her typical loving detail, can be viewed as a



Alexandra Kehayoglou, *Santa Cruz River*, 2017. Wool, 382½ × 165¾ in.

Many of Kehayoglou's chosen landscapes are threatened by

Alexandra Kehayoglou, *Santa Cruz River*, 2017. Wool, 382½ × 165¾ in.

Studio Gang
Established 1997, Chicago

Populus, Denver, Colorado
2019–24

Digital rendering

© and courtesy of Studio Gang



Studio Gang, Populus, Denver, Colorado, digital rendering, 2020.

For architect Jeanne Gang and her eponymous firm Studio Gang, design and architecture should make cities better places. This does not just apply to the cosmetic alteration of a skyline but to a reduction of environmental harm and a concrete improvement in the lives of its users. Studio Gang calls this approach “actionable idealism,” and it guides their research-based and localized process.¹



Aspen Grove.

In Denver, Studio Gang’s Populus hotel rises from a triangular junction of three busy Denver streets. The building’s bright façade and varied, oval-shaped windows are a motif that is familiar for many Coloradans: they resemble the white bark and dark “eyes” of aspen trees. On an aspen, these

characteristic marks are left behind as the trees self-prune, shedding their lower branches to expose more of the photosynthetic bark, which absorbs light and energy year-round. For Populus, the eye-shaped windows, the largest of which are thirty feet high, accomplish the same effect, providing light, views, and, for some hotel rooms, built-in seating. Extended “lids” over each window redirect rainwater and create shade as an efficient response to the harsh Denver climate; these considerations of local and environmental impacts can also be seen in the architects’ decision to have no onsite parking, encouraging visitors to bike, use public transit, or explore the neighborhood on foot.

Aesthetics are not the only similarity between the hotel and aspens. A cluster of aspens seems to be made of many individual trees (fig. 1), but they are all extensions of the same vast, underground root network, a single part of a larger organism. In the same way, Populus is informed by and will impact downtown Denver as a whole, despite being just one building. By drawing on a quintessential aspect of the regional environment, Studio Gang designed the building to resonate with local residents,

Close-Knit Flower Sack

Cedar Sigo

seedless golden tears,
ferns bound to flesh at off angles,
busted out rez towns,
hemming us in with a cloak of mosses.

The orchestration needs tufts of black shadow,
incidental notes to weigh it down, the blanket depicts a field and lo
I said we once formed kingdoms at the foot of a vanishing stone.

What was it I said that they said?
"Vividness is Self>Selecting"
several points flowing together in stonework.

I only use words like stones because we are far away.
We corrupt a landscape through the planting of foreign flowers.
Borders are so often theorized as division
wending along with a spot of sunlight,
"The bone frame was made
for
no such shock, knit within
terror
yet the skeleton stood up to it."

They are not artifacts but fit to our hand,
our daily voice,
the short mouth line erased.

The marsh revels in its glitter
and occasional cranberry.

The subject is left purposely unstable,
we will not be robbed of continuum.

The shells fly out from the dress,
on strings, according
to demands left in the music.

Certain stories are told in full frog regalia,

the music is allowed its wet set of wings

and room to lie down.

Words arranged for prayer

are in fact geometric forms

or portraits of poets themselves,

uncovering the dictates of a graven line.

Orlando, are we even

allowing ourselves the present

moment anymore?

There are still two blankets that sit on either

Reimagining can take place at the root of time,

out of all necessity

we convert the elements

as a matter of course.

Checklist

Objects are listed alphabetically by designer.

Aranda\Lasch and Terrol Dew Johnson

Aranda\Lasch

Established 2003, New York and Tucson, Arizona

Benjamin Aranda, American, born 1973

Chris Lasch, American, born 1972

Terrol Dew Johnson

Tohono O'odham, born 1973, active in Sells, Arizona

Desert Paper 02

2022

Desert globemallow, agave fiber, and jute

16 × 11 × 9¾ in. (40.6 × 27.9 × 24.8 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2022.160. © Aranda\Lasch and Terrol Dew Johnson. Photo courtesy of Volume Gallery.



Aranda\Lasch and Terrol Dew Johnson, *Desert Paper 02*, 2022. Desert globemallow, agave fiber, and jute, 16 × 11 × 9¾ in.

Aranda\Lasch and Terrol Dew Johnson

Aranda\Lasch

Established 2003, New York and Tucson, Arizona

Benjamin Aranda, American, born 1973

Chris Lasch, American, born 1972

Terrol Dew Johnson

Tohono O'odham, born 1973, active in Sells, Arizona

Desert Paper 05

2022

Desert marigold, jute, and abaca

19½ × 10¾ × 10 in. (48.6 × 27.6 × 25.4 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2022.161. © Aranda\Lasch and Terrol Dew Johnson. Photo courtesy of Volume Gallery.



Aranda\Lasch and Terrol Dew Johnson, *Desert Paper 05*, 2022. Desert marigold, jute, and abaca, 19½ × 13 × 10 in.

Aranda\Lasch and Terrol Dew Johnson

Aranda\Lasch

Established 2003, New York and Tucson, Arizona

Benjamin Aranda, American, born 1973

Chris Lasch, American, born 1972

Terrol Dew Johnson

Tohono O'odham, born 1973, active in Sells, Arizona

Desert Paper 09

2022

Creosote and jute

13 $\frac{3}{8}$ × 10 $\frac{1}{4}$ × 6 $\frac{3}{4}$ in. (34 × 26 × 17.1 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2022.162. © Aranda\Lasch and Terrol Dew Johnson. Photo courtesy of Volume Gallery.



Aranda\Lasch and Terrol Dew Johnson, *Desert Paper 09*, 2022. Creosote and jute, 15 × 9 × 9 in.

**Andreea Avram Rusu
Botanica Chandelier**

2023

Glass, brass, steel, leather, and LED

135 × 56 × 33 in.

Courtesy of the artist and Wexler Gallery. © TBC Photograph by Josh Gaddy courtesy of Wexler Gallery.



Andreea Avram Rusu, *Botanica Chandelier*, 2023.
Glass, brass, steel, leather, and LED, 135 × 56 × 33
in.

Ronan Bouroullec and Erwan Bouroullec

Ronan Bouroullec, French, born 1971, active in Paris
Erwan Bouroullec, French, born 1976, active in Paris

Algues

2004

Injection-molded plastic

Dimensions variable, each component 12½ × 10 in. (31.8 × 25.4 cm)

Manufactured by Vitra, Birsfelden, Switzerland.

Exhibition funds from the Denver Art Museum. © Ronan Bouroullec and Erwan Bouroullec.
Photograph © Paul Tahan and R. Bouroullec and E. Bouroullec.



Ronan Bouroullec and Erwan Bouroullec, *Algues*,
2004. Injection-molded plastic; dimensions variable,
each component 12½ × 10 in. Manufactured by
Vitra, Birsfelden, Switzerland.

Daniel Brown

British, born 1977, active in London

Secret Garden

2008, updated 2015

Interactive software program

Dimensions variable

Denver Art Museum: Funds from the Ralph L. and Florence R. Burgess Trust, 2015.267



Daniel Brown, *Secret Garden*, 2008, updated 2015.
Interactive software program; variable dimensions.

Humberto Campana and Fernando Campana

Humberto Campana, Brazilian, born 1953, active in São Paulo
Fernando Campana, Brazilian, 1961–2022

Bulbo

2019

Leather and fabric

59 × 47 × 48 in. (149.9 × 119.4 × 121.9 cm)

Manufactured by Louis Vuitton, Paris, France for Objets Nomades

Louis Vuitton Collection. © Humberto Campana and Fernando Campana



Humberto Campana and Fernando Campana, *Bulbo*
Chair, 2019. Fabric and leather, 59 × 47 × 48 in.
Manufactured by Louis Vuitton, Paris, France for
Objets Nomades.

Nacho Carbonell

Spanish, born 1980, active in Eindhoven, Netherlands

One-Seater Concrete Tree

2022

Metal mesh, cork, steel, concrete, and light fittings

139¾ × 74¾ × 112¼ in. (355 × 189.9 × 285.1 cm)

Courtesy of Carpenters Workshop Gallery. © Nacho Carbonell. Photo by Ronald Smiths.



Nacho Carbonell, *One-Seater Concrete Tree*, 2022.

Metal mesh, cork, steel, concrete, and light fittings,
139¾ × 74¾ × 112¼ in.

Álvaro Catalán de Ocón

Spanish, born 1975, active in Madrid

Plastic River No. 6: Ganges

2022

Hand-tufted recycled plastic PET (polyethylene terephthalate)

118 × 158 in. (299.7 × 401.3 cm.)

Manufactured by GAN, Valencia, Spain

Courtesy of GAN by Gandia Blasco Group



Álvaro Catalán de Ocón, *Plastic River No. 6: Ganges*, 2022. Hand-tufted recycled plastic PET (polyethylene terephthalate), 118 × 158 in. Manufactured by GAN, Valencia, Spain.

Sandra Davolio

Italian, born 1951, active in Copenhagen, Denmark

Coral Flower IV

2022

Porcelain

9¾ × 11 in. dia. (24.8 × 27.9 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2023.6. © Sandra Davolio. Photograph by Ole Akhøj with image editing by Lorie Reilly, courtesy of J. Lohmann Gallery.



Sandra Davolio, *Coral Flower IV*, 2022. Porcelain,
9¾ × 11 in. dia.

Sandra Davolio

Italian, born 1951, active in Copenhagen, Denmark

Coral Flower I

2023

Porcelain

16½ × 10 in. dia. (41.9 × 25.4 cm)

Courtesy of J. Lohmann Gallery, New York. © Sandra Davolio. Photography by Anna Meldal.



Sandra Davolio, *Coral Flower I*, 2023. Porcelain, 16½ × 10 in. dia.

Sandra Davolio

Italian, born 1951, active in Copenhagen, Denmark

Vessel with Blue Edges III

2023

Porcelain

8 × 8 in. dia. (20.3 × 20.3 cm dia.)

Courtesy of J. Lohmann Gallery, New York. © Sandra Davolio. Photography by Anna Meidal.



Sandra Davolio, *Vessel with Blue Edges III*,
Porcelain, 8 × 8 in. dia.

Jason DeMarte

American, born 1973, active in Ann Arbor, Michigan

Arcadia

2021

Pigmented ink print

Dimensions variable

Courtesy of RULE Gallery, Denver. © Jason DeMarte.



Jason DeMarte, *Arcadia*, 2021. Pigmented ink print,
dimensions variable.



DRIFT, *Meadow*, 2017. Aluminum, stainless steel, printed fabric, LEDs, and robotics; variable dimensions.

DRIFT

Established 2007, Amsterdam

Meadow

2017

Site-specific kinetic sculpture with aluminum, stainless steel, printed fabric, LEDs, and robotics

Dimensions variable

Represented by Pace Gallery. © 2023 DRIFT. Photo by Oriol Tarridas, courtesy Superblue Miami.



DRIFT, *Meadow*, 2017. Aluminum, stainless steel, printed fabric, LEDs, and robotics; variable dimensions.

Marc Fish

British, born 1971, active in Newhaven, England

Ethereal Double Console

2022

Sycamore veneers and resin

39 $\frac{3}{8}$ × 110 $\frac{1}{4}$ × 15 $\frac{3}{4}$ in. (100 × 280 × 40 cm)

Courtesy of Sarah Myerscough Gallery. © Marc Fish. Photo courtesy James Harris and Sarah Myerscough Gallery.



Marc Fish, *Ethereal Double Console*, 2022.
Sycamore veneers and resin, 39 $\frac{3}{8}$ × 110 $\frac{1}{4}$ × 15 $\frac{3}{4}$ in.

Fredrikson Stallard

Established 2005, London

Patrik Fredrikson, Swedish, born 1968

Ian Stallard, British, born 1973

Species 1

2015

Polyurethane, rubber, fiberglass, and polyester

36 × 98 × 59 in. (91.4 × 248.9 × 149.9 cm)

Courtesy of David Gill Gallery. © Fredrikson Stallard. Images courtesy David Gill Gallery.
Photo by Alejandro Olaya Torres.



Fredrikson Stallard, *Species 1*, 2021. Polyurethane, rubber, fiberglass, and polyester, 36 × 98 × 59 in.

Fredrikson Stallard

Established 2005, London
Patrik Fredrikson, Swedish, born 1968
Ian Stallard, British, born 1973

Rock #22

2022

Polyurethane, pigment, and steel

21 × 15 × 7 in. (53.3 × 38.1 × 17.8 cm)

Courtesy of the artists. Artwork and image © and courtesy Fredrikson Stallard.



Fredrikson Stallard, *Rock #22*, 2022. Polyurethane, pigment, and steel, 21 × 15 × 7 in.

Fredrikson Stallard

Established 2005, London

Patrik Fredrikson, Swedish, born 1968

Ian Stallard, British, born 1973

Rock #23

2022

Polyurethane, pigment, and steel

24 × 12 × 7 in. (61 × 30.5 × 17.8 cm)

Courtesy of the artists. Artwork and image © and courtesy Fredrikson Stallard.



Fredrikson Stallard, *Rock #23*, 2022. Polyurethane, pigment, and steel, 24 × 12 × 7 in.

Front Design

Established 2004, Stockholm

Curve Lamps

2018–19

Painted metal base and painted glass shade

Dimensions variable

Manufactured by Zero Lighting, Nybro, Sweden

Denver Art Museum: Funds from the Colonial Dames of Colorado, by exchange, 2023.186–192. © Front. Image courtesy of Zero Lighting.



Left to right:

Curve Floor Lamp, 2018–19

Painted metal base and painted glass shade
42½ × 7¾ in. diam. (107.3 × 19.7 cm diam.)

Manufactured by Zero Lighting,
Nybro, Sweden

Denver Art Museum: Funds from
the Colonial Dames of Colorado, by
exchange, 2023.186

Curve Floor Lamp, 2018–19

Painted metal base and painted metal shade
62½ × 5¾ in. diam. (158.8 × 14.9 cm diam.)

Manufactured by Zero Lighting,
Nybro, Sweden

Denver Art Museum: Funds from
the Colonial Dames of Colorado, by
exchange, 2023.187

Curve Table Lamp, 2018–19

Painted metal base and painted glass shade
24½ × 7¾ in. diam. (62.2 × 19.7 cm diam.)

Manufactured by Zero Lighting,
Nybro, Sweden

Denver Art Museum: Funds from
the Colonial Dames of Colorado, by
exchange, 2023.188

Curve Table Lamp, 2018–19

Painted metal base and painted metal shade
19 × 11¾ in. diam. (48.3 × 29.9 cm diam.)

Manufactured by Zero Lighting,
Nybro, Sweden

Denver Art Museum: Funds from
the Colonial Dames of Colorado, by
exchange, 2023.189

Curve Floor Lamp, 2018–19

Painted metal base and painted metal shade
42½ × 5¾ in. diam. (107.3 × 14.9 cm diam.)

Manufactured by Zero Lighting,
Nybro, Sweden

Denver Art Museum: Funds from
the Colonial Dames of Colorado, by
exchange, 2023.190

Curve Floor Lamp, 2018–19

Painted metal base and painted metal shade
62½ × 5¾ in. diam. (158.8 × 14.9 cm diam.)

Manufactured by Zero Lighting,
Nybro, Sweden

Denver Art Museum: Funds from
the Colonial Dames of Colorado, by
exchange, 2023.191

Curve Floor Lamp, 2018–19

Painted metal base and painted

Front Design, *Curve Lamps*, 2018–19. Painted metal base and painted glass or metal shades, dimensions variable. Manufactured by Zero Lighting, Nybro, Sweden.

gt2P (great things to People)

Established 2009, Santiago, Chile

Remolten N1: Revolution Stools and Aux Table

2016–2017

Stoneware and volcanic lava

Dimensions variable

Denver Art Museum: Funds from Alianza de las Artes Americanas and Design Council of the Denver Art Museum, 2017.89–91. © gt2P (great things to People).

Left to right:



Remolten N1: Revolution Stool L, Quitralco, Osorno Volcano, 2016
Stoneware and basaltic andesite
17¾ in. high (45.1 cm)

Denver Art Museum: Funds from Alianza de las Artes Americanas and Design Council of the Denver Art Museum, 2017.89

Remolten N1: Revolution Aux Table M, Mahuanco, Osorno Volcano, 2017
Stoneware and basaltic andesite

8 × 11¾ in. diam. (20.3 × 29.9 cm)

Denver Art Museum: Funds from Alianza de las Artes Americanas and Design Council of the Denver Art Museum, 2017.90

Remolten N1: Revolution Stool L, Mahuanco, Osorno Volcano, 2017
Stoneware and basaltic andesite
17¼ × 12½ in. diam. (43.8 × 31.8 cm)

Denver Art Museum: Funds from Alianza de las Artes Americanas and Design Council of the Denver Art Museum, 2017.91

Zaha Hadid

Iraqi British, born Iraq, 1950–2016

Tau Vases

2015



Tau Vase, 2015

Bardiglio Nuvolato marble

7 $\frac{1}{8}$ × 13 $\frac{3}{8}$ in. dia. (19.7 × 34 cm dia.)

Manufactured by Citco, Rivoli

Veronese, Italy

Courtesy of CITCO USA CORP

Manufactured by Citco, Rivoli

Veronese, Italy

Courtesy of CITCO USA CORP

Tau Vase, 2015

Bianco Carrara marble

18 $\frac{1}{8}$ × 15 $\frac{3}{4}$ in. dia. (47.9 × 40 cm dia.)

Manufactured by Citco, Rivoli

Veronese, Italy

Courtesy of CITCO USA CORP

Tau Vase, 2015

Statuario marble

7 $\frac{1}{8}$ × 17 in. dia. (20 × 43.2 cm dia.)

Manufactured by Citco, Rivoli

Veronese, Italy

Courtesy of CITCO USA CORP

Tau Vase, 2015

Bardiglio Nuvolato marble

29 $\frac{1}{8}$ × 19 $\frac{1}{8}$ in. dia. (74 × 49.9 cm dia.)

Manufactured by Citco, Rivoli

Veronese, Italy

Courtesy of CITCO USA CORP

Tau Vase, 2015

Bianco Covelano Bluette marble

13 $\frac{3}{8}$ × 15 $\frac{3}{4}$ in. dia. (34 × 40 cm dia.)

Zaha Hadid, *Tau Vases*, 2015. Bardiglio Nuvolato marble, 7 $\frac{1}{8}$ × 13 $\frac{3}{8}$ in. Manufactured by Citco, Rivoli Veronese, Italy.

Simon Heijdens

Dutch, born 1978, active in London

Lightweeds

2005-ongoing

Location-responsive light projection

Dimensions variable

Courtesy of the artist. © Simon Heijdens.



Simon Heijdens, *Lightweeds*, 2005. Location-responsive light projection, dimensions variable.

J. MAYER H.

Established 1996, Berlin

Metropol Parasol, Seville, Spain

2004-11

2021 © J.MAYER.H. Photograph by Fernando Alda Fotógrafo



Model, 2005

Acrylic, fluorescent lights, and
polyurethane
13⅝ × 35⅜ × 51¼ in. (35.2 × 89.9 ×
130.2 cm)

Model by Werk5, Berlin, and
Marcus Blum

The Museum of Modern Art, New
York: Fund for the Twenty-First
Century, 2006

Drawings, 2007

Graphite pencil on paper
22 × 15¾ in. each (55.9 × 40 cm)

Drawings by Jürgen Mayer H.
Private collection, Berlin

Aerial view, 2011

Reproduction of color photograph

Dimensions

Photograph © Fernando Alda
Fotógrafo
Courtesy of Fernando Alda
Fotógrafo

View of plaza, 2011

Reproduction of color photograph

Dimensions

Photograph © Fernando Alda
Fotógrafo
Courtesy of Fernando Alda
Fotógrafo

View of column and roof, 2011

Reproduction of color photograph

Dimensions

Photograph © Iñigo Bujedo Aguirre
Courtesy of Iñigo Bujedo Aguirre

Alexandra Kehayoglou

Argentine, born 1981, active in Buenos Aires, Argentina, and Athens, Greece

Bajío

2024

Hand-tufted wool

118 × 147½ in. (299.7 × 374.7 cm)

Denver Art Museum: Funds from Collector's Council with generous gifts from Amanda Precourt, Marilyn Carol and Robert Weaver, and Nancy Leprino, 2024.115. © and courtesy of Alexandra Kehayoglou



Alexandra Kehayoglou, *Bajío*, 2024. Hand tufted wool, 118 × 147½ in.

Joris Laarman

Dutch, born 1979, active in Amsterdam

Microstructures Adaptation Chair (Long Cell) Prototype

2014

3-D printed polyamide and copper

28 $\frac{3}{8}$ × 27 $\frac{1}{2}$ × 30 $\frac{1}{4}$ in. (72.1 × 69.9 × 76.8 cm.)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2015.263. © Joris Laarman.



Joris Laarman, *Microstructures Adaptation Chair (Long Cell) Prototype*, 2014. 3-D printed polyamide and copper, 28 $\frac{3}{8}$ × 27 $\frac{1}{2}$ × 30 $\frac{1}{4}$ in.

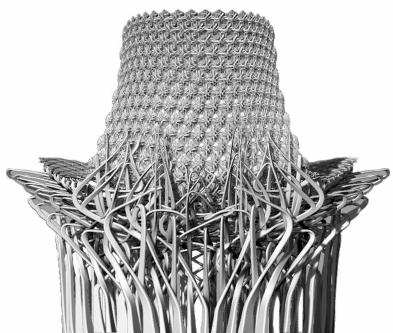
Joris Laarman

Dutch, born 1979, active in Amsterdam

**Digital drawings for *Microstructures*
*Adaptation Chair (Long Cell) Prototype***

2013

Courtesy of the artist and Friedman Benda.



Joris Laarman, Digital drawings for *Microstructures*
Adaptation Chair (Long Cell) Prototype, 2013.

Joris Laarman

Dutch, born 1979, active in Amsterdam

**Digital drawings for *Microstructures*
*Adaptation Chair (Long Cell) Prototype***

2013

Courtesy of the artist and Friedman Benda.



Joris Laarman, Digital drawings for *Microstructures Adaptation Chair (Long Cell) Prototype*, 2013.

Mathieu Lehanneur
French, born 1974, active in Paris

**Ocean Memories (Circular Low Table
Black XL)**

2017

Nero Marquina marble

15¾ × 43¼ in. dia.

Courtesy of the designer. Image © Felipe Ribon, courtesy of Mathieu Lehanneur.



Mathieu Lehanneur, *Ocean Memories (Circular Low Table Black XL)*, 2017. Nero Marquina marble, 15¾ × 43¼ in. dia.

Mathieu Lehanneur

French, born 1974, active in Paris

Permanent Flame

Polished bronze

17¾ × 14½ × 21¼ in. (45.1 × 36.8 × 54 cm)

Courtesy of the designer. © Mathieu Lehanneur. Image © Leandro Viana, courtesy of Mathieu Lehanneur.



Mathieu Lehanneur, *Permanent Flame*, 2017
Polished bronze, 17¾ × 14½ × 21¼ in.

Mathieu Lehanneur

French, born 1974, active in Paris

50 Seas

2018

Enameled faience

Each 19½ in. dia. (49.9 cm dia.)

Courtesy of the designer. © Mathieu Lehanneur.



Mathieu Lehanneur, *50 Seas*, 2018. Enameled
faience (*glazed earthenware*), each 19½ in. dia.

Mathieu Lehanneur

French, born 1974, active in Paris

Tomorrow Is Another Day (Demain est un Autre Jour)

2011

Digital weather station with steel, resin, and light fittings

10 × 37½ in. dia. (25.4 × 94.3 cm dia.)

Courtesy of the designer. © Mathieu Lehanneur. Image © Felipe Ribon, courtesy of Mathieu Lehanneur.



Mathieu Lehanneur, *Tomorrow is Another Day* (*Demain est un autre jour*), 2011. Digital weather station with steel, resin, and light fittings; 10 × 37½ in. dia.

Greg Lynn

American, born 1964, active in Los Angeles

Flatware Set

2007

Sterling silver

Dimensions variable

The Art Institute of Chicago, Celia and David Hilliard Fund; purchased with funds provided by the Architecture & Design Society, 2007.646.1-5. © Greg Lynn FORM. Art Institute of Chicago/Art Resource, NY



Left to right:

Dessert Fork

$6\frac{1}{2} \times 1$ in. (16.5×2.5 cm)

Tablespoon

$8 \times 1\frac{3}{4}$ in. (20.3×4.5 cm)

Teaspoon

$5\frac{1}{2} \times 1\frac{1}{4}$ in. (14×3.2 cm)

Fish Fork

$7\frac{1}{2} \times 1\frac{1}{4}$ in. (19×3.2 cm)

Table Knife

9×1 in. (22.9×2.5 cm)

Sterling silver

Manufactured by Alessi, Crusinallo, Italy

The Art Institute of Chicago: Celia and David Hilliard Fund, purchased with funds provided by the Architecture & Design Society

Greg Lynn, *Flatware Set*, 2007. Sterling silver, dimensions variable. Manufactured by Alessi, Crusinallo, Italy.

Greg Lynn

American, born 1964, active in Los Angeles

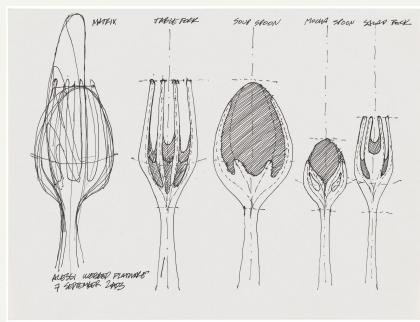
Flatware Prototype Sketch

2003-05

Reproduction of ink-on-paper drawing

9 × 11 in. (22.9 × 27.9 cm)

Los Angeles County Museum of Art: Gift of the Artist. © Greg Lynn FORM. Digital Image © 2024 Museum Associates/LACMA. Licensed by Art Resource, NY.



Greg Lynn, *Flatware Prototype Sketch*, 2003-2005.
Ink on paper, 9 × 11 in.

Greg Lynn

American, born 1964, active in Los Angeles

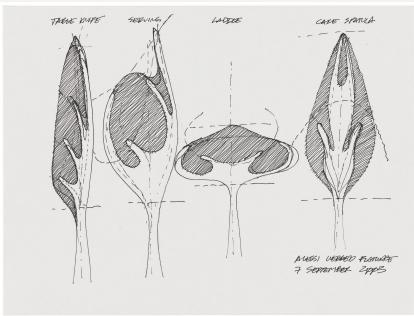
Flatware Prototype Sketch

2003-05

Reproduction of ink-on-paper drawing

9 × 11 in. (22.9 × 27.9 cm)

Los Angeles County Museum of Art: Gift of the Artist. © Greg Lynn FORM. Digital Image © 2024 Museum Associates/LACMA. Licensed by Art Resource, NY.



Greg Lynn, *Flatware Prototype Sketch*, 2003-2005.
Ink on paper, 9 × 11 in.

MAD Architects

Established 2004, Beijing

**Nanjing Zendai Himalayas Center,
Nanjing, China**

2021

Courtesy of MAD Architects. © MAD Architects.

Model, 2018

Acrylic, crystal, PVC, and wood
21½ × 43½ × 90½ in. (54.9 × 110.2
× 230.2 cm)

Courtesy of MAD Architects

Aerial view, 2021

Reproduction of color photograph
Dimensions
Photograph by CreatAR Images
Courtesy of MAD Architects

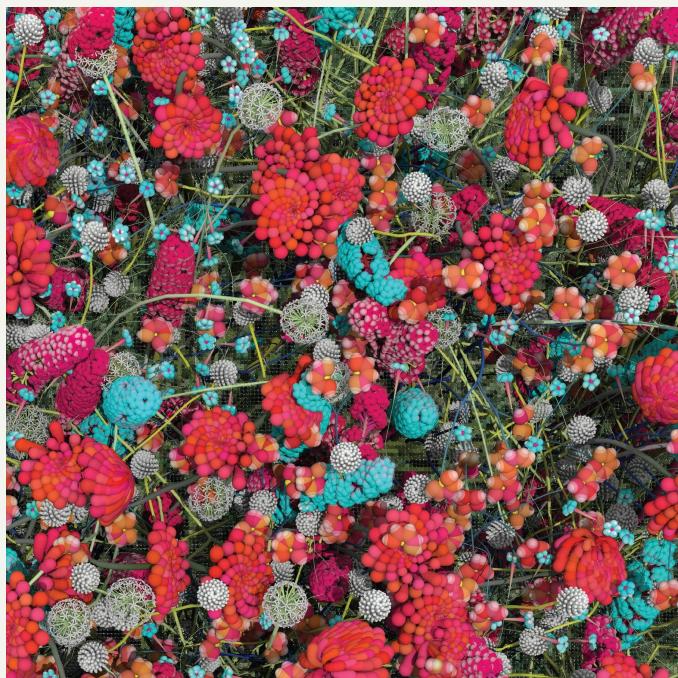
Video, 2022

Duration: 2 min. 8 sec.
Video by Blackstation
Courtesy of MAD Architects

View of center of complex, 2021
Reproduction of color photograph
Dimensions
Photograph by CreatAR Images
Courtesy of MAD Architects



MAD Architects, Nanjing Zendai Himalayas Center,
Nanjing, China, 2012–2021. Ariel view, 2021.



Elena Manferdini, *Wall Flowers (Clover)*, 2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.



Elena Manfredini, *Wall Flowers (Clover)*, 2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.

Elena Manferdini

Italian, born 1974, active in Venice, California

Wall Flowers (Clover)

2022

Vinyl on acrylic mirrors mounted on medium-density fiberboard and vinyl wall covering

Dimensions variable

Courtesy of and © Elena Manferdini



Elena Manferdini, *Wall Flowers (Clover)*, 2022. Vinyl on acrylic mirrors mounted on medium-density fiberboard, and vinyl wall covering, dimensions variable.

Elena Manferdini

Italian, born 1974, active in Venice, California

Botanical Garden Smoke Set

2009

Cast ceramic covered by fused silver

Dimensions variable

Manufactured by Ottaviani, Recanati, Italy

Courtesy of and © Elena Manferdini



Elena Manferdini, *Botanical Garden Smoke Set*, 2009. Cast ceramic covered by fused silver; various dimensions. Manufactured by Ottaviani, Recanati, Italy.

Brad Miller

American, born 1950, active in Venice, California

Plate

2019-23

Unglazed porcelain

3½ × 14 in. dia. (8.3 × 35.6 cm dia.)

Courtesy of the artist. © Brad Miller. Photo by Alex Delapena.



Brad Miller, *Plate*, 2019–23. Unglazed porcelain, 3½ × 14 in. dia.

Brad Miller

American, born 1950, active in Venice, California

Plate

2019-23

Stoneware

3 × 13 in. dia. (7.6 × 33 cm dia.)

Courtesy of the artist. © Brad Miller. Photo by Alex Delapena.



Brad Miller, *Plate*, 2019–23. Stoneware, 3 × 13 in.
dia.

Brad Miller

American, born 1950, active in Venice, California

Vessel

2019-23

Glazed stoneware

19 × 15 in. dia. (48.3 × 38.1 cm)

Courtesy of the artist. © Brad Miller. Photo by Alex Delapena.



Brad Miller, *Vessel*, 2019–23. Glazed stoneware, 19
× 15 in. dia.

Brad Miller

American, born 1950, active in Venice, California

Vessel

2019-23

Glazed stoneware

13 × 17 × 18 in. (7.6 × 43.2 × 45.7 cm)

Courtesy of the artist. © Brad Miller. Photo by Alex Delapena



Brad Miller, *Vessel*, 2019–23. Glazed stoneware, 13
× 17 × 18 in. dia.

Brad Miller

American, born 1950, active in Venice, California

Vessel

2019-23

Glazed stoneware

15 × 16½ in. dia. (38.1 × 41.9 cm dia.)

Courtesy of the artist. © Brad Miller. Photo by Alex Delapena.



Brad Miller, *Vessel*, 2021. Glazed stoneware, 15 × 16½ in. dia.

Nervous System

Established 2007, Palenville, New York

Jessica Rosenkrantz, American, born 1983

Jesse Louis-Rosenberg, American, born 1986

Floraform Chandelier

2017

3-D-printed nylon and LED

43½ in. dia. (109.9 cm dia.)

Produced by Shapeways, New York City.

Denver Art Museum: Funds from the Architecture and Design Collectors' Council, 2022.57.
© Nervous System, Inc. Image courtesy of Nervous System.



Nervous System, *Floraform Chandelier*, 2017. 3-D-printed nylon, 43½ in. dia. Produced by Shapeways, New York City.

PELLE

Established 2011, Brooklyn, New York

Nana Lure Chandelier

2021

Painted cast cotton paper, patinated steel, and LEDs

96 × 82 in. dia. (243.8 × 208.3 cm dia.)

Courtesy of Jean and Oliver Pelle. © Jean & Oliver Pelle. Image courtesy of PELLE.



PELLE, *Nana Lure Chandelier*, 2021. Painted cast cotton paper, patinated steel, and LEDs, 96 × 82 in. dia.

Andrés Reisinger

Argentine, born 1990, active in Barcelona, Spain

Hortensia Armchair

2018

Molded foam, metal frame, and laser-cut upholstery

34½ × 43¾ × 44 in. (87.9 × 110.2 × 111.8 cm)

Textile design by Júlia Esqué. Courtesy of Reisinger Studio.



Andrés Reisinger, *Hortensia Armchair*, 2019. Molded foam, metal frame, and laser-cut upholstery, 30 × 42 × 37½ in.

Studio Gang
Established 1997, Chicago

Populus, Denver, Colorado
2019–24

Digital rendering

© and courtesy of Studio Gang



Model, 2024
Wood, plastic, acrylic, fabric, paper,
spray paint, and museum board
75 × 33 × 33 in.
Courtesy of Studio Gang

Aspen eye research diagram and
geometry analysis, 2020
Reproduction of color photograph
and digital drawing
Photo by Peng Chen on Unsplash,
2017
Courtesy of Studio Gang

Exterior view, 2020
Reproduction of digital rendering
Courtesy of Studio Gang

Exterior view into lobby, restaurant,
and amenity spaces, 2020
Reproduction of digital rendering
Courtesy of Studio Gang

Unrolled elevation and window
modules, 2019
Reproduction of digital drawing
Courtesy of Studio Gang

Nao Tamura

Japanese, born 1976, active in Brooklyn, New York

Seasons and Petal Serving Ware

2011

Silicone

9½ × 7¾ in. each

Manufactured by COVO, Rome, Italy.

Exhibition funds from the Denver Art Museum. © and image courtesy of Nao Tamura

Petals Plate

7¼ × 6¼ in. (18.4 × 15.9 cm)

Seasons Plate

12¾ × 8½ in. (31.4 × 21.9 cm)

Seasons Plate

9½ × 7¾ in. (24.1 × 20 cm)

Seasons Serving Platter

20½ × 11¾ in. (52.1 × 29.9 cm)



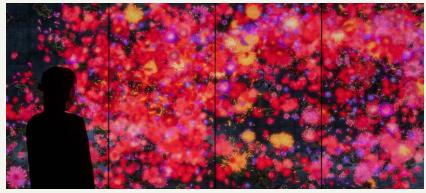
Nao Tamura, Seasons Plates, 2011. Silicone; 9 1/2 × 7 7/8 in. Manufactured by COVO, Rome, Italy.

teamLab
Established 2001, Tokyo

**Flowers and People – A Whole Year per
Hour**
2020

Six-channel interactive digital installation, endless loop.

Courtesy of the artist and Pace Gallery. Sound by Hideaki Takahashi. © teamLab,
courtesy Pace Gallery.



teamLab, *Flowers and People – A Whole Year per Hour*, 2020.

threeASFOUR
Established 2005, New York

**Autumn Leaf Suit, Human Plant
Collection, Spring/Summer 2020**
2020

Digitally printed cotton voile and broadcloth

Courtesy of threeASFOUR. Photo by Randy Brooke.



threeASFOUR, *Autumn Leaf Suit*, from the *Human Plant* Collection, Spring/Summer 2020, Look 6.
Digitally printed cotton voile and broadcloth.

threeASFOUR
Established 2005, New York

**Eve Dress, Human Plant Collection,
Spring/Summer 2020**
2020

Laser-cut backed brown cork

Courtesy of threeASFOUR. Photo by Randy Brooke.



threeASFOUR, *Eve Dress*, from the *Human Plant* Collection, Spring/Summer 2020, Look 19. Laser-cut backed brown cork.

threeASFOUR
Established 2005, New York

**Lily Dress, Human Plant Collection,
Spring/Summer 2020**
2020

Hand-pleated organdy with cotton binding

Courtesy of threeASFOUR. Photo by Randy Brooke.



threeASFOUR, *Lily Dress*, from the *Human Plant* Collection, Spring/Summer 2020, Look 25. Hand-pleated organdy and cotton binding.

David Valner

Czech, born 1990, active in Olomouc, Czech Republic

Fungus Vases and Polypore Bowl

2018–23

Handcrafted glass

Dimensions variable

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024



Left to right:

Fungus Vase, 2023

Glass

9 × 5½ in. dia. (22.9 × 14.9 cm dia.)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Fungus Vase, 2018, this example

2020

Glass

19½ × 6¼ in. × 6¾ in. (49.9 × 15.9 × 17.2 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Fungus Vase, 2018, this example

2022

Glass

11 × 9½ in. dia. (27.9 × 24.1 cm dia.)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Fungus Vase, 2018, this example

2020

Glass

19½ × 6¼ × 6¾ in. (49.9 × 15.9 × 17.2 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Fungus Vase, 2023

Glass

8½ × 5½ × 4¾ in. (21.9 × 14 × 12.1 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Fungus Vase, 2023

Glass

8½ × 5½ × 4¾ in. (21.9 × 14 × 12.1 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Fungus Vase, 2018, this example

2022

Glass

13⅓ × 5⅜ in. dia. (34 × 14.9 cm dia.)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Fungus Vase, 2022

Glass

20½ × 5⅔ × 6¼ in. (52 × 14.9 × 15.9 cm)

Denver Art Museum: Funds from Design Council of the Denver Art Museum, 2024

Polypore Bowl, 2019, this example

2023

Glass

7⅓ × 11¾ × 10⅓ in. (18.1 × 29.9 × 27 cm)

Denver Art Museum: Funds from

David Valner, *Fungus Vases and Polypore Bowl*, 2018–23. Handcrafted glass, dimensions variable.



Iris van Herpen, *Dress*, from the *Syntopia* Collection, Autumn/Winter 2018. Laser-cut Mylar and cotton heat bonded onto organza.

Iris van Herpen

Dutch, born 1984, active in Amsterdam

**Dress, Syntopia Collection,
Autumn/Winter 2018**

2018

Laser-cut Mylar and cotton heat bonded onto organza

Courtesy of Iris van Herpen. © Iris van Herpen. Image courtesy of Iris van Herpen Atelier.



Iris van Herpen, Dress, from the *Syntopia* Collection, Autumn/Winter 2018. Laser-cut Mylar and cotton heat bonded onto organza.

Iris van Herpen
Dutch, born 1984, active in Amsterdam

**Diatom Gown, Sensory Seas Collection,
Spring/Summer 2020**
2020

Oil paintings by Shelee Carruthers digitally printed on organza

Courtesy of Iris van Herpen. © Iris van Herpen. Photograph by Gio Staiano; styling by Patti Wilson; makeup by Sil Bruinsma; hair by Martin Cullen; footwear by Trippen; manicure by Jessica Scholten; modeled by Sofochka Sofia. Image courtesy of Iris van Herpen Atelier.



Iris van Herpen, *Diatom Gown*, from the *Sensory Seas* Collection, Spring/Summer 2020.

Installation Photographs

Come back soon to see installation photographs of *Biophilia: Nature Reimagined* taken by James Florio.

Glossary

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

Affective

relating to, arising from, or influencing feelings or emotions; expressing emotion

Affective Ecology

a new branch of ecology concerned with emotional relationships between human beings and the rest of the living world

Algorithm

a process or set of rules to be followed to solve a mathematical problem or perform a computation

Algorithmic Design

the process of using algorithms to produce a design model

Anthropocene

the period of time during which human activities have had an environmental impact on the Earth; regarded as constituting a distinct geological age

Anthropocentric

regarding humankind as the central or most important element of existence, especially as opposed to animals, plants, the natural landscape, or the concept of divinity

Anthropogenic

of, relating to, or resulting from the influence of human beings on nature

Arcadia

a vision of pastoralism and harmony with nature; a poetic term for an unspoiled and idyllic landscape or way of life, associated with bountiful natural splendor

Attention Restoration Theory (ART)

a theory that holds that mental fatigue and concentration can be improved by time spent in or looking at nature. According to Stephen Kaplan, the natural environment must have four properties in order to provide this restorative effect: 1) extent (the scope to feel immersed in the environment); 2) being away (providing an escape from habitual activities); 3) soft fascination (aspects of the environment that capture attention effortlessly); and 4) compatibility (individuals must want to be exposed to, and appreciate, the environment).

Awe

a feeling of reverential respect mixed with wonder or fear, often in response to that which is considered sacred or sublime

B

Biodiversity

the variety and variability of life forms in a particular ecosystem, region, or the entire planet. It encompasses the multitude of species of plants, animals, fungi, microorganisms, and their interactions within their environment.

Biome

a large naturally occurring community of flora and fauna occupying a major habitat, e.g., forest or tundra

Biomimicry

the design and production of materials, structures, and systems that are modeled on biological entities and processes

Biomorphism

a twentieth-century style of painting, sculpture, photography, and design with roots in the late nineteenth century; a painted, drawn, or sculptured free form or design suggestive in shape of a living organism, especially an ameba or protozoan. Biomorphic forms or images are ones that while abstract nevertheless refer to, or evoke, living forms such as plants and the human body.

Biophilia

the innate tendency to focus on life and lifelike processes

Biophilic Design

the process of basing decisions about the built environment on intuition or credible research—derived from either an appetency for nature or measurable biological responses—to achieve the best possible health outcomes

Biophobia fear or aversion to nature

Botanical

relating to plants

Built Environment

places and spaces created or modified by people with particular emphasis on buildings, parks, streetscapes, and other spaces that provide the setting for human activity

C

Climate change

long-term shifts in temperatures and weather patterns, either natural or caused by human activities, such as the burning of fossil fuels.

D

Deep Ecology

an environmental philosophy based in the belief that humans must radically change their relationship to nature from one that values nature solely for its usefulness to human beings to one that recognizes that nature has an inherent value. Sometimes called an “ecosophy,” deep ecology is a social movement that sometimes has religious and mystical undertones. The phrase originated in 1972 with Norwegian philosopher Arne Naess.

E

Ecological Aesthetic Theory

proclaims that knowledge about the ecological functions of a landscape will increase preference ratings for that landscape. The theory depends on knowledge as a key driver of landscape preference.

Ecology

as a scientific discipline, the branch of biology that deals with the relations of organisms to one another and to their physical surroundings; in a social or political context, the political movement that seeks to protect the environment, especially from pollution; often associated with environmentalism

Ecopsychology

the study of the relationship between human beings and the natural world through ecological and psychological principles. The field seeks to develop and understand ways of expanding the emotional connection between individuals and the natural world, thereby assisting individuals with developing sustainable lifestyles and remedying alienation from nature.

Ecosystem

a biological community of interacting organisms and their physical environment

Emergence

in evolutionary theory, as life evolves, new forms and systems arise that possess qualities and behaviors that are not simply the sum of their parts or a straightforward consequence of the conditions that preceded them. This concept highlights the inherent complexity and unpredictability of evolutionary processes.

Environmental Generational Amnesia

the generational perception that the environment into which it's born, no matter how developed, urbanized or polluted, is the norm. As a result, what each generation comes to think of as “nature” is relative, based on exposure.

E Environmental Psychology

an interdisciplinary practice that studies the relationship between human behavior and the environment, from both directions—how the environment affects behavior and how people's behaviors and attitudes affect the environment

E Environmental Quality

an umbrella term that refers to the sum of the properties and characteristics of a specific environment and how it affects human beings and other organisms

F

Fractal

a never-ending pattern. Fractals are infinitely complex patterns that are self-similar across different scales. They are created by repeating a simple process over and over in an ongoing feedback loop. Driven by recursion, fractals are images of dynamic systems—the pictures of chaos. Geometrically, they exist in between our familiar dimensions and can be found in trees, rivers, coastlines, mountains, clouds, seashells, hurricanes, etc.

G

Generative Design

the process of using algorithms to generate a batch of design options for evaluation

H

Heraclitean Motion

a pattern of movement that always changes, yet always stays the same; examples are the movement of trees or grasses in a light breeze, aquarium fish, or the pattern of light and shade created by cumulus clouds

Homeland

a place where a cultural, national, or racial identity has formed; often associated with a sense of belonging, identity, and attachment to the place where one was born, grew up, or has significant cultural, historical, or emotional ties; does not necessarily adhere to geographical boundaries and can encompass cultural heritage, shared values, traditions, and a feeling of being rooted in a particular place.

Human Ecology Theory

a theoretical framework that considers the interactions of humans with their environments, including biological, social, and physical aspects, as a system

I

Inherent

existing in something as a permanent, essential, or characteristic attribute; involved in the constitution or essential character of something; belonging by nature or habit; intrinsic

Innaate

inborn; natural; originating in the mind; existing in, belonging to, or determined by factors present in an individual from birth; belonging to the essential nature of something; inherent; originating in or derived from the mind or the constitution of the intellect rather than from experience

I
Intrinsic

belonging to the essential nature or constitution of a thing; originating or due to causes within a body, organ, or part; originating and included wholly within an organ or part

M**Morphogenesis**

formation of the structure of an organism or part; differentiation and growth of tissues during development; concerns the fundamental question of how biological form and structure are generated

N**Nastic Movement**

a nondirectional response to environmental stimuli (e.g., temperature, humidity, light irradiance) usually associated with plants

Nature

the phenomena of the physical world collectively, including plants, animals, microorganisms, their ecosystems, and evolutionary and geologic processes; in the broadest sense, the natural, physical, or material world or universe

Natural phenomena

events that occur in nature without human involvement. Natural phenomena can be physical, biological, or chemical and can occur regularly, like the seasonal blooming of trees or flowers, or irregularly, such as lightning.

Nyctinasty

a circadian rhythm-based nastic movement (as the opening and closing of some flowers) that is associated with diurnal changes of temperature or light intensity; a highly evolved natural process that protects delicate structures and conserves resources when conditions are not optimal

P**Parametric Design**

the process of using parameters and rules to create a design solution that is easily modified

Placemaking

a multi-faceted approach to the planning, design, and management of public spaces, capitalizing on a local community's assets, inspiration, and potential, with the intention of creating public spaces that promote people's health, happiness, and well being

S**Sociobiology**

a field of scientific study based on the assumption that social behavior has resulted from evolution

Soft Fascination

a key component of natural environments that encourages restoration; a stimulus that initiates the use of involuntary attention, or attention that requires no effort, e.g., bird song, the sound of wind blowing through the trees, clouds, a sunrise or sunset, or a flowing stream or river

Somatic

relating to the body, especially as distinct from the mind

Stimulus

a thing or event that evokes a specific functional reaction in an organ, cell, or tissue

Stress Reduction Theory

a theory that holds that experiencing natural environments can reduce physiological stress and negative emotion

T

Topography

the physical landforms and features of an area

Topophilia

the love of or emotional connection with place or physical environment; a strong sense of place, which often mixes with the sense of cultural identity among certain people and a love of certain aspects of a place

Note to reader

These definitions are synthesized from Merriam-Webster Dictionary and various sources included in the Selected Readings and essay citations.

Recommended Reading

Books

Browning, William, Catherine Ryan, and Joseph Clancy. *14 Patterns of Biophilic Design: Improving Health & Well-Being in the Built Environment*. New York: Terrapin Bright Green, 2014. <https://www.terrapinbrightgreen.com/reports/14-patterns/>.

Gibson, James William. *A Reenchanted World: The Quest for a New Kinship with Nature*. New York: Metropolitan Books / Henry Holt and Company, 2009.

Gombrich, E. H. *The Sense of Order: A Study in the Psychology of Decorative Art*. Ithaca, NY: Cornell University Press, 1979.

Greyson, Lauren. *Vital Reenchantments: Biophilia, Gaia, Cosmos, and the Affectively Ecological*. Goleta, CA: Punctum Books, 2019. <https://www.jstor.org/stable/jj.2353889>.

Kaplan, Rachel, and Stephen Kaplan. *The Experience of Nature: A Psychological Perspective*. Cambridge: Cambridge University Press, 1989.

Kellert, Stephen R. *Birthright: People and Nature in the Modern World*. New Haven, CT: Yale University Press, 2014.

———. *Kinship to Mastery: Biophilia in Human Evolution and Development*. Washington D.: Island Press, 1997.

———. *Nature by Design: The Practice of Biophilic Design*. New Haven, CT: Yale University Press, 2018.

Kellert, Stephen R., and Edward O. Wilson, eds. *The Biophilia Hypothesis*. Washington DC: Island Press, 1993.

Kellert, Stephen R., Judith Heerwagen, and Martin Mador. *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life*. Hoboken, NJ: John Wiley & Sons, 2011.

Keltner, Dacher. *Awe: The New Science of Everyday Wonder and How It Can Transform Your Life*. New York: Penguin Press, 2023.

Louv, Richard. *Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder*. Revised edition. Chapel Hill, NC: Algonquin Books, 2008.

Mandelbrot, Benoit B. *The Fractal Geometry of Nature*. 1977. Updated edition. New York: W. H. Freeman, 1982.

Tuan, Yi-fu. *Topophilia: A Study of Environmental Perception, Attitudes, and Values*. New York: Columbia University Press, 1990.

Williams, Florence. *The Nature Fix: Why Nature Makes Us Happier, Healthier, and More Creative*. New York: W. W. Norton and Company, 2017.

Wilson, Edward O. *Biophilia*. Cambridge, MA: Harvard University Press, 1984.

Journal Articles and Scientific Studies

Barbiero, Giuseppe, and Chiara Marconato. "Biophilia as Emotion." *Visions for Sustainability* 6 (November 2016): 45–51.
<https://ojs.unito.it/index.php/visions/article/view/1755/1642>.

Flannery, Maura C. "Jellyfish on the Ceiling and Deer in the Den: The Biology of Interior Decoration." *Leonardo* 38, no. 3 (2005): 239–44.
<https://doi.org/10.1162/0024094054029056>.

Hung, Ruyu. "Journeying between Home and Nature: A Geo-Phenomenological Exploration and Its Insights for Learning." *Environmental Values* 19, no. 2 (May 2010): 233–51. <https://www.jstor.org/stable/30302348>.

Joye, Yannick. "Architectural Lessons from Environmental Psychology: The Case of Biophilic Architecture." *Review of General Psychology* 11, no. 4 (2007): 305–28.
<https://doi.org/10.1037/1089-2680.11.4.305>.

Kaplan, Stephen. "The Restorative Benefits of Nature: Toward an Integrative Framework." *Journal of Environmental Psychology* 15, no. 3 (September 1995): 169–82.
[https://doi.org/10.1016/0272-4944\(95\)90001-2](https://doi.org/10.1016/0272-4944(95)90001-2).

Mayer, F. Stephan, and Cynthia McPherson Frantz. "The Connectedness to Nature Scale: A Measure of Individuals' Feeling in Community with Nature." *Journal of Environmental Psychology* 24, no. 4 (December 2004): 503–15.
<https://doi.org/10.1016/j.jenvp.2004.10.001>.

Monroy, Maria, and Dacher Keltner. "Awe as a Pathway to Mental and Physical Health." *Perspectives on Psychological Science* 18, no. 2 (2023): 309–20.
<https://doi.org/10.1177/17456916221094856>.

Nisbet, Elizabeth K., John M. Zelenski, and Steven A. Murphy. "The Nature Relatedness Scale: Linking Individuals' Connection with Nature to Environmental Concern and Behavior." *Environment and Behavior* 41, no. 5 (2009): 715–40.
<https://doi.org/10.1177/0013916508318748>.

Piff, Paul K., Pia Dietze, Matthew Feinberg, Daniel M. Stancato, and Dacher Keltner. "Awe, the Small Self, and Prosocial Behavior." *Journal of Personality and Social Psychology* 108, no. 6 (2015): 883–99. <https://doi.org/10.1037/pspi0000018>.

Salingaros, Nikos A. "Fractal Art and Architecture Reduce Physiological Stress." *Journal of Biourbanism* 2, no. 2 (2012): 11–28.

Taylor, Richard P. "Reduction of Physiological Stress Using Fractal Art and Architecture." *Leonardo* 39, no. 3 (2006): 245–51. <https://doi.org/10.1162/leon.2006.39.3.245>.

Taylor, Richard P., Adam P. Micolich, and David Jonas. "Fractal Analysis of Pollock's Drip Paintings." *Nature* 399, no. 422 (June 1999). <https://doi.org/10.1038/20833>.

Ulrich, Roger. S. "View through a Window May Influence Recovery from Surgery." *Science* 224, no. 4647 (April 1984): 420–21. DOI: 10.1126/science.6143402.

Ulrich, Roger S., Robert F. Simons, Barbara D. Losito, Evelyn Fiorito, Mark A. Miles, and Michael Zelson. "Stress Recovery during Exposure to Natural and Urban Environments." *Journal of Environmental Psychology* 11, no. 3 (September 1991): 201–30.
[https://doi.org/10.1016/S0272-4944\(05\)80184-7](https://doi.org/10.1016/S0272-4944(05)80184-7).

Vining, Joanne, Melinda S. Merrick, and Emily A. Price. "The Distinction between Humans and Nature: Human Perceptions of Connectedness to Nature and Elements of the Natural and Unnatural." *Human Ecology Review* 15, no. 1 (Summer 2008): 1–11.
<https://www.jstor.org/stable/24707479>.

On the Designers, Artists, and Architects

Carbonell, Nacho. *De Rebus Natura*. Eindhoven, Netherlands: Lecturis, 2015.

Gang, Jeanne, ed. *Studio Gang: Architecture*. London: Phaidon, 2022.

Ingels, Bjarke, Beatrice Leanza, William Myers, et. al. *DRIFT: Choreographing the Future*. London: Phaidon, 2022.

Laarman, Joris. *Joris Laarman: Lab*. New York: August Editions, 2017.

Lepik, Andres, and Andre Santner, eds. *Metropol Parasol: J. Mayer H.* Ostfildern, Germany: Hatje Cantz, 2011.

Ma Yansong. *MAD Rhapsody*. With contributions by Paul Goldberger and Philip Jodidio. New York: Rizzoli Electa, 2021.

Ma Yansong. *Shanshui City*. With contributions by Hans Ulrich Obrist, Lorenza Baroncelli, et al. Zurich: Lars Müller Publishers, 2015

Rus, Mayer, Susan Weber, and David Wiseman. *David Wiseman*. Edited by Ari Wiseman. With a contribution by Bobbye Tigerman. New York: Rizzoli Electa, 2020.

Sudjic, Deyan, Glenn Adamson, Richard Dyer, and Caroline Roux. *Fredrikson Stallard: Works*. Milan, Italy: Skira Editore, 2019.

Van Herpen, Iris and Cloe Pitiot. *Iris van Herpen: Sculpting the Senses*. Tielt, Belgium: Lannoo Publishers, 2023.

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Biophilia

Biophilia: Nature Reimagined

Darrin Alfred

DENVER ART MUSEUM, DENVER

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