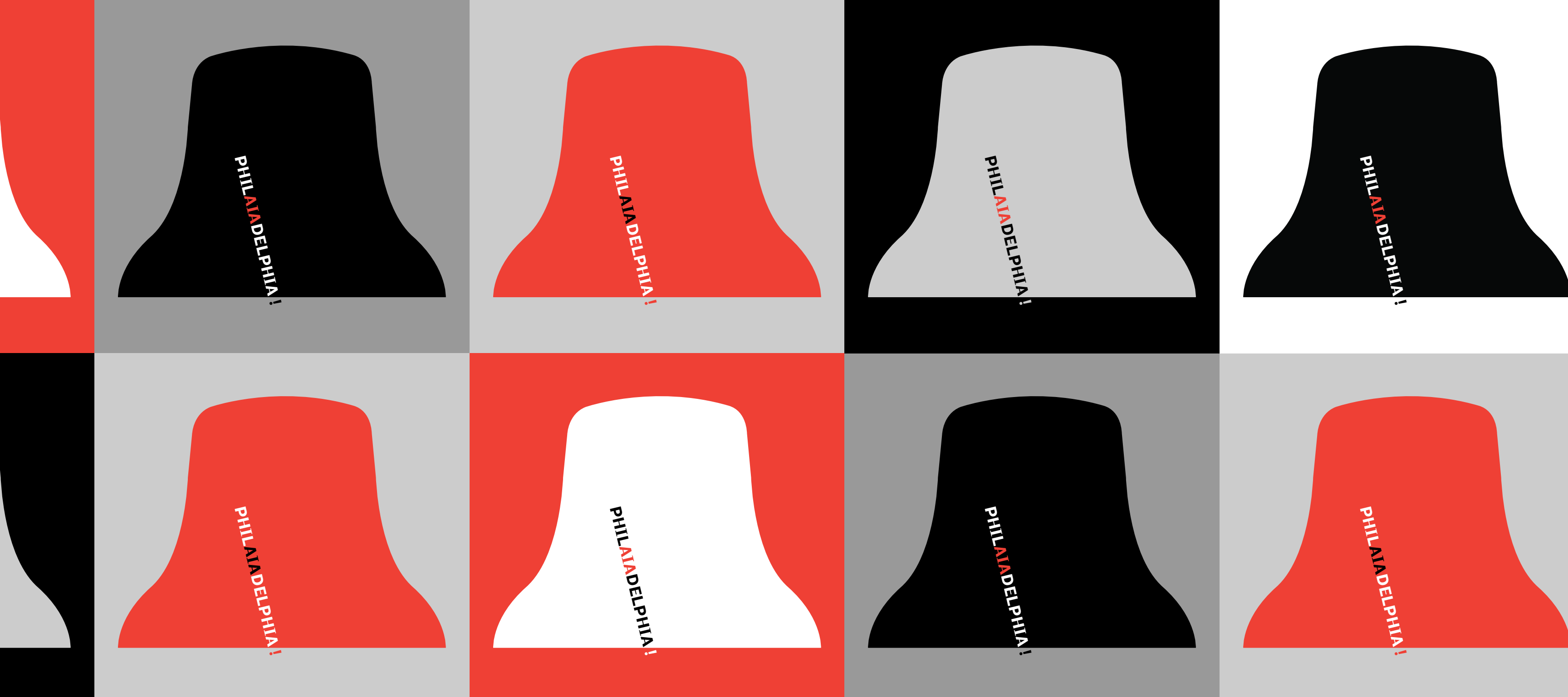
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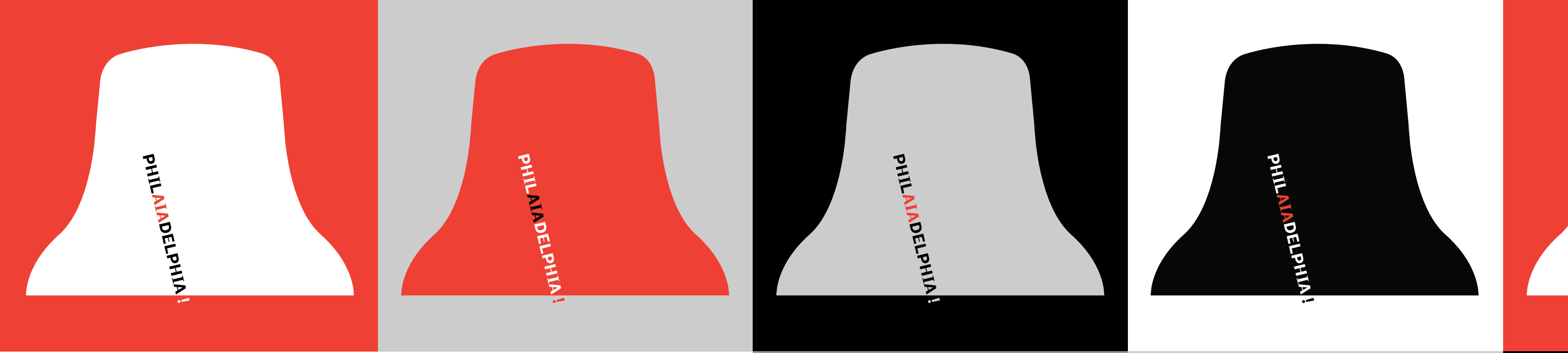

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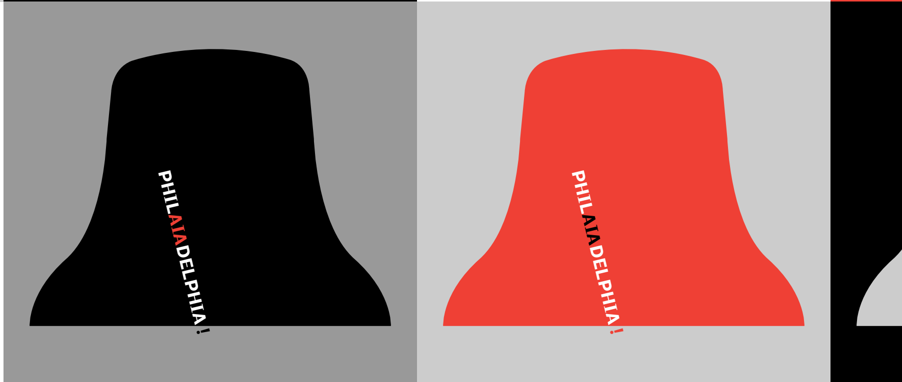

