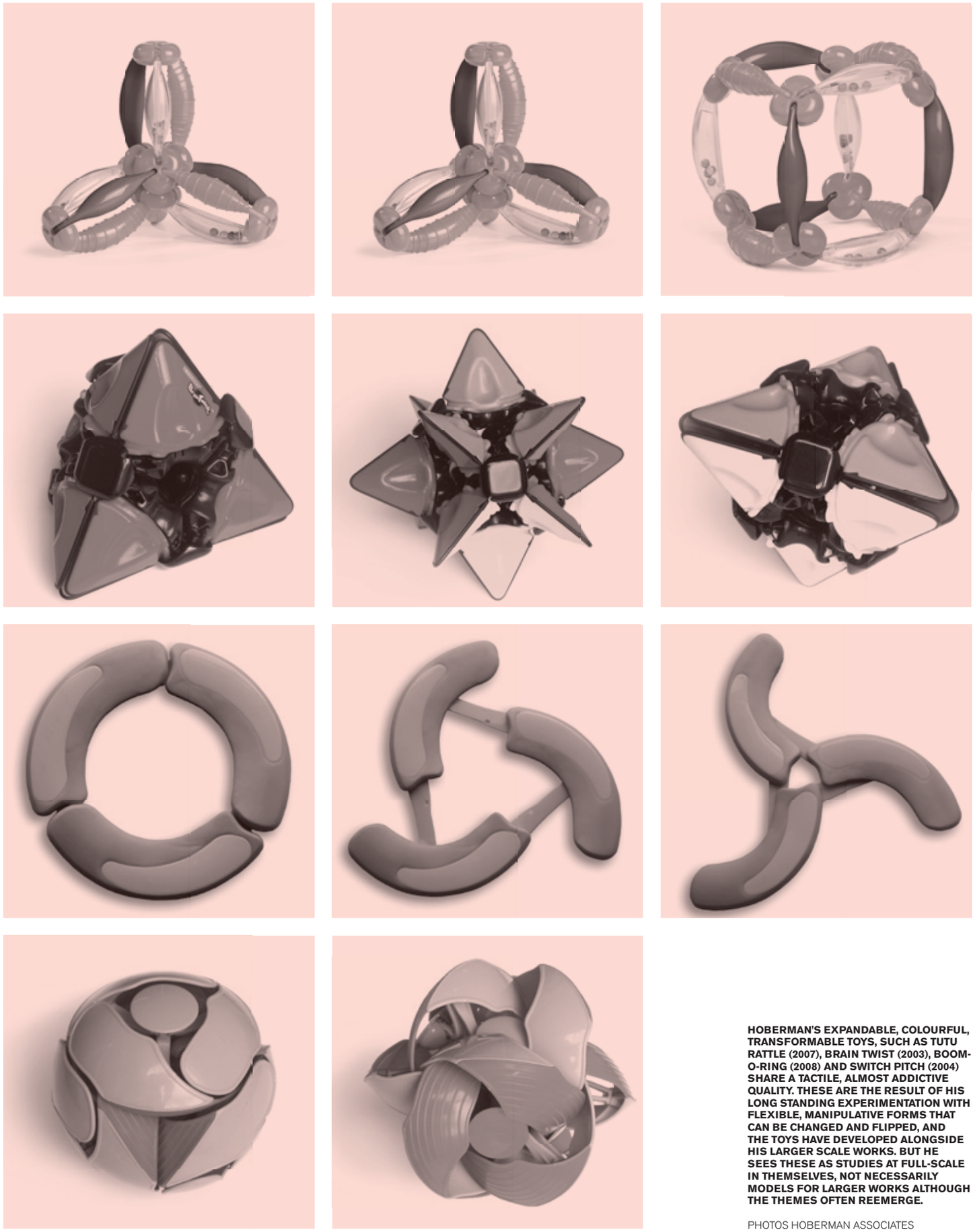


HOBERMAN'S EXPANDABLE, COLOURFUL, TRANSFORMABLE TOYS, SUCH AS TUTU RATTLE (2007), BRAIN TWIST (2003), BOOM-O-RING (2008) AND SWITCH PITCH (2004) SHARE A TACTILE, ALMOST ADDICTIVE QUALITY. THESE ARE THE RESULT OF HIS LONG STANDING EXPERIMENTATION WITH FLEXIBLE, MANIPULATIVE FORMS THAT CAN BE CHANGED AND FLIPPED, AND THE TOYS HAVE DEVELOPED ALONGSIDE HIS LARGER SCALE WORKS. BUT HE SEES THESE AS STUDIES AT FULL-SCALE IN THEMSELVES, NOT NECESSARILY MODELS FOR LARGER WORKS ALTHOUGH THE THEMES OFTEN REEMERGE.

