

# HOWL

Inspiration for Creatives  
from *Wolf-Gordon*

Issue 05, 2022 — Quarterly  
Curated by Paul Makovsky



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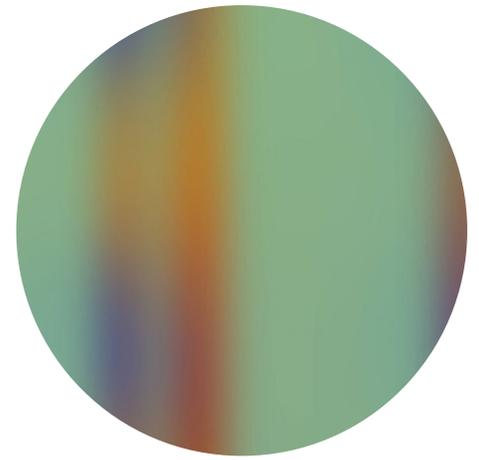
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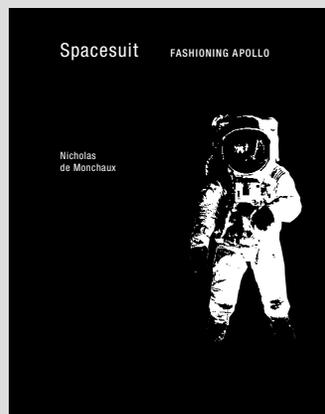
# Nicholas de Monchaux

Author Nicholas de Monchaux on the story of how the twenty-one-layer Apollo Spacesuit, made by Playtex, was a triumph of intimacy over engineering, and what it teaches us.

## Astronaut Edward H. White II

Astronaut Edward H. White II, pilot for the Gemini-Titan 4 space flight, floats in space during America's first spacewalk in 1965.

Photo: NASA, Public domain, via Wikimedia Commons



Nicholas de Monchaux  
*Spacesuit: Fashioning Apollo*  
(MIT Press, 2011)

Photo: Book Cover © 2011 Massachusetts Institute of Technology

— How did you come up with the idea for your book, “Spacesuit,” which tells the story of the twenty-one-layered Apollo spacesuit and topics relevant to the suit, the body and 20th century technology?

As a graduate student at Princeton, I discovered Reyner Banham’s great book, *Scenes in America Deserta*, in which he writes that one learns the most about architecture in its absence, and that the architecture of the desert is the most instructive environment on the core nature and needs of architecture. Also, for a seminar on domestic space, I wanted to write about the



### Gemini Space Suits

Cross sections of the Gemini EVA configuration (top) and Gemini GT-3 suit (bottom).

Photo: NASA Images NASA Image S-65-4970 and S-65-4973, courtesy Johnson Space Center



### T-1 Pressure Suit

A photo of the T-1 from a 1952 Air Force press release.

Photo: Image 342-FH-3B-34751, courtesy National Archives at College Park, College Park, MD

most extreme, non-architectural domestic space that could inform us about architecture, and that led me to the Apollo space program which sustained a human on the surface of the moon—the most hostile environment ever encountered by mankind. It turned out to be a very difficult, complicated story, and for that term paper, I submitted twenty-one one-page papers that tried to get into the story of the Apollo spacesuit made by the Playtex bra company.

Later, I was invited to give a lecture at the Santa Fe Institute on the theme of complexity and design, and so I returned to this subject and, as I've learned, everyone is interested in spacesuits. I just barely scratched the surface, and about eight years later, the book was published.

——— In your book, you discuss the actual origins of space, referencing Milton:

Milton coined the word, "Space," as the space between worlds in the context where space is an environment outside of the earthly realm, which is inherently hostile to human occupation. You also have the space of the architect—and the space of outer space is actually the opposite of the space of the architect, because it is a space that humans cannot encounter without dying, and so must enter exclusively through a dependence on technological mediation. Despite the utopian renderings we see nowadays from the likes of Elon Musk and Jeff Bezos, space is mostly a place where we project our fantasies of who we are and how we want to be, and that has a relationship to technology. Space has a very different physical definition for different disciplines, from medicine to astronautics.

——— You discuss the spacesuit—this twenty-one-layered messy assemblage made by the Playtex bra company, using hand-stitched couture techniques—as a kind of anti-hero, a women's lingerie company that manufactures a textile that plays an important life-or-death role in the survival of an astronaut.

One of the main narratives of the book is that the spacesuit stands between the body and not just the extreme environment of outer space, but the organizational and technological environment of the space race, which was all based upon techniques to develop missile defense systems and then nuclear weapons. The engineering systems of the space race weren't designed for human

Nicholas de Monchaux is Professor and Head of Architecture at MIT. He is a partner in the architecture practice modern, and a founder of the design technology company, Local Software. He is the author of *Spacesuit: Fashioning Apollo* (MIT Press, 2011), winner of the Eugene Emme award from the American Astronautical Society, as well as *Local Code: 3,659 Proposals about Data, Design, and the Nature of Cities* (Princeton Architectural Press, 2016).

habitation or occupation in any way, and were designed, in fact, for the reverse. The original Mercury suits were designed as emergency suits, and the Gemini suit allowed you to survive a brief expedition into outer space. [The Mercury and Gemini suits] weren't designed to allow you to walk around and do work because it's very hard to design a pressurized capsule shaped like a person.