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The Journal of the American Institute of Architects

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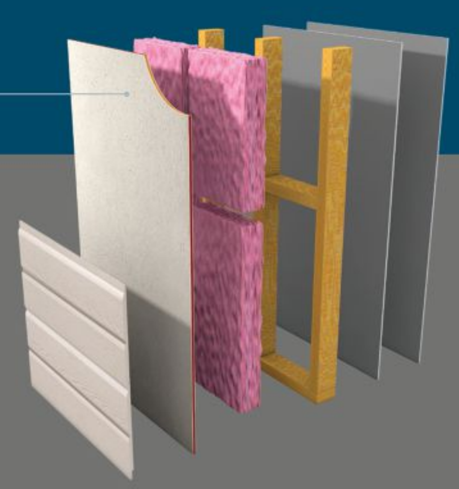

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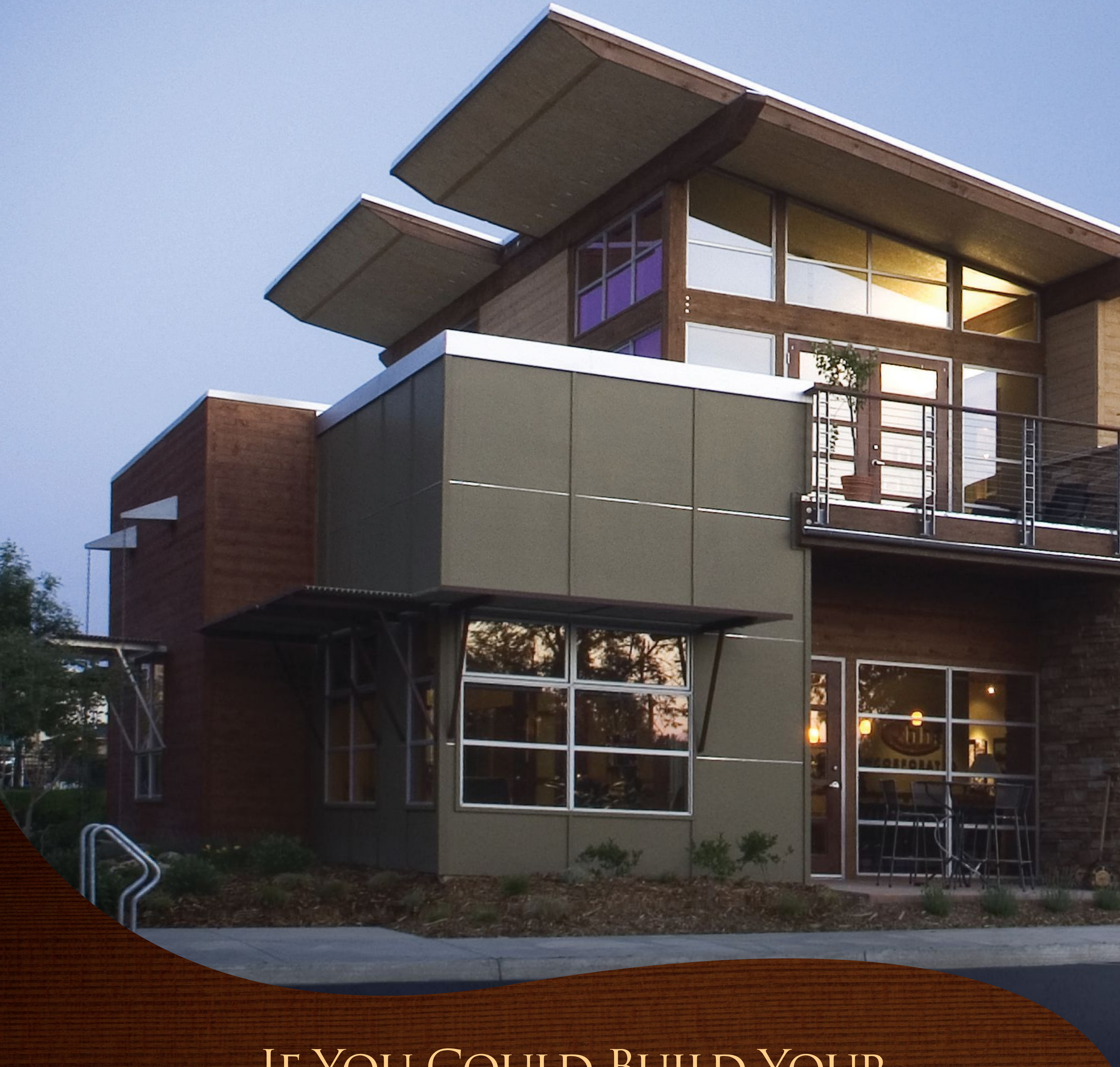