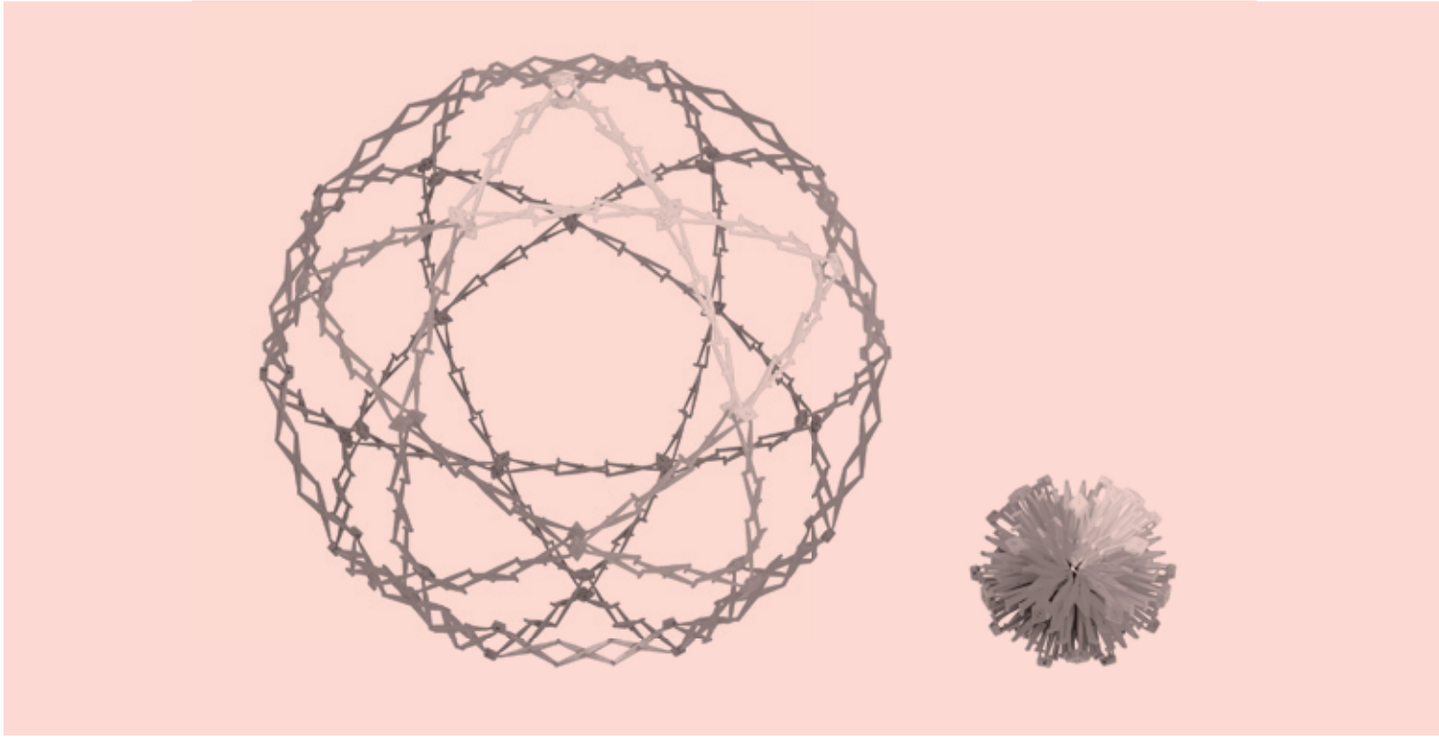
PHOTOS HOBERMAN ASSOCIATES

Text **Terri Peters**

CHUCK HOBERMAN

DESIGNS TRANSFORMATIONS

CHUCK HOBERMAN.
PHOTO HOBERMAN ASSOCIATES



HOBERMAN SPHERE.
PHOTO HOBERMAN ASSOCIATES

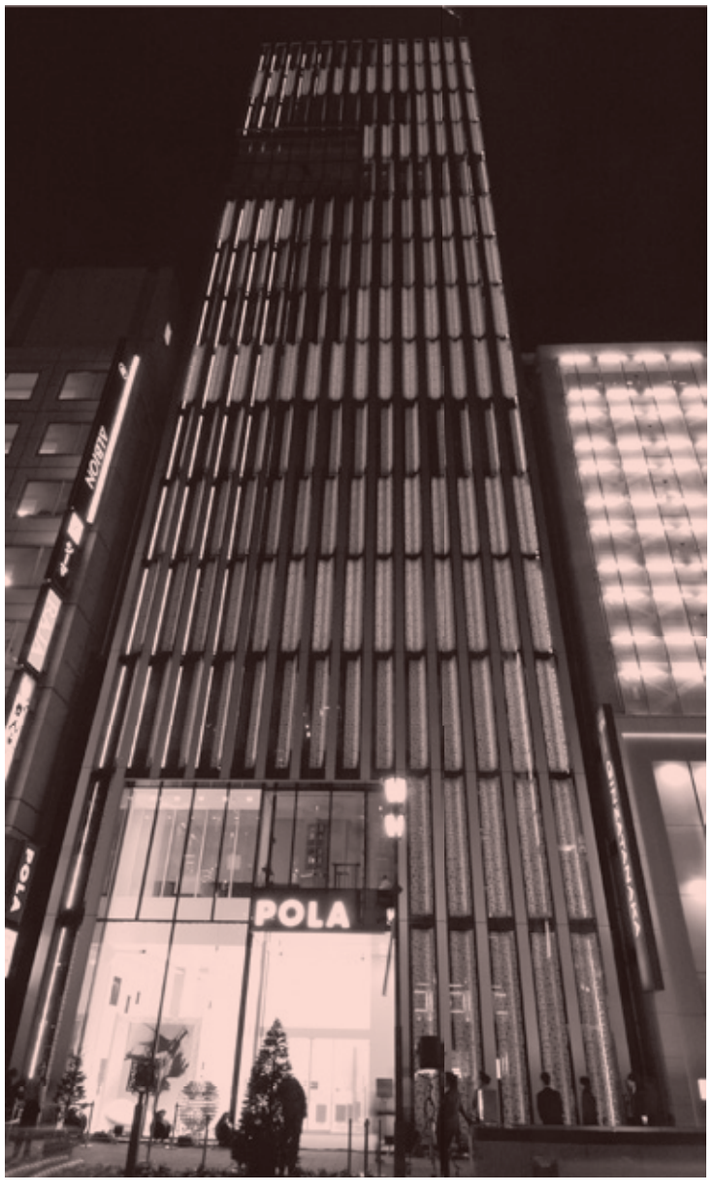
It seems every single thing in inventor, artist and engineer Chuck Hoberman's Manhattan studio space moves. If you look hard enough, you will note that every prototype or full-scale building component has an expandable or adaptable design. Even the man himself seems to be constantly moving, thinking about design problems, tapping his pencil, scrolling through his iPad, his mind filled with designs for things that adapt or convert into something else. From toys to space satellites, Hoberman's ideas are difficult to classify. He calls himself 'a designer of transformations'.

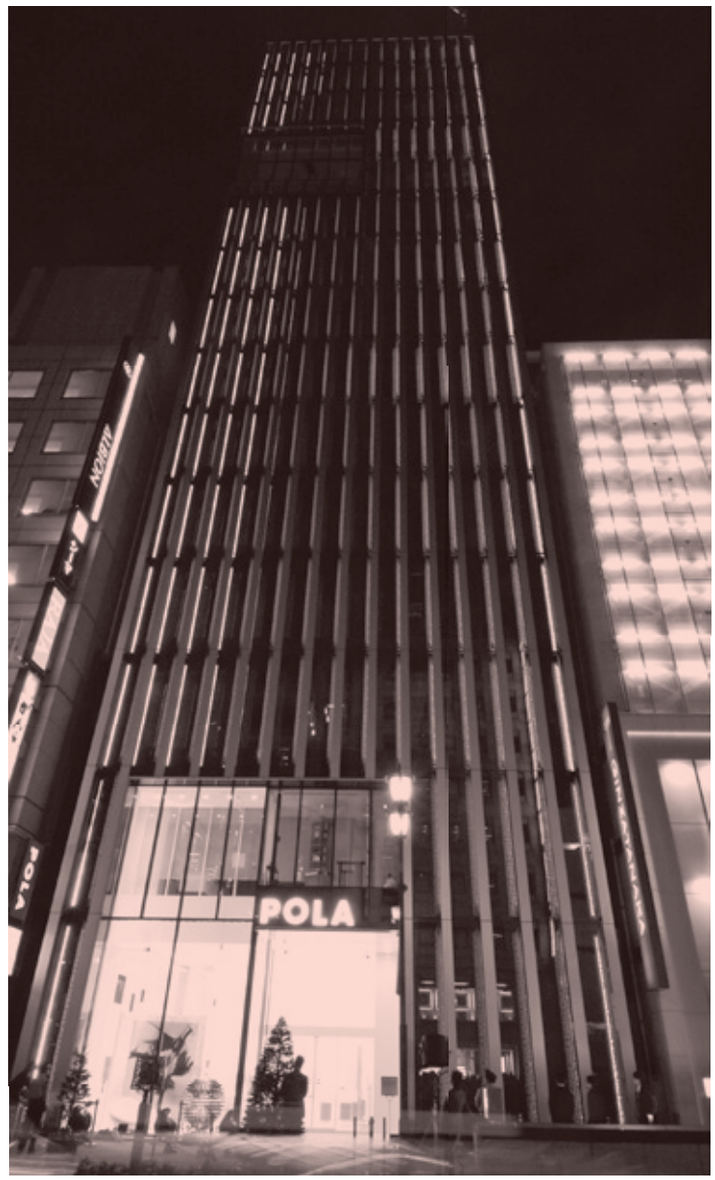
Originally trained as a sculptor and mechanical engineer, Hoberman now tackles art, architecture, product design and engineering all at once. Over the past 20 years, as head of Hoberman Associates, he has established himself as a wizard in geometry and creative mathematics through his folding, shape-shifting and retractable designs. In 2008 he cofounded Adaptive Building Initiative (ABI) with engineers Buro Happold. Their aim is to design for what Hoberman calls 'the widest horizon possible': architectural components for the built environment.

His approach to the Hoberman Sphere, perhaps his most well-known invention, illustrates his way of working across scales and materials, focusing on the idea and its buildability. 'As an inventor, I have a pretty good idea of the value of an idea. Without it, nothing happens. But I also know it is a very small percentage of what needs to be done.' The Hoberman Sphere was first produced as a 318-kg kinetic aluminium centrepiece for the atrium of New Jersey's Liberty Science Center. Later, the design was mass-produced as a colourful children's toy in the form of a lightweight, flexible plastic dome that opens and closes. Last year Hoberman was approached by navy scientists to develop the concept for a radar-calibration satellite for the US Naval Research Laboratory. The toy version is officially a 'design classic', having this year entered the collection of the Museum of Modern Art (MoMA). 'I have a lot of ideas about making gadgets and stuff,' he says modestly, 'but it is not about the final object. I design relationships, not things.'

'When I started designing transformable objects,' Hoberman continues, 'I thought about it in terms of mathematics and physical possibilities. But I think it is important to also focus on where things meet and on how to apply that capability to specific design problems.' Creating flexible, moving, shape-changing objects relies on the design of parameters and on an understanding of material and formal performance. 'And then when "parametric design" came along, it was like all of a sudden there was a name for what we did.'

Currently occupying the centre of the office – between, on one side, a workshop area with 3D printers, laser cutters and woodworking tools and, on the other side, a smaller office area with desks, tables and full-size physical prototypes – is a temporary workshop used to test the upcoming top-secret installation for the fifth floor of the »

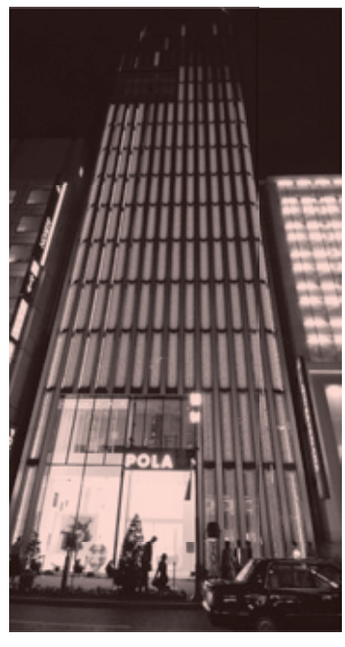




POLA Ginza Building Façade

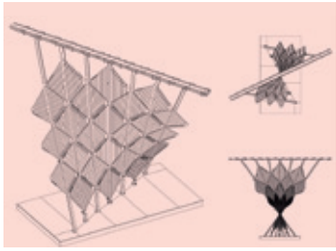
Tokyo / Japan
2009
In collaboration with Nikken Sekkei and Yasuda Atelier
Photos Koichi Yasuda

POLA, a Japanese cosmetics manufacturer, asked for an adaptive shading system for its new showroom building in the Ginza district of Tokyo. The 14-storey building features 185 individually controlled shutter mechanisms that are housed within the double glazing of the façade. Each shutter is approximately 1 x 3 m and is made of a moulded sheet of curved acrylic resin.



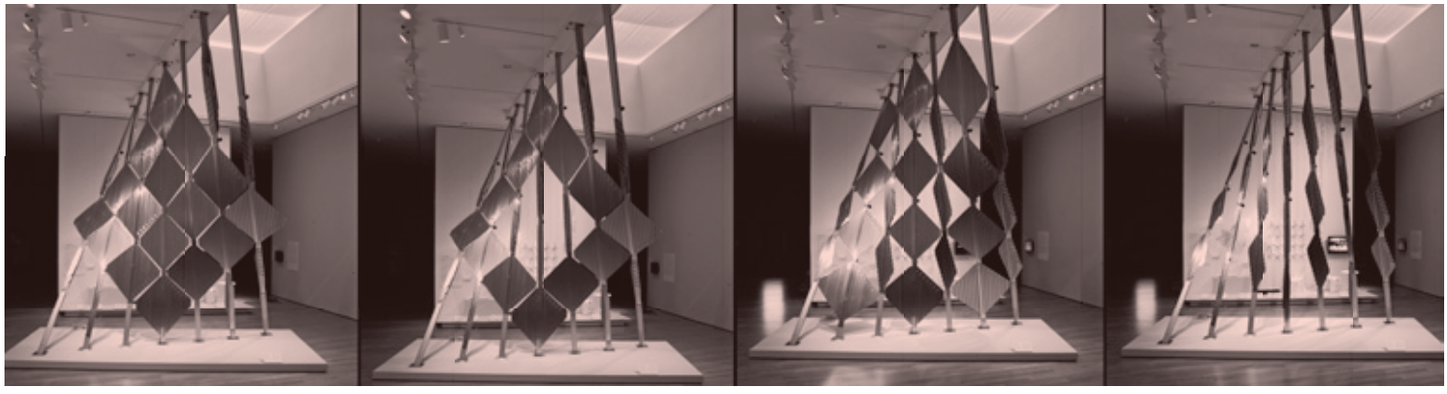
its joints to contract and fold down to a fraction of its normal size. 'The scale and parameters are so ambitious,' he says. 'I ended up thinking of the Iris idea upside down, to get the elliptical shape.' The structure is like a living, breathing organism, and video images stretched over its frame give it a constantly changing skin. Hoberman collaborated with U2's creative team and consultants from Buro Happold, who conducted performance analysis using custom software. 'It's a video display that becomes something else – a living, theatrical event,' says Hoberman. He designed the extreme technology that allowed the giant stretchy screen to morph into a seven-storey-high, cone-shaped structure. The challenge was to design a screen and construction robust enough to withstand the high winds and weather of outdoor concerts, while keeping in mind that the set would need to be assembled in eight hours and quickly disassembled after each show for transport to the following venue – in one of the 22 countries on the tour.

Around the same time, work was completed on another large-scale transformable design. In 2009 Hoberman put the finishing touches on his first project with the Adaptable Building Initiative: a 14-storey building façade in Tokyo for POLA Cosmetics. Working



‘Embedding a building with physical intelligence – this is the future’

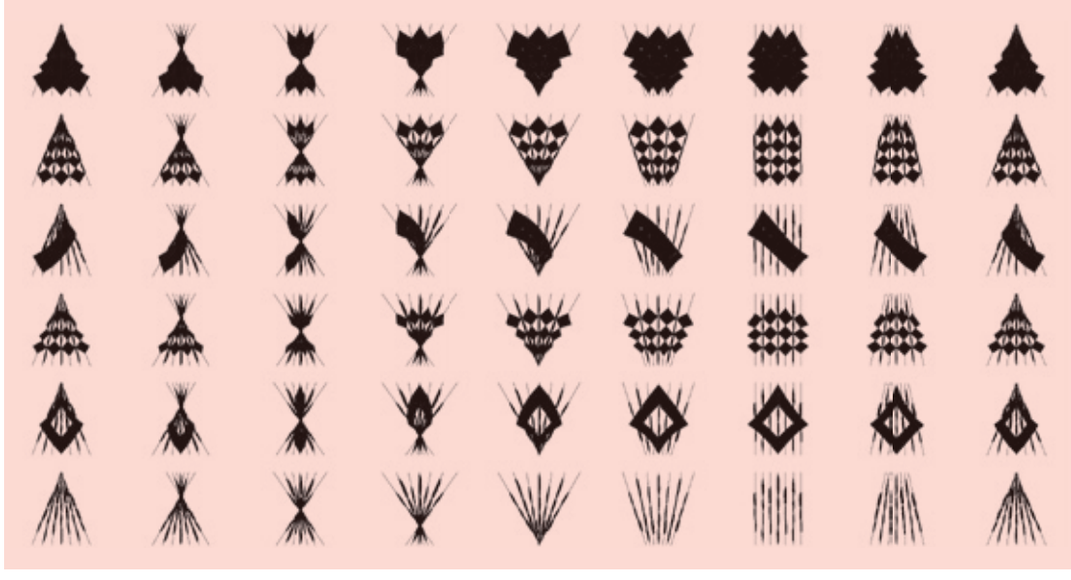
Chuck Hoberman



Emergent Surface

The Museum of Modern Art
New York (NY) / USA
2008
Photos Hoberman Associates

Emergent Surface is a wall that continuously reconfigures itself as portions selectively disappear and reappear. In one condition, the piece appears as a solid surface with a three-dimensional curvature. In another, it resolves itself into seven slender poles running floor to ceiling. Between these extremes lies an infinite variety of configurations.



with the building’s architects, Nikken Sekkei and Yasuda Atelier, he devised a façade that provided the location, the posh Ginza neighbourhood, with an adaptive and decorative installation. ‘Architectural works always have both experience and performance aspects; it is a sort of sliding scale,’ Hoberman says. ‘Here the clients wanted to create brand expression, to have an expanding and adaptable façade.’

Hoberman designed a custom kinetic mechanism by which the façade panels respond to environmental stimuli with an opening and closing effect. Buro Happold contributed its expertise in constructability and performance analysis. ‘I thought: what can we make it do? What is its transformative capacity? There is an idea here about changing the media of building itself.’ Using sheets of moulded curved acrylic resin, he sandwiched 185 environmentally responsive shutters between two layers of glazed façade. These shading panels cover about 930 m^2, and each LED-studded modular panel screens sun and heat during the day, casting snowflake patterns of light on the floors. A difficult building to photograph, it is camouflaged into its surroundings, pretending to be a typical mid-rise, curtain-wall office building. Inside, however, a changing kaleidoscope of patterned light hits the concrete floor slabs. Hoberman’s 1-x-3-m, floor-to-ceiling screens allow in filtered light but not heat as they move and stretch past the various rooms. At night, passers-by enjoy a striking light show as the building’s vertical louvre panels appear to expand and contract across each floor.

Hoberman is eager to compete for more architectural projects. With ABI, he is developing a series of projects – currently in the design stage – with architects Foster + Partners, including a series of retractable roofs for a market in Abu Dhabi and an environmentally responsive shading system for law courts (the largest in Europe) in Madrid.

He aspires to design new relationships between people and the environment, using adaptation and transformation. ‘How can new technologies create new business models and collaborative relationships that develop into a platform for significant reforming of what buildings can be?’ he asks.

‘I think there is an imperative for innovation – climate change is a big one.’ Hoberman believes time-based, responsive architecture is the next major challenge for architecture. ‘Embedding a building or façade with physical intelligence – this is the future.’ «

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