My book talks about the engineering problem both from a military industrial perspective and a much more MacGyvering model. A five-person industrial design team at Playtex, staffed by a former TV repairman who was an MIT dropout, certainly knew something about engineering by working adjacent to the production line of bras and girdles, and working with fabrics and rubber dipping. These were devices and mechanisms that could allow a pressurized envelope to be inflated to very high pressure but still be able to be moved by and walked around by the person inside of it. And then, when that was adapted further, instead of making a single layer that could try to do everything, they just added more and more layers of different kinds of fabrics that all already existed.

And so, this epidermal structure, just like our own skin, was very soft. It was made by hand by women, and it didn't fit into the larger system of how things were produced for the space race, which result in all kinds of problems. When I was at the Smithsonian in the early 2000s, the Apollo astronauts came to visit their suits, and I remember asking Tom Stafford about his suit. He said, "It was just a truck," he said. "This is a part of me," pointing to the suit. It was a very special kind of object but particularly remarkable in that larger technological system of the Apollo infrastructure that it had as much to do with the body inside, as it did with all the systems outside of it.



John Young

Astronaut John Young posing in his David Clark Gemini spacesuit, 1963.

Photo: NASA Image S-63-15077, courtesy Johnson Space Center



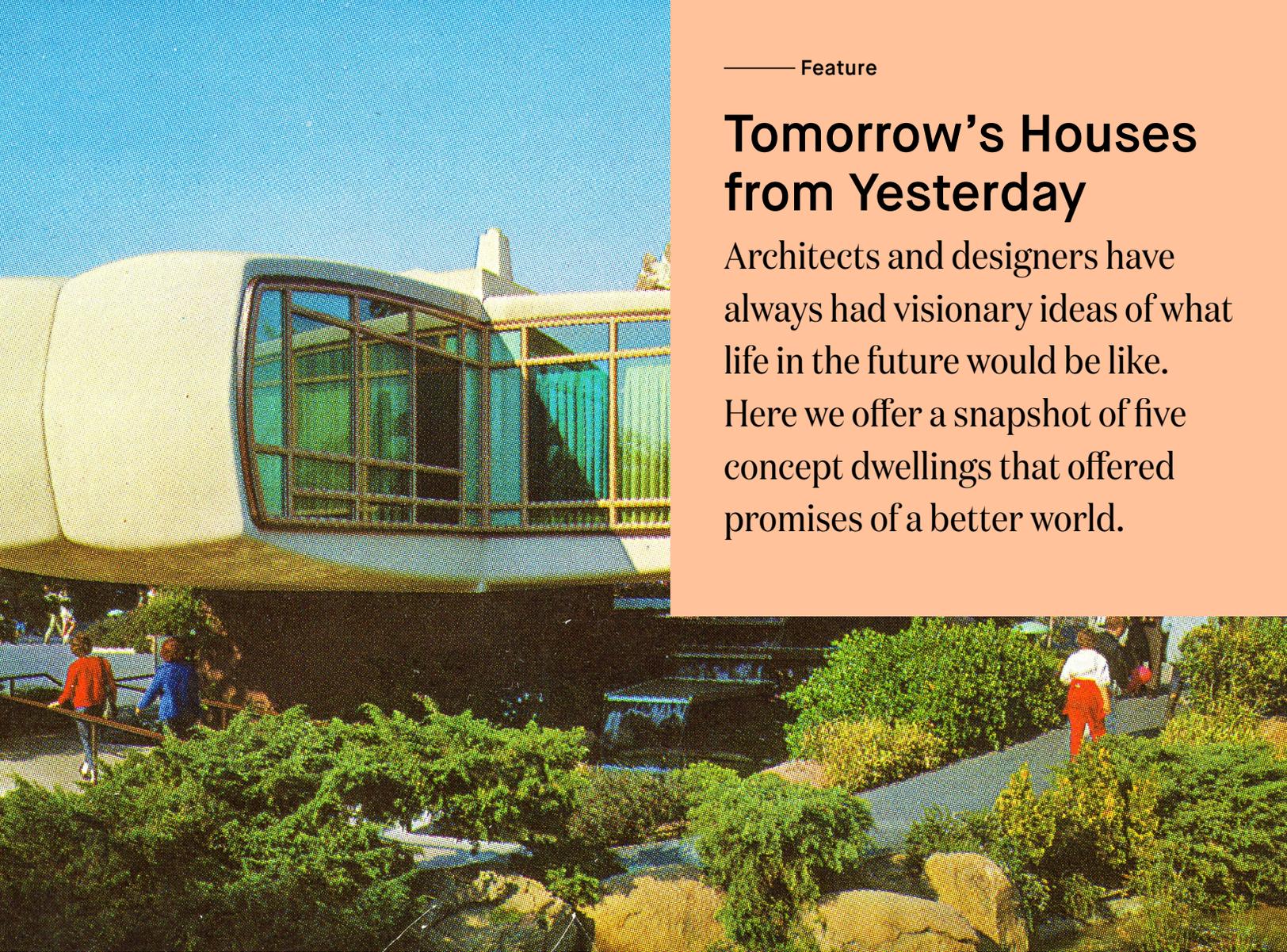
Earth

The full earth photographed by Apollo 17 commander Eugene Cernan, December 1972.