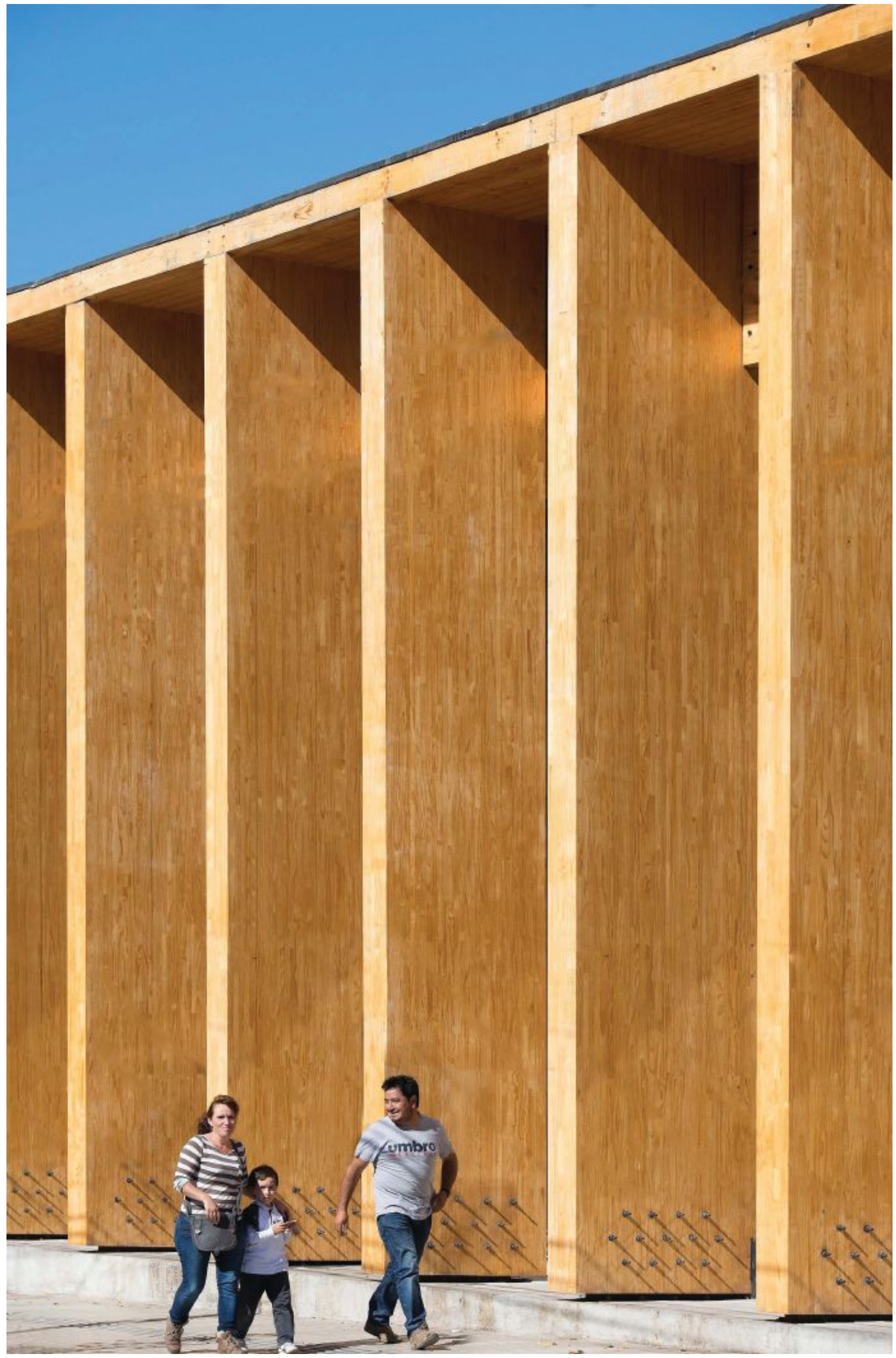
Ice Cube

In January, the Winter Stations Design Competition unveiled its winners. The competition was founded last year by Toronto firms RAW Design, Ferris + Associates, and design consulting practice Curio to transform lifeguard chairs along Lake Ontario during the colder months. This year's jury selected four architect and three student submissions, out of 378. (One winner, "Floating Ropes" by Montreal's MUDO, shown above, allows visitors to view the beach through a cube of draped ropes.) The winners get up to $15,000 Canadian for construction costs, travel costs, and honorarium, and the finished projects are on display through March 20. —SELIN ASHABOGLU

COURTESY MUDO

> *See all seven winning designs at bit.ly/2016WinterStations.*


Time Saver
Give Kids the World Towne Hall, Kissimmee, FL
Architect: C.T. Hsu & Associates, Orlando
General contractor: Welbro Building Corp., Maitland, FL
Installing contractor: Hartford South, Orlando
Material distributor: ABC Supply, Orlando
Profiles: Snap-Clad, PAC-150
Color: Patina Green
With Snap-Clad, "You don't have to come back and mechanically seam it—that's a cost and a time saver."
Donny Cammenga, project manager, Hartford South
SNAP-CLAD
Patina Green - Energy Star - Cool Color



FELIPE DIAZ CONTARDO

Chile On Top

In the midst of preparations for the May opening of the Venice Architecture Biennale, which he is directing under the theme "Reporting from the Front," socially conscious Chilean architect Alejandro Aravena has been named this year's Pritzker Architecture Prize laureate (his new cultural center in Constitución, Chile, appears above). Aravena served as a Pritzker juror from 2009 until last year, and he is genuinely modest while discussing his elevation. "The level of discussion [during the deliberations] is very high," he tells ARCHITECT. "My work isn't even close to what I witnessed." This year's jury rightly begs to differ. —EDWARD KEEGAN, AIA

> *For more on Alejandro Aravena and Element's projects, visit bit.ly/PritzkerAravena.*

The Great Memorial

The controversy over the National World War I Memorial in Washington, D.C., stems from the project's intended site: Pershing Park, a 1.76-acre landscape by M. Paul Friedberg and Oehme van Sweden just southeast of the White House. "The Weight of Sacrifice," the memorial competition winner announced last month, removes part of the 1981 park but preserves its monument to World War I hero Gen. John J. Pershing. "The design is meant to work with the existing park as much as it possibly can," says Joseph Weishaar, of Chicago's Brininstool + Lynch, who developed the design with New York sculptor Sabin Howard. —SARA JOHNSON

> *For more images of "The Weight of Sacrifice," as well as back story on the competition, visit bit.ly/WWIMemorialWinner.*

Three Firms, Six Sides

For its first exhibition of 2016, New York gallery Chamber invited Leong Leong, Levenbetts, and Steven Holl Architects to explore the artistic potential of an iconic shape: the cube. Curator Andrew Zuckerman, a photographer and filmmaker, asked the three architecture firms to produce designs inspired by the platonic solid. Chris and Dominic Leong of Leong Leong crafted the nine objects shown above out of pink Himalayan salt, and each of them has a different function, such as a mortar and pestle and an iPhone speaker. "Unpacking the Cube" is on display until March 5.

GUANG XU

CASEY SILLS

Classic Win

Scott Merrill, AIA, of Vero Beach, Fla.–based Merrill, Pastor & Colgan Architects, has won the 2016 Richard H. Driehaus Prize, given by the University of Notre Dame "to a living architect whose work embodies the highest ideals of traditional and classical architecture." Merrill will receive $200,000 and a bronze miniature of the Choragic Monument of Lysicrates in Athens, Greece. In addition, Eusebio Leal Spengler, director of the restoration program of Cuba's Old Havana and its historic center, will receive the $50,000 Henry Hope Reed Award, which recognizes nonpractitioners who support the advancement of the traditional city. —CAROLINE MASSIE

> *For more on Scott Merrill's Driehaus Prize win and images of his projects, visit bit.ly/ScottMerrillDriehaus.*

Los Angeles Opens Its Heart Of Compassion • The Vermont, Los Angeles, CA • Fabricoil Clamp System • © 2014 Cliff Garten Studio • Photography by Jeremy Green

Best Practices: How to Navigate a PR Crisis

TEXT BY ELIZABETH EVITTS DICKINSON

In 2013, the retail giant JCPenney posted a billboard outside of Culver City, Calif., featuring a stainless steel tea kettle designed by architect Michael Graves. The company quickly received complaints that the kettle resembled Adolf Hitler. Soon, the Internet picked up on the Hitler comparison and media outlets wrote stories with headlines like "Kettle That Looks Like Hitler Brews Trouble."

Dalia Stoniene, vice president of New York–based public relations firm Susan Grant Lewin Associates, told Graves, her client, to ignore the controversy. "We laughed," Stoniene says, recalling the conversation. "Do we respond to this? The answer was a resounding 'No.' How can you? It was just so silly."

> "When a problem arises, don't be defensive. It's the worst thing you can do."
>
> —Susan Lewin, president, Susan Grant Lewin Associates

Architects have always courted controversy due to the public nature of their work, but in this era of global commissions and social media, firms need to be prepared to manage crises. Communication strategists offer advice on how firms can handle criticism and turn negative press into positive growth.

Be Prepared
"We front load any project with information," says Carin Whitney, the in-house communications director at Philadelphia's KieranTimberlake. This includes creating a sheet of frequently asked questions for the press and the public, and preparing staff on how to respond to comments they might receive. When a project is particularly newsworthy, Whitney might convene a mock press event. "You practice by having people throw questions at you to see how you think on your feet," she says. "We imagine the kinds of things that people are going to seize on and we consider how best to respond."

Don't Be Defensive
Before founding her eponymous public relations firm, Susan Lewin was a journalist who covered a contentious river walk in Dayton, Ohio, designed by 1991 AIA Gold Medal recipient Charles Moore. "I asked [Moore] how he was going to defend his plan to the public, and he said, 'I have nothing to defend. I am here at a town meeting to gather ideas.' I never forgot that," Lewin says. "When a problem arises, don't be defensive. It's the worst thing you can do." Ignoring questions or ducking phone calls will only frustrate journalists.

Consider the Source
Not every criticism warrants a response. "Look at who is speaking, who they are reaching, and what kind of authority they have," Stoniene says. "If it isn't consequential, ignore it. You don't want to appear petty." If the source is reputable, or "if there are factual errors that need to be corrected, we encourage people to respond," she says. "These things live on the Internet. Request a written correction, or put a response on your own website and share it."

Establish a Social Media Policy
A misinterpreted tweet or Facebook post from a firm member can raise a firestorm. "We have broad guidelines for our staff about social media," Whitney says. "We tell people that the work we do is confidential unless otherwise noted. Our first responsibility is to protect our clients. We do want people to have ownership of their work and have opportunities to talk about it, but it requires thought and clearance."

Turn a Negative into a Positive
Negative press and criticism can sometimes offer a chance to redirect a conversation and elaborate on your firm's work. When KieranTimberlake designed a sustainable prefab house for a 2008 exhibit, the firm was criticized for using aluminum, an energy-intensive material. The firm used it as an opportunity to talk about its materials research and design process, posting a press release explaining that "because the house could be put together and taken apart with bolts and screws, all the material could get reused," Whitney says. "[There was] an initial response saying we're not really being sustainable, but [the explanation of our logic sparked] a whole new discourse about how aluminum can actually be sustainable."

> *For more tips on crisis management, visit bit.ly/PRcrisismanagement.*

Detail:
Sandibe Okavango Safari Lodge

TEXT BY TIMOTHY A. SCHULER

From the air, the Okavango River valley is a green gash through the arid grasslands of northern Botswana. Here, about 50 miles east of the Namibian border, Nicholas Plewman Architects of Johannesburg, South Africa, was commissioned to design an 11,500-square-foot luxury resort with minimal site impact.

The design team, which included London-based architecture firm Michaelis Boyd Associates, turned to wood. "Timber became the necessary building material because of its biodegradability," Plewman says. The team drew inspiration from the carpentry of Botswana's indigenous Bayei people as well as animals that either "carry their shelter with them or weave it from the organic materials on hand," like the scaly pangolin and the sociable weaver bird.

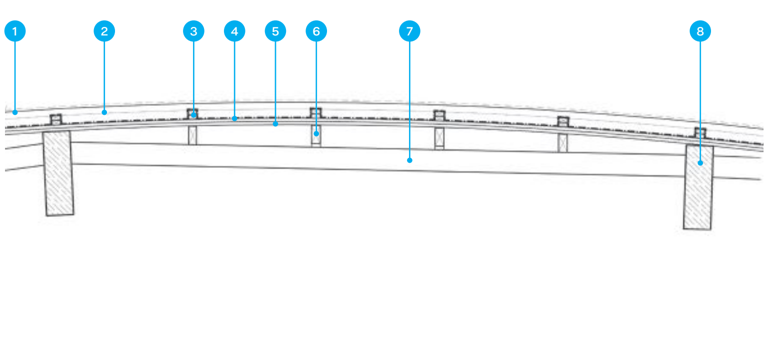
The main building rises 27 feet to its peak, and is supported by parabolic portal frames made from glulam pine, bolted to concrete footings and cross-braced with twin pine 2×6s. Secondary arch ribs, soaked in a nearby river and bent on-site, help support a sheathing made of pine strips.

The asymmetry of the portal frames meant each frame had to be broken into three sections—two leg supports and the arch apex—to maintain the specified radius per section and then joined with steel plates. "In total, 10 different radii were used," Plewman says.

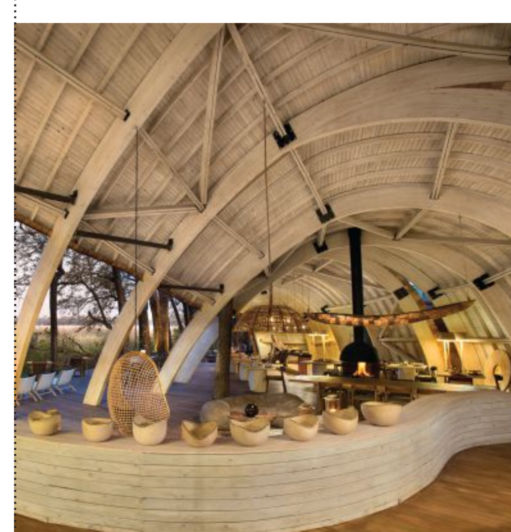
But when the timber arrived on site after a journey of more than 800 miles, at least half of the portals had warped. With help from their structural engineer, the architects drew the supplied sections in CAD and determined the new radii that would allow for a smooth form and be structurally sound. Local contractor Lodge Builders Botswana then re-cut the glulam frames.

Plewman isn't too fazed by the imperfections. Such unexpected moments, he says, can give a building texture and a more lifelike energy—which is what he wanted in the first place.

Wall Section



1. Cedar shingles
2. Pine battens
3. 2mm × 22mm × 44mm blocking
4. Roll-on acrylic waterproof membrane
5. ½" × 3" pine strips, 12' to 18' long
6. Secondary wood arch, 600mm o.c.
7. Twin 2×6 pine cross-bracing
8. Glulam pine portal arch frame



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Next Progressives: RODE Architects

TEXT BY CHRISTINE CIPRIANI

Based in the South End of Boston, RODE Architects aims to invigorate industrial neighborhoods by imparting thoughtful design to what principal Kevin Deabler calls "a class of buildings that weren't meant to be looked at." Their portfolio thus includes a concrete-mixing plant, a grease-recycling plant, and a food-truck commissary alongside non-industrial projects such as multifamily housing, research facilities at Harvard University, and a number of restaurants finished in exuberant materials.

Now a team of 16, RODE (pronounced "ro-dee") was founded in 2005 by Deabler and co-principal Eric Robinson, former classmates at North Carolina State University who came together after working for nearly a decade at different firms in Greater Boston, including Charles Rose Architects and Benjamin Thompson Associates. The pair pride themselves on their ability to dream big while contending with the realities of getting their plans built—particularly in neighborhoods not yet thick with contemporary design. Here, they discuss their recent and upcoming projects with ARCHITECT.

Heavy on Industry

"We're seeing a lot of interesting things come out of our industrial work," Deabler says. "One is that the forms are never repetitive from one project to another." The New York concrete facility [for Ferrara Bros.] beside Brooklyn's Park Slope neighborhood is a 125-foot-tall windowless box, which could easily become a looming eyesore. "Concrete has to be made close to the city, and the site will have some great visibility," Deabler said. "[We asked ourselves,] 'How do you shape this kind of building in a way that's going to be interesting for a long time?' " As a result, the firm "is trying to add some formal touches to the building" such as its roof, angled to mimic its exposed conveyor belt incline.

Also in Brooklyn, the ClearBrook Recycling Center has beautiful views of the Statue of Liberty, proximity to the fabulous Bush Terminal Park—and nonstop truck traffic. "One thing that ties industrial projects like this together is logistics; the concrete plant gets 10 trucks per hour," Deabler says. "Both projects need to buffer against other parts of the neighborhood in tight, confined spaces."

"These are somewhat forgotten building types, but the city wants them to look aesthetically pleasing," Robinson adds. "People are already asking: 'Why can't these buildings be good architecture, too?' "

Improvisations Over Implosions

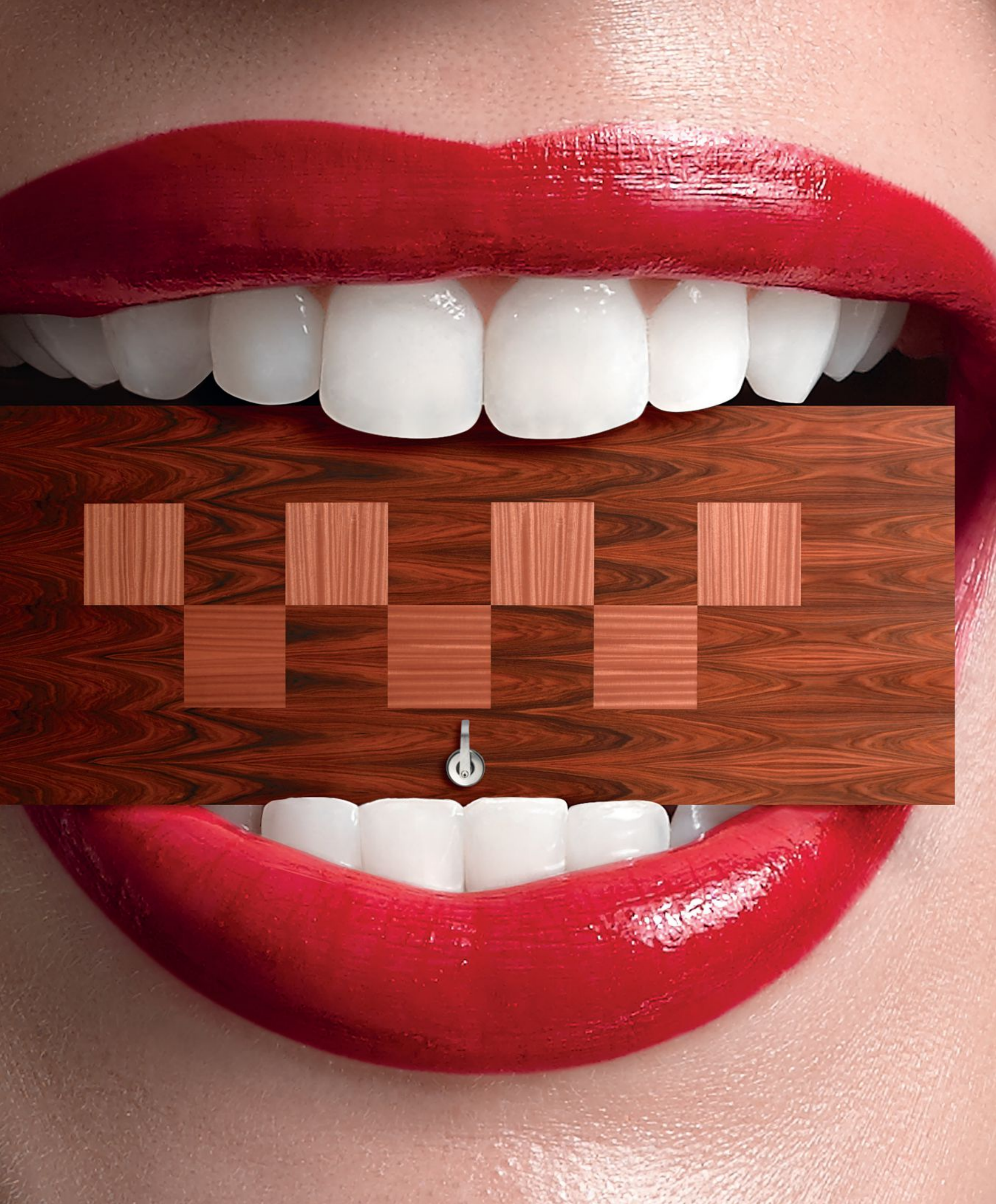
"Our approach to sustainability is centered on adaptive reuse," Deabler says. The firm tries to make the most of an existing building's embodied energy, both in its construction materials as well as its aesthetic capital. "Sometimes the clients just want to tap into the visceral qualities of their buildings," he says.

The Bornstein & Pearl Food Production Center, a commercial kitchen and food-business incubator in residential Dorchester, Mass., presented an opportunity to enhance the former meat factory despite it being more expensive to renovate and bring it up to code than to tear it down and start from scratch. "Boston has a lot of that kind of quasi-historical project—which is a great thing, because it's forcing people to keep beautiful buildings that have stood the test of time and can be altered in a way that brings them both back and forward," Robinson says.


Kevin Deabler and Eric Robinson

Creating a Social Glue

RODE seeks out projects with the potential to transform a space or an entire neighborhood. "Many of our projects have a commercial or retail component that serves the community, and a way to talk about the project to neighbors who otherwise get turned off by development," Robinson says. "We're finding that restaurants can be the most transformational because the community builds around them."



Next Progressives:
RODE Architects

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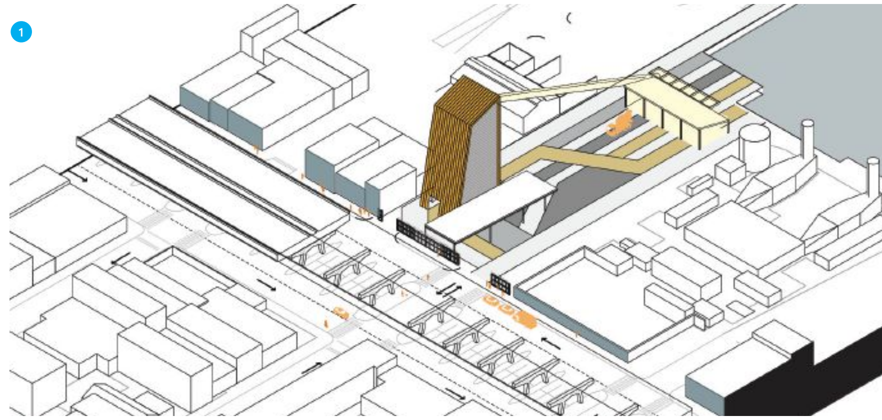

2

COURTESY RODE ARCHITECTS

1,2. Angular formal moves in RODE Architects' New York concrete facility in Brooklyn shape its strong roadside presence from Third Avenue. 3. The low building masses of the ClearBrook Recycling Center, also in Brooklyn, would act as storm surge barriers. 4. Dorchester Brewing Co., in Boston's Dorchester neighborhood, will serve as a 25,000-square-foot brewing incubator for craft beer makers. 5. Dot Block, in Boston, proposes a whole city block of mixed-use development. 6. Commonwealth Restaurant, in Cambridge, Mass., combines restaurant and marketplace.

Products: Textiles

BY HALLIE BUSTA
PHOTO BY JEFF ELKINS

A gray and black color palette shows off texture in this set of tactile textiles.

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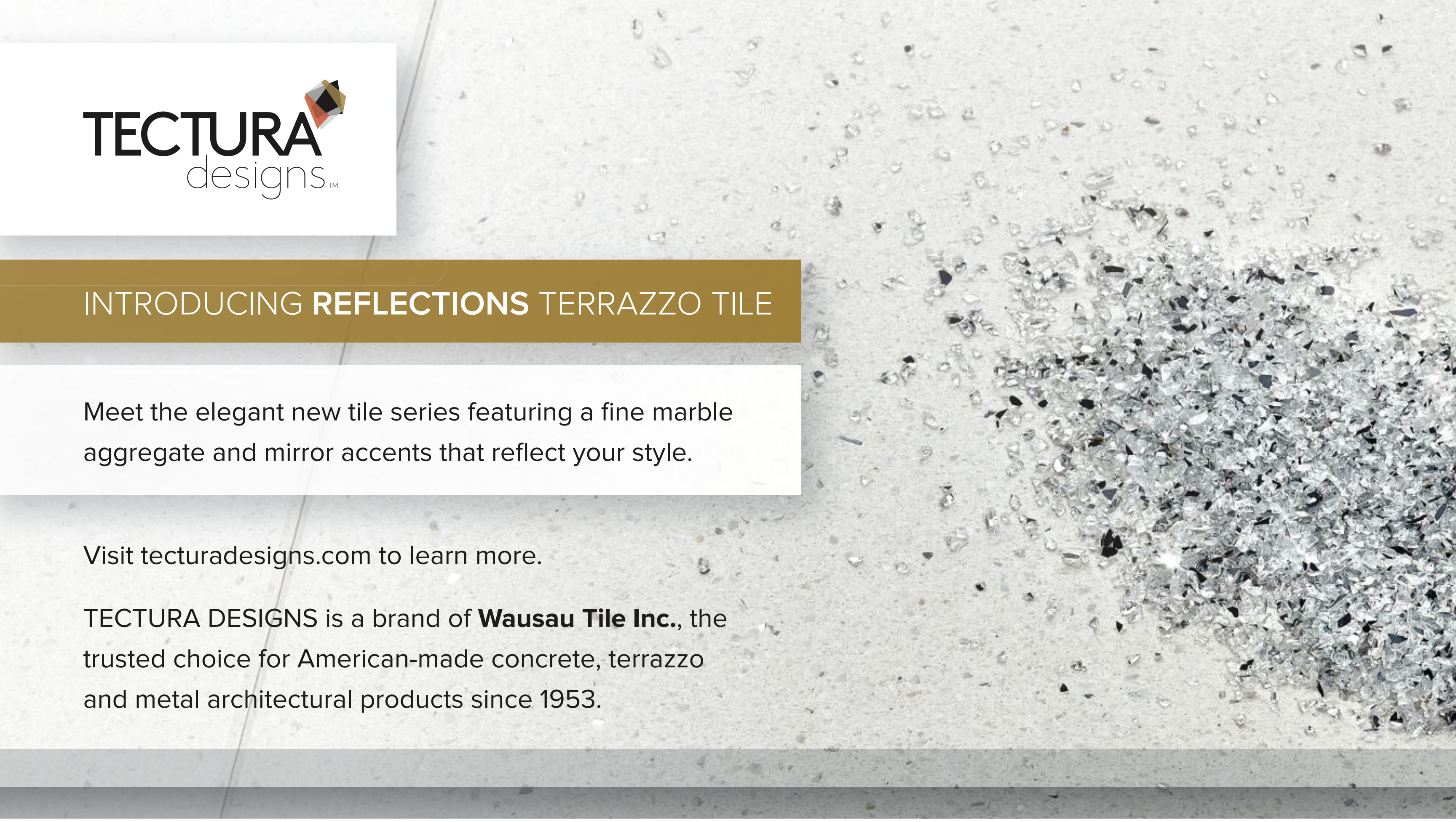
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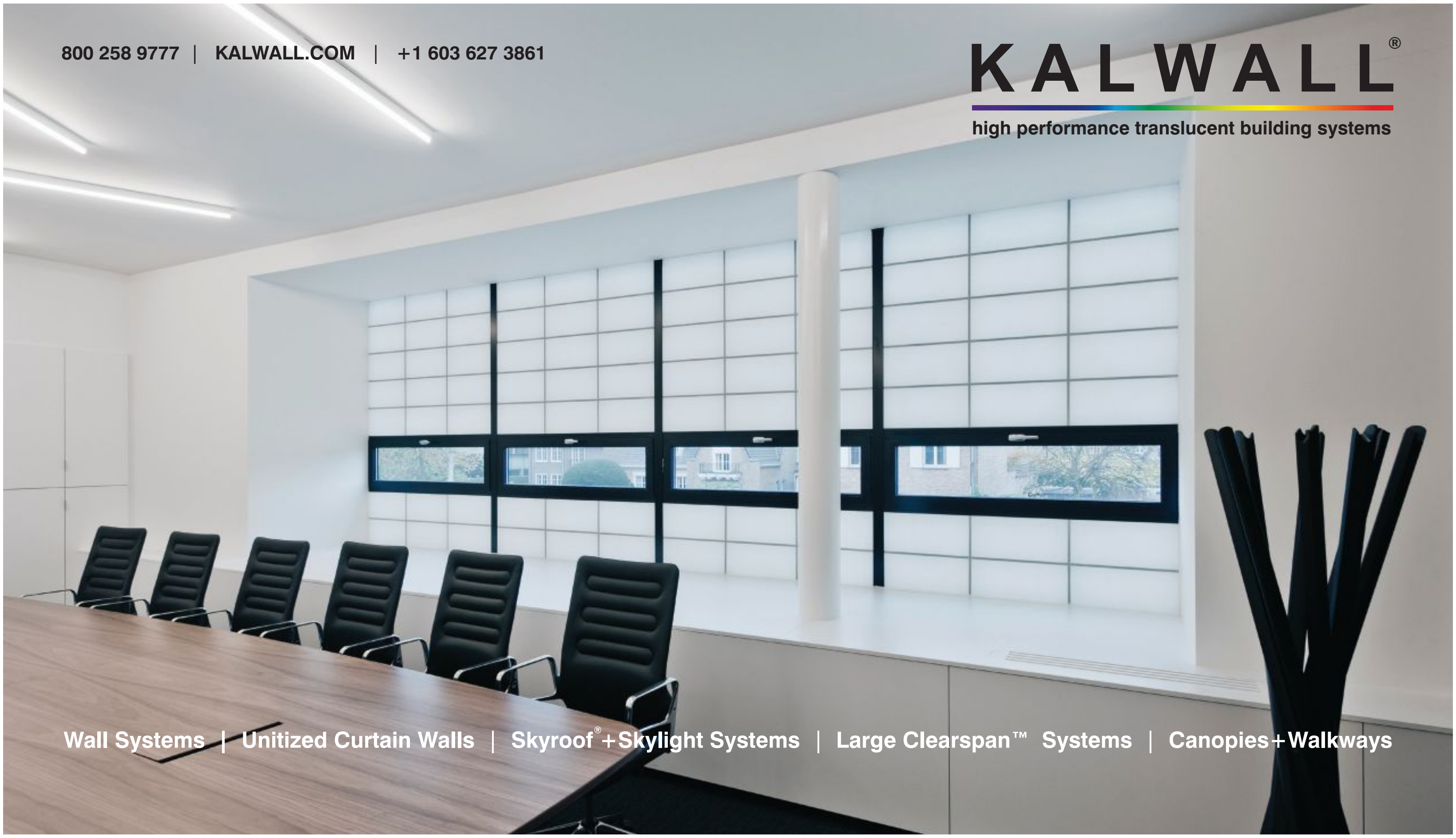
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PHOTOGRAPHY: VINCENT RICARDEL

Something Old, Something New

The future of preservation.

Ashley Robbins Wilson, AIA, the Graham Gund Architect at the National Trust for Historic Preservation, has spent her entire life studying the architecture of the past for inspiration. Growing up in Florida in the 1970s meant being surrounded by suburban development, but she has distinct memories of searching for beautiful buildings and wondering how she could learn more about them. She's now in charge of overseeing the 21 historic properties and landscapes owned by the Trust.

As told to Steve Cimino

Preservation is the ultimate upcycling and you can see that idea finally mainstreaming. It is sensible and practical to reuse buildings because they have embodied craftsmanship and are expensive to demolish. The creative classes figured it out first: Old buildings have character and more reasonable rental or purchase rates than new buildings. Add in tax credits and the resurgence of downtowns, and now reuse is becoming far more commonplace.

There are also the emotional benefits of reuse. Old buildings are authentic and help to make place. They give us emotional connection to our communities; they grant us orientation and identity; they provide emotional security. Buildings have a way of triggering memories in the same way that music does. Our buildings are tangible reminders of those who went before us and for those who follow. Healthy preservation embraces both the past, as well as the future.

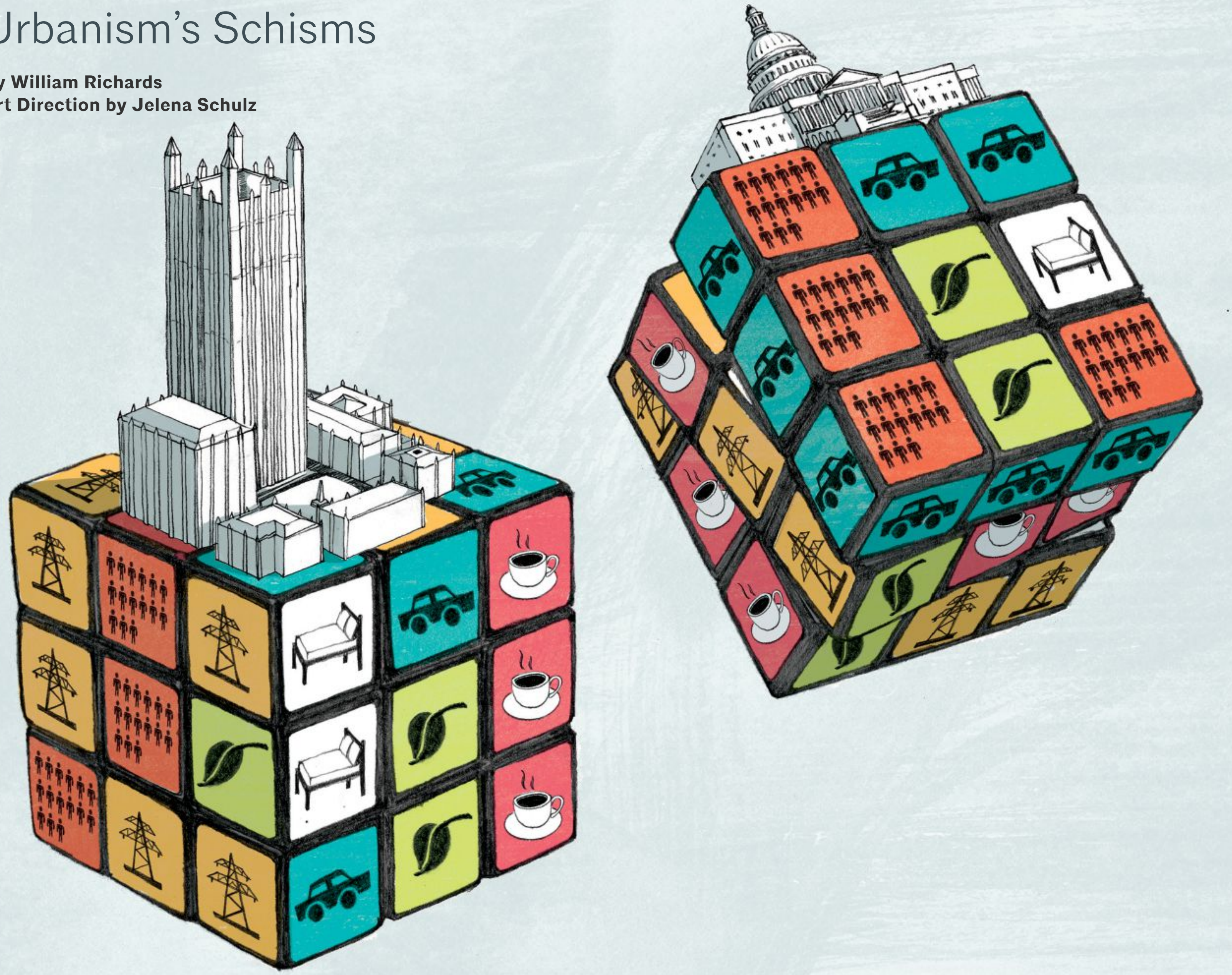
Pop culture helps to heighten awareness. *Mad Men* did more to emphasize the importance and hipness of midcentury Modernism than we preservationists could have done on our own. I also find the value that we put on our industrial heritage particularly fascinating; appreciation for this aspect of our past has partially grown from the school of photography that emphasizes the beauty of obsolete water towers, gas holders, factories, mills, and military bases. Think of Detroit and all of those evocative images of decay: As a result, there is a new emphasis in our field of not "over-restoring." That partially missing plaster, that layer of paint, that exposed mechanical equipment: They all have their own identity.

We're living in an era when people enjoy the local and authentic—craft beers, farm-to-table food, regional music. It's the things that make a place unique that have achieved widespread appeal. It's the same way with buildings—the craft of construction, the materials, the technology, the style, the vernacular touches. Architects respond to historic places, just like everyone else. Buildings are adaptable and fun to work on. When you do something new and fun to a historic building, it tends to sing. AIA

AIANow

Urbanism's Schisms

By William Richards
Art Direction by Jelena Schulz



Pittsburgh
Population: 305,841 (2013)
Population change since 2000: -8.6%
Estimated median household income: $42,004
(Pennsylvania: $52,007)

According to the most recent U.S. Census data, several of Pittsburgh's predominantly African-American neighborhoods, such as East Liberty, have lost hundreds of residents over the past 15 years. Out-pricing and gentrification have also pushed low-income residents out of the city, leaving a lot of buildings largely vacant. On the flipside, according to data collected by the city, violent crime has dropped. Data from the American Lung Association notes that levels of air pollution have also dropped—owing to the conversion of some area coal-burning power plants to natural gas. If *Pittsburgh City Paper* is correct, the Steel City's fortunes will continue to change for the better: Its population is poised to grow again for the first time in 60 years.

Washington, D.C.
Population: 646,449 (2013)
Population change since 2000: +13.0%
Estimated median household income: $67,572
(Greater Washington, D.C., region: $90,149)

At the close of 2014, the District of Columbia had 97 homicides on the books. A year later, there were 154—an increase of nearly 60 percent. That's a far cry from the 20-year high in 1996 of 397, but the uptick troubles local residents. Traffic snarls put the region at or near the top of most "most-congested" lists, owing to two transportation failures: the city's revamped streetcar system is still stalled and Metrorail breakdowns have contributed to a steady decline in ridership, according to *The Washington Post*, even as the population has grown almost one point per year since 2000. The city is also projected to sink a full six inches over the next century. While Washington, D.C., is not technically built on a swamp, as some claim, it may very well turn into one.

This month, attendees at the AIA's Grassroots Leadership Conference in Detroit will look at the role that architects can play in solving the challenges of rapid urbanization—as well as the challenges that cities have faced for decades. Income inequality, infrastructure that struggles to meet demand (and in some cases is crumbling altogether), homelessness, and the legacy of ineffective urban-planning decisions define the scope of work for 21st-century design interventions. Those issues also suggest ways to approach urgent topics such as resilience and affordable housing. Here are a few hot spots, some of which will be on the table for discussion in Detroit:

