INTERACTIVE THERMOPLASTIC PAVILION BY B+U

ARCHITECTURE, ART, DESIGN, FABRIKATOR, TECHNOLOGY, WEST
FRIDAY, JULY 25, 2014
ANNA BERGREN MILLER.

Fabrikator

BAUMGARTNER+URIU DESIGNED AND BUILT APERTURES WITH STUDENTS FROM SCI-ARC. (JOSHUA WHITE)

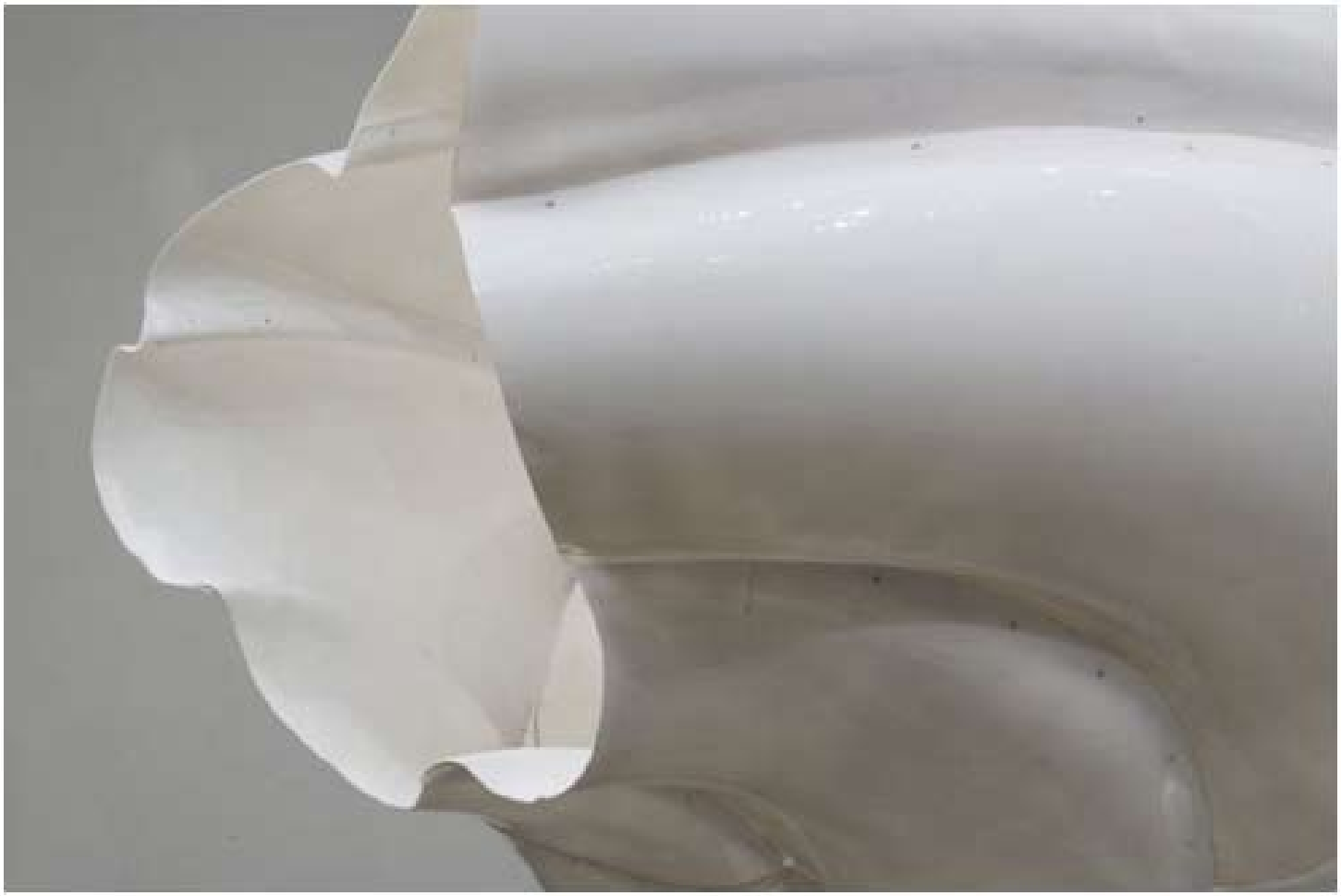
A thin shell pavilion with an audio feedback program invites engagement.

Apertures, the amorphous pavilion designed and fabricated by Baumgartner+Uriu (B+U) with students from SCI-Arc, challenges two of architecture's defining dualities: the distinction between wall and window, and the division between exterior and interior. "Conceptually, we were looking at objects that are multi-directional and have apertures as their main theme," said partner Herwig Baumgartner. "That was one aspect of it; the other was the barriers between inside and outside and how we can dissolve these. We're interested in architecture that's responsive through either movement or sound." As visitors pass through or otherwise engage with the 16-foot-tall, 1/8-inch-thick structure's many rounded openings, attached heat sensors trigger sounds based on human bio-rhythms, creating a feedback loop that encourages active exploration of the space.

BAUMGARTNER+URIU DESIGNED AND BUILT APERTURES WITH STUDENTS FROM SCI-ARC. (JOSHUA WHITE)

A thin shell pavilion with an audio feedback program invites engagement.

Apertures, the amorphous pavilion designed and fabricated by Baumgartner+Uriu (B+U) with students from SCI-Arc, challenges two of architecture's defining dualities: the distinction between wall and window, and the division between exterior and interior. "Conceptually, we were looking at objects that are multi-directional and have apertures as their main theme," said partner Herwig Baumgartner. "That was one aspect of it; the other was the barriers between inside and outside and how we can dissolve these. We're interested in architecture that's responsive through either movement or sound." As visitors pass through or otherwise engage with the 16-foot-tall, 1/8-inch-thick structure's many rounded openings, attached heat sensors trigger sounds based on human bio-rhythms, creating a feedback loop that encourages active exploration of the space.



THE 1/8-INCH-THICK STRUCTURE WAS BUILT OF HEAT-FORMED PLASTIC. (JOSHUA WHITE)

In addition to the themes of apertures and inside versus outside, B+U were interested in investigating the technology of thin shell structures. "How can you build something that's over ten feet tall and very thin, and what's the minimal material you can get away with?" asked Baumgartner. The architects used digital modeling software including Maya to determine the pavilion's form, then constructed a series of mockups in different materials. "We'd be working with consultants, or we'd ask fabricators: how would they build this?" recalled partner Scott Uriu. "We were thrown quite a few interesting ideas. A lot of them wouldn't quite pan out, but we were always working back and forth between digital and analog design."

APERTURES EXPLORES THE NATURE OF WALL AND WINDOW, AND THE RELATIONSHIP BETWEEN INSIDE AND OUTSIDE. (JOSHUA WHITE)

The designers originally tried building Apertures out of acoustic foam. "It was interesting for us because it creates an absorptive environment, but it was very weak," said Baumgartner. They considered supporting it with an egg-crate structure. "But in the end we said, 'Let's get rid of the structure and make the surface the structure,'" he explained. They landed on heat-formed plastic, a thin material that becomes self-supporting when molded into certain shapes. "We did a mockup and we really liked it," said Baumgartner. "It's glossy and shiny on the outside, but the inside was matte. It has a very different interior and exterior." Matt Melnyck, a principal at Nous Engineering, worked closely with B+U to insure the pavilion's stability.

AS VISITORS EXPLORE THE SPACE, ATTACHED HEAT SENSORS TRIGGER A SOUNDTRACK BASED ON HUMAN BIO-RHYTHMS. (JOSHUA WHITE)

With 35 students from SCI-Arc, B+U CNC-milled polyurethane foam molds for the pavilion's 233 panels. At Warner Bros. Staff Shop, they poured the hot plastic resin over the molds, then cut out and painted the components. Reveals and guides milled into the molds indicate attachment points; the panels are joined with aluminum rivets. On site at SCI-Arc, the design team assembled the panels into nine sections of 30-40 panels each before lifting them into place. Designed for easy assembly and disassembly, the structure "breaks down into 233 panels and nests well," said Uriu.

Fabricator B+U with SCI-Arc students

Designers B+U

Location Los Angeles

Date of Completion 2014

Material thermoplastic polymer resin, aluminum rivets

Process Maya, modeling, CNC milling, heat forming, bolting, lifting

Media artist Hannes Köcher developed Apertures' audio program based on B+U's concept. "If you stick your head through the apertures or you walk through them, the majority of them have sensors. Different sensors trigger different sounds—we basically made a thermal map of the object," said Baumgartner. "When you're in the space and especially when there's multiple people in the space, it heats up. The sound starts building up over time, almost like a polyphony thing." Because the audio is delivered through transducer speakers, visitors feel as well as hear the rhythms. During its spring showing at SCI-Arc, the result was exactly as B+U had hoped, Baumgartner reflected. "People started interacting with it, entering into a sort of feedback with the sounds."

Apertures comprises 233 unique panels. (Courtesy B+U)

The panels were first assembled into nine super-components. (Courtesy B+U)

Each super-component, or pod, contains 30-40 panels. (Courtesy B+U)

During the design process, the architects fabricated a series of mock-ups in different materials. (Courtesy B+U)

B+U and their students CNC-milled molds out of polyurethane foam. (Courtesy B+U)

The molds, and corresponding panels, are between three and five feet in length. (Courtesy B+U)

The design team thermoformed the panels at Warner Bros. Staff Shop. (Courtesy B+U)

Students assembled each pod on the ground. (Courtesy B+U)

Aluminum rivets join the panels for easy assembly and disassembly. (Courtesy B+U)