Photo: NASA Image S-63-15077, courtesy Johnson Space Center

# Tomorrow's Houses from Yesterday

Architects and designers have always had visionary ideas of what life in the future would be like. Here we offer a snapshot of five concept dwellings that offered promises of a better world.



## Monsanto House of the Future

Disneyland, Anaheim, CA

Photo: Thomas Hawk, [CC BY-NC-ND 2.0](#), via Flickr



## Monsanto House of the Future

Interior

Photo: Ralph Crane / LIFE Magazine  
© Time, Inc.

## The Monsanto House of the Future

This popular attraction at Disneyland, California, opened in 1957, the result of a partnership between Disney, the Massachusetts Institute of Technology and the Monsanto company. Designers were asked to imagine what housing might look like 30 years in the future. The futuristic fiberglass structure was set on a pedestal, with a kitchen and bathroom in the central part of the home and the bedrooms and living spaces branching out like spokes. The exterior shell of the house, floors and ceiling were all made out of plastic—an inexpensive way to prefabricate houses and minimize the harvesting of trees for lumber. As a house of the future, it included a flat-screen TV—a novelty at the time.



### Futuro House

Tapiola, Espoo, Finland

A Futuro house on display at the WeeGee museum in Tapiola, Espoo, Finland

Photo: JIP, [CC BY-SA 4.0](#), via Wikimedia Commons

## A Failed Mission Gets a Second Life

Biosphere 2, the world's largest controlled environment, located on a three-acre site in Oracle, Arizona, and constructed between 1987 and 1991, had as its mission to create the equivalent of a self-sustaining colony on another planet. Described as a "live-in terrarium", the organization's first experiment had a crew of eight "Biospherians" living in a multi-biome bubble that was meant to last 100 years (It lasted only two years.).

Today the giant terrarium (managed by the University of Arizona since 2011) is finally becoming a site for new and risky research. It currently is studying how tropical ecosystems might weather late-21st-century heat and drought. And in March of this year, it unveiled a project to mimic a plant-filled habitat on a lifeless alien world like Mars.

### Biosphere 2

Oracle, AZ

Photo: Jasper Nance, [CC BY-NC-ND 2.0](#), via Flickr

In 1967, the House of the Future closed for good at Disneyland, with more than 20 million people having visited it during the ten years it was standing, but recently Howard Johnson's opened its own House of the Retro Future Suite in Anaheim that pays homage to the defunct Disneyland attraction, where guests can pay about \$2,000 for a two-night stay and enjoy a nostalgic view of the future.

## The Futuro House Touches Down on Earth

The Futuro House was conceived by Finnish architect Matti Suuronen in 1968 as a portable ski chalet. Often nicknamed the Flying Saucer or the UFO House, the idea behind this prefab house was born when his childhood friend Jaako Hidenkari was looking for someone to design a lightweight cabin that was easily transportable through all kinds of terrain. Built of fiberglass reinforced plastic, it was constructed of sixteen pieces bolted together and positioned on a steel frame. It could fit a cozy eight people, and featured an electric heating system which could go from -20 to 60 degrees Fahrenheit in just 30 minutes.

From 1968 to 1973, about 100 of the Futuro Homes were built worldwide, and sold for about \$12,000 to \$14,000 each. Aside from being houses, they have been used as banks, restaurants, children's playrooms, targets for shooting practice and even a dog kennel. Today, about 68 of them still stand, in various states of condition, with the biggest concentration being in the United States (eighteen structures). So, while the houses were a sci-fi vision of the future, they turned out to be a curiosity rather than a force for change.



## Is a 3D-Printed House the Solution to our Housing Crisis?

Architecture studio Lake Flato has completed a 3D-printed, modern ranch style home in East Austin, Texas that is a model for the future of housing by joining beauty, sustainability and technological efficiency. The "House Zero" single-family residence, built in collaboration with ICON, a construction technology company, uses 3D printing and robotic construction to dispense layers of Lavacrete, a cement-like substance that is air-tight, to construct the walls of the 2,000-square-foot home. The building took 10 days to print, and the home was built using biophilic design principles which allowed the soft curves of the walls to create pleasant circulation routes throughout the home. Building houses with this technology means that homes like this could be constructed faster and at a lower cost.

## Next Stop: Moon Village

Skidmore, Owings & Merrill (SOM), in partnership with the European Space Agency and MIT, has designed Moon Village, a concept for the first full-time human settlement on the lunar surface. The challenge with a colony like Moon Village is to sustain human life in an otherwise uninhabitable setting, requiring the designers to consider issues such as radiation protection, pressure differentials and how to provide breathable air.

This bold initiative calls for three- to four-story structures with workspaces, living quarters, environmental controls and life support systems. These inflatable structures would provide resistance to extreme temperatures, projectiles and solar radiation. SOM's concept enables the Moon Village to carry out its purpose as a scientific, industrial and entertainment development.



House Zero by Lake Flato and ICON  
East Austin, TX  
Photo: ICON



Moon Village  
Rendering: SOM | Slashcube GmbH



—— Feature

## Tsz Yan Ng

This Michigan-based academic is using textiles to create space-age forms that could transform how we build.

Drupelet texture details

Photo: Tsz Yan Ng

For the past five years, Tsz Yan Ng, Assistant Professor at the Taubman College of Architecture + Planning at the University of Michigan in Ann Arbor, has focused on how textiles can form concrete in new ways.

Why concrete and textiles? As a designer at heart, while Ng was pursuing her PhD about 15 years ago, she worked on a façade that resembled textile patterning for a clothing company's headquarters in China. Later at the University of Michigan, her interest in a larger role for textiles in building materials continued. Ng's research draws on the expertise of many different fields, from material science and engineering to construction logic and architectural design, and she has worked collaboratively with her students, engineers, scientists, and even a CNC knitting expert. Ng explains, "It's exciting to create sustainable practices that reduce construction waste in the forming of the material. The result is a more resilient concrete that will last longer with the least amount of maintenance, and finally that might even lessen the amount of work needed for such construction."



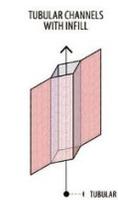
Tsz Yan Ng, Assistant Professor at the Taubman College of Architecture + Planning at the University of Michigan in Ann Arbor

Photo: Kathy Velikov

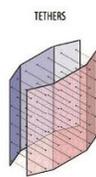
The Knit Casting project, for example, is a recent collaboration with Sean Ahlquist, a CNC knitting expert, and Evgueni T. Filipov, from the Civil and Environmental Engineering Department at the University of Michigan. It explores the use of CNC manufactured knits to produce volumetric textile formwork for casting glass fiber reinforced concrete. The research investigates how a functionally-graded knit formwork can be used as a fully seamless system to cast concrete.

The advantage of using a knitted textile as formwork is that it uses a minimal amount of material in comparison to traditional wood or steel formwork. This means that you can get complex geometries and textures that would otherwise be difficult to achieve with traditional flat stock materials. Not only does it reduce the labor and time in the making of the structure through automation, it also drastically reduces material waste for construction. The knit formwork is lightweight, transportable and can be deployed for casting anywhere. "It uses less concrete and cement as a material," Ng says. "And so, there's a lot of pluses when we start rethinking how we cast concrete."

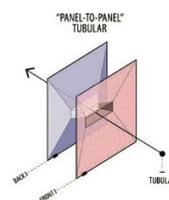
The research team has come up with several knit types of varying stretch that create diverse formworks. By inflating the knit with concrete, you end up giving both the concrete and the soft textile it's final form. "In the end, we don't know the final form until the knit is cast," says Ng. In one example, the team used a single jersey knit with



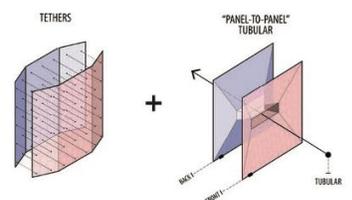
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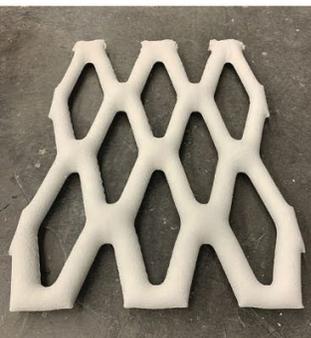
DRUPELET



APERTURES



3D FUNNEL SHELL



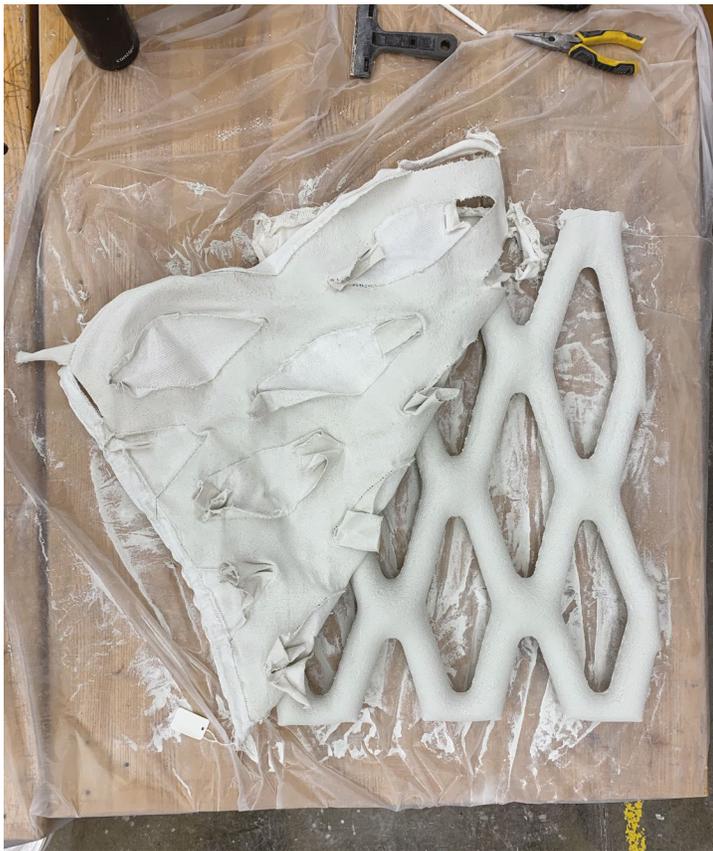
CNC knit types and cast typologies

Photo: Tsz Yan Ng, Sean Ahlquist



Demolding diagrid cast

Photo: Sean Ahlquist



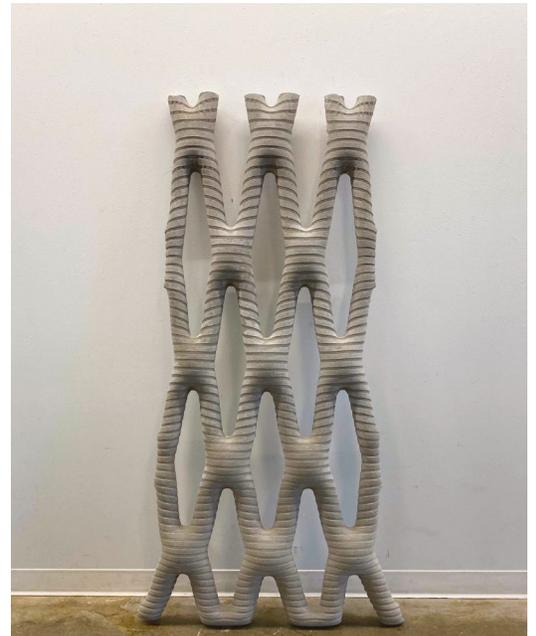
Demolding of diagrid cast with polyester jersey knit

Photo: Tsz Yan Ng

polyester that could be removed quite easily after forming the concrete shape.

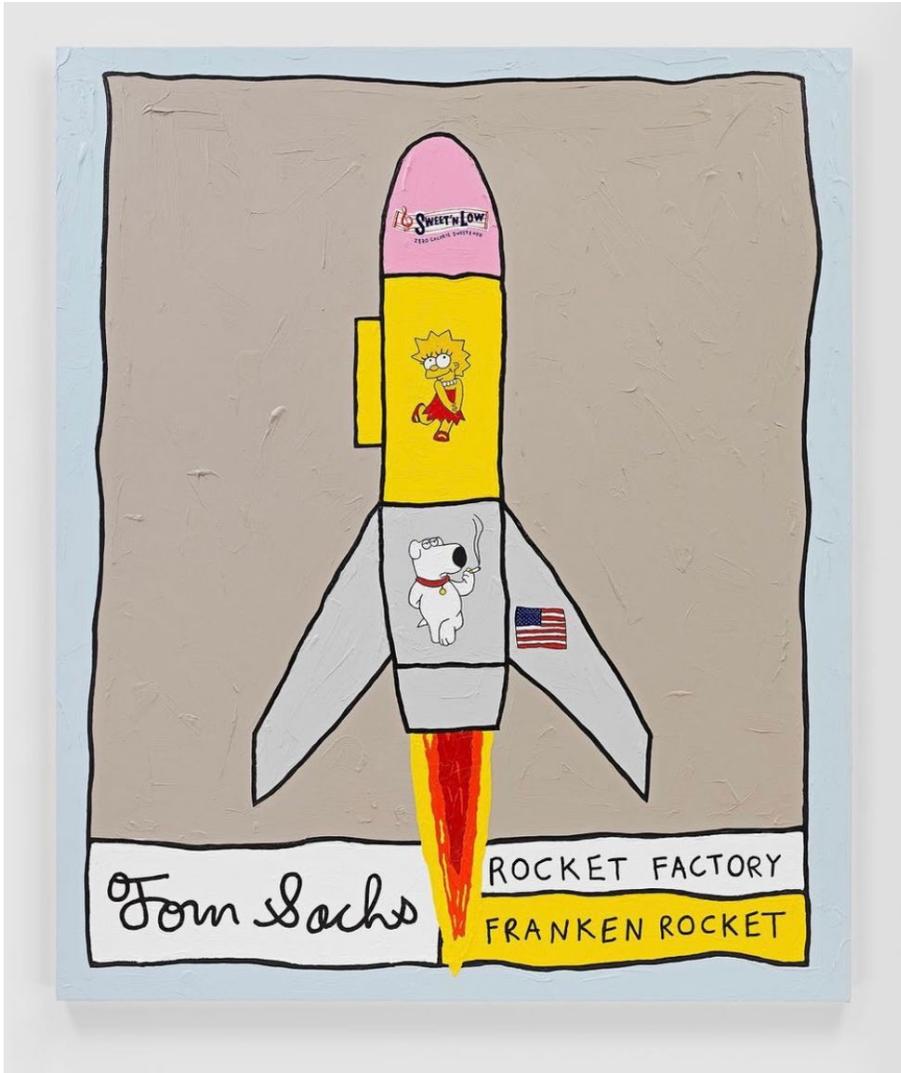
The researchers have developed simulation models to better understand the effects of the knit in relation to the hydrostatic pressure of the concrete. They have also experimented with different materials. In one case, they used acrylic which was heated and vacuumed over a diagrid cast, creating a complete seal to the panel and resulting in a space-age bubble-like window. Ng hopes to be able to develop different ways to assemble the products so that they can be put together either on- or off-site.

“Our built environment is composed of different materials, which means that instead of just using one material like 3D printing, we could use several materials,” Ng says. “As you’re creating an interior or exterior wall panel, you could create views out of it, using not only concrete but also glass. The challenge is figuring out how to do this at scale.”



Diagrid cast with rib texture

Photo: Tsz Yan Ng



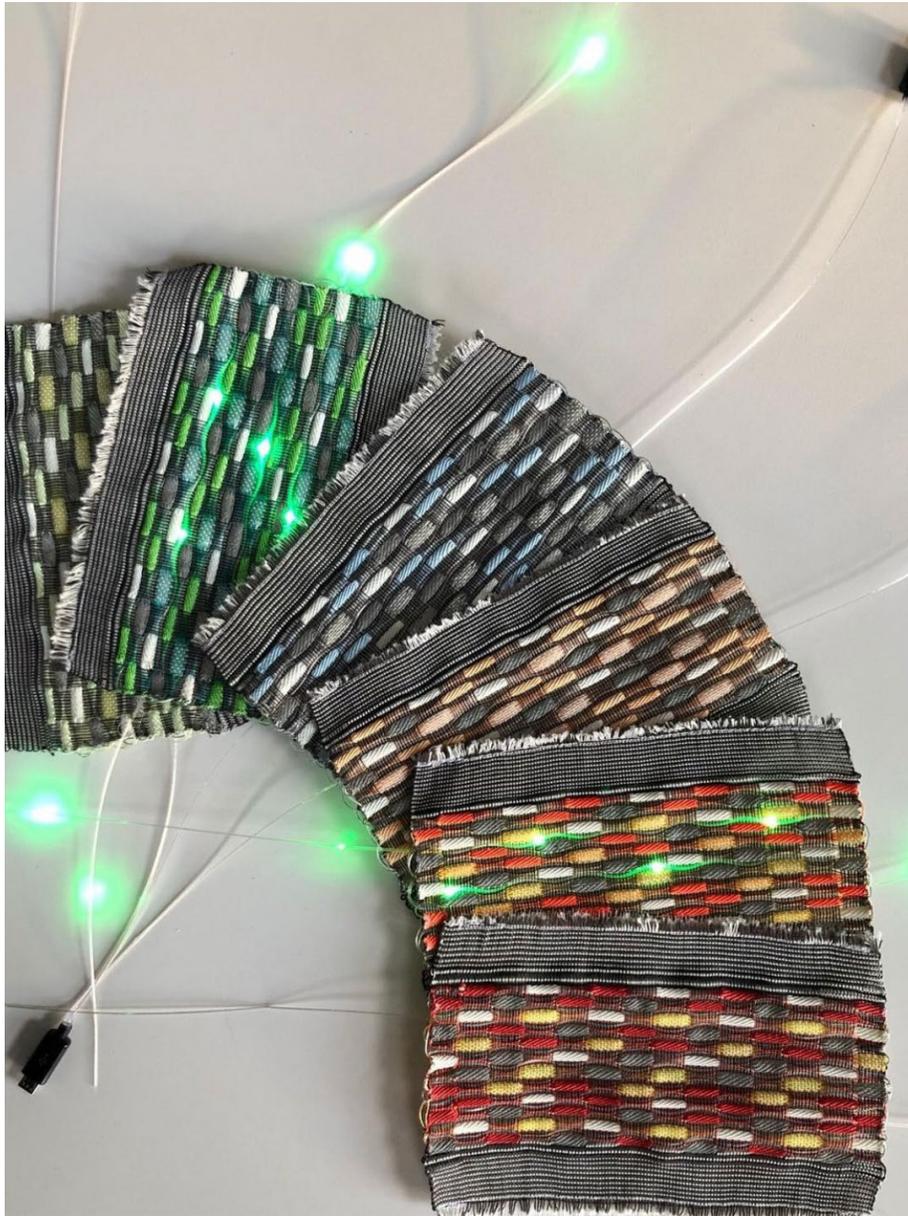
Tom Sachs  
*Admiral Ackbar (2022)*

Synthetic polymer and Krink on canvas.  
72 H x 60 W x 1.5 D inches  
S/N: 2022.072  
Photo via @tomsachs

——— @tomsachs

## *DIY Space*

The New York-based artist Tom Sachs is inspired by do-it-yourself culture and evidence of the hand throughout an object's construction. One of his obsessions is exploring outer space through his "Tom Sachs Space Program: Indoctrination," where he recreates mock space missions and NASA's moon landing through a DIY sculptural installation of sorts. Along the way, he shows the audience about our use of natural resources and survival on earth, reflecting on the issues of colonizing new environments in search of new resources—all through the use of everyday materials like plywood, duct tape and solder.



Elizabeth Whelan  
*LED2b2*

LED2b2, designed by Elizabeth Whelan, is woven with a monofilament yarn embedded with light-emitting diodes, an integration that elevates the fabric itself into a communication device.

Photo via @elizabethwhelandesign

—— @elizabethwhelandesign

## *Computing Fabrics*

Elizabeth Whelan is a textile designer, based in Maine, who has worked with Nike, Humanscale, and Tumi, among others, developing innovative materials such as light-reflective sports fabrics, high-performance chair meshes and experimental woven LED smart fabrics. Whelan discussed her work in “Computing Fabrics”, a collaborative course between MIT and RISD, in which students investigated the degree to which fabrics are powerful forms of synthetic engineering and product expression.



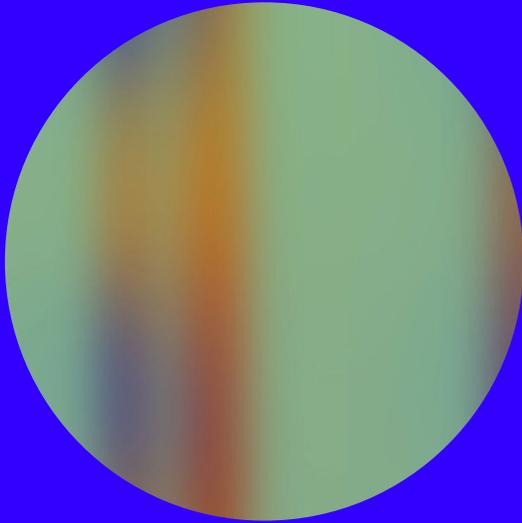
Peter Sekaer  
*Untitled* (New York, ca. 1934)  
Gelatin silver print photograph  
Photo courtesy The National Collection of  
Photography, Denmark

— @areasvellas

## *Dreaming of Architecture*

With a following of over 113,000, Spanish architect Angel Muñoz obsessively posts mostly monochrome images (over 33K to date) of the spatial environment, often highlighting obscure projects by iconic architects like Le Corbusier and Wright (his rubber village, anyone?), in addition to discoveries of works by lesser-known photographers and architects. One day, he'll post a 1920s abstract photo by Ralph Steiner, and the next day you'll discover the work of Matthew Borrett, a Canadian illustrator who draws spaces you want to hide in or hide from.

The result is a mood board that borders on an other-worldly, utopian, dreamscape.



— Digital Wallcovering

## Borealis

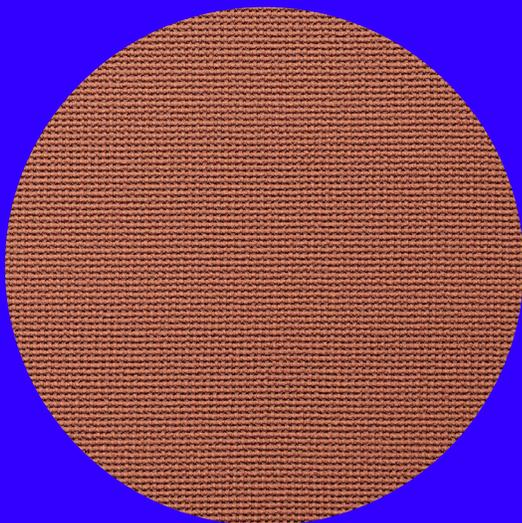
Bradley L Bowers designed *Borealis* as a testament to the fact that everything in life is in the process of happening. This pattern's soft gradient resembles spectral (or alien!) forms morphing into view with a look of subtle movement. Check out the [Chromalis Collection](#) for more of Bowers' work.



— Wall Protection

## RAMPART® Resolve™

[RAMPART Resolve](#) protects walls against impact and abrasion in high-traffic interiors, and it's PVC-free. *Redondo* is an intricate, multi-textured embossing joined with a highly detailed print—with metallic accents—to achieve the appearance and tactile experience of concrete (or the moon's surface!). *Redondo* is a flexible alternative to rigid sheet goods that can be applied to irregular surfaces, such as CMU blocks, when paired with [RAMPART Stronghold](#).



— Upholstery

## Sirona

This inherently antimicrobial upholstery textile is worthy of the space age! Unlike other antimicrobial fabrics that contain harmful topical chemical treatments, *Sirona* is woven with Protect+ technology which embeds natural copper and silver salts into recycled polyester to permanently inhibit the growth of microbes—including staph, E. coli, and klebsiella—in or on the fabric, and reduce the odor caused by bacteria. Safe for human health and the environment, *Sirona* will stand up to bleach-, peroxide- and disinfectant-based cleaners.



— Exhibition

## Destination Moon

National Air and Space Museum  
Washington, DC

October 14, 2022 - Ongoing

For centuries, humans dreamed of traveling to the Moon. In 1959, our machines actually began to go there. A decade later, two humans walked on its surface. Building on the Museum's collection of Mercury, Gemini, and Apollo artifacts, *Destination Moon* showcases how an extraordinary combination of motivations, resources and technologies made it at long last possible for humans to walk on the Moon. It begins with ancient dreams of lunar flight, takes the visitor through the Space Race of the 1950s thru 1970s, and ends with what is happening now.

*One of the first steps taken on the Moon, this is an image of Buzz Aldrin's boot print from the Apollo 11 mission. Neil Armstrong and Buzz Aldrin walked on the Moon on July 20, 1969.*

Photo: NASA GPN-2001-000014



— Catalog

## Betty Cooke: the Circle and the Line

By Jeannine Falino and  
Eleanor Hughes

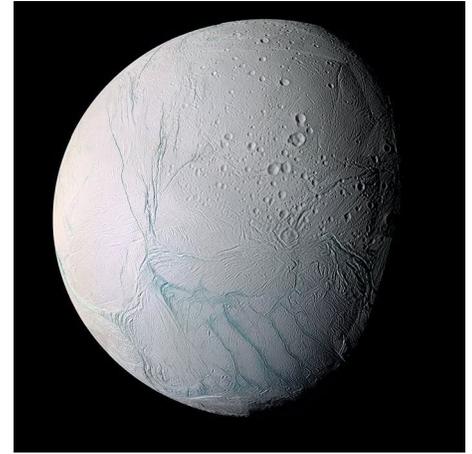
Published by the Walters Art Museum  
in association with D. Giles Limited  
Baltimore, MD

This catalog accompanied the 2021-22 retrospective exhibition of the same title on the work of Betty Cooke, one America's premier modernist jewelry artists. Cooke's work is deeply personal, witty and full of emotional meanings. Her conviction is, "With a circle and a line, you can make anything." Her inspiration varies—from the natural world, especially animals and birds, to kinetic forms—using materials such as metal tubing, enamel, wood and gemstones to create modernist abstract works that have been featured in *Vogue* and dozens of other publications. The catalog showcases approximately 160 objects, demonstrating how Cooke's jewelry functions as individual works of art and, in relation to the body, as sculptures in motion.

*Betty Cooke: the Circle and the Line* (2020)

Cover Image: Detail of *Gold necklace* (1988)

Photo courtesy Betty Cooke and the Walters Art Museum.



— Collection

## Unknown Unknowns

La Triennale di Milano  
Milan, Italy

until December 11, 2022

*Unknown Unknowns*, curated by Ersilia Vaudo, Astrophysicist and Chief Diversity Officer of the European Space Agency, discusses the idea of an area with boundaries that are hazy and permeable, and showcases more than a hundred works by international artists, researchers and designers dealing with the unknown. It also addresses a series of themes, including gravity—"the greatest designer"—that tirelessly shapes out universe. *Unknown Unknowns* ponders new challenges facing architecture, such as how to live in extraterrestrial space, and, ultimately, mysteries linked to deep space.

*The complex terrains of Saturn's icy-moon Enceladus.*

Photo: NASA/JPL-Caltech

## — Take a Look



### — Exhibition

## Archive of the World: Art and Imagination in Spanish America, 1500-1800

Los Angeles County Museum of Art  
Los Angeles, CA

until October 30, 2022

This is LACMA's first exhibition of their notable holdings of Spanish American art. Following the arrival of the Spaniards in the Americas in the 15th century, the region developed complex artistic traditions that drew on Indigenous, European, Asian and African art. Private homes and civic and ecclesiastic institutions in Spanish America were filled with imported and locally made objects, many of which had traveled across the globe. Featuring approximately 90 works, including several recent acquisitions, the exhibition emphasizes the creative power (and plunder) of Spanish America and its regional inventory that could be described as the "archive of the world."

Vicente Albán  
Detail, *Noble Woman with Her Black Slave*  
(*Señora principal con su negra esclava*) (1896)

Ecuador

Los Angeles County Museum of Art, purchased with funds provided by the Bernard and Edith Lewin Collection of Mexican Art Deaccession Fund

Photo © Museum Associates/LACMA



### — Exhibition

## Before Yesterday We Could Fly: An Afrofuturist Period Room

The Metropolitan Museum of Art  
New York, NY

Ongoing

Drawing on *Afrofuturism*, this period room embraces the African and African diasporic belief that the past, present and future are interconnected. It focuses on Seneca Village—a vibrant 19th century community of predominantly Black landowners and tenants—which flourished in what is now Central Park. In 1857, the City of New York used eminent domain to seize Seneca Village land, displacing its residents and leaving only the barest traces of the community behind. Presented with a variety of works from The Met's collection—from Bamileke beadwork and 19th-century ceramics to contemporary art and design, it presents only one vision for what might have been, had Seneca Village been allowed to thrive into the present and beyond.

Roberto Lugo  
*Digable Underground* (2021)

Glazed stoneware, enamel paint, and luster.

Metropolitan Museum of Art, purchase, The Kay Unger Family Foundation Gift, 2021

Courtesy The Metropolitan Museum of Art

# HOWL

Inspiration for Creatives  
from *Wolf-Gordon*

Next Issue: Winter 2022.  
See you then!

Feedback and suggestions for  
future content should be addressed  
to [howl@wolfgordon.com](mailto:howl@wolfgordon.com).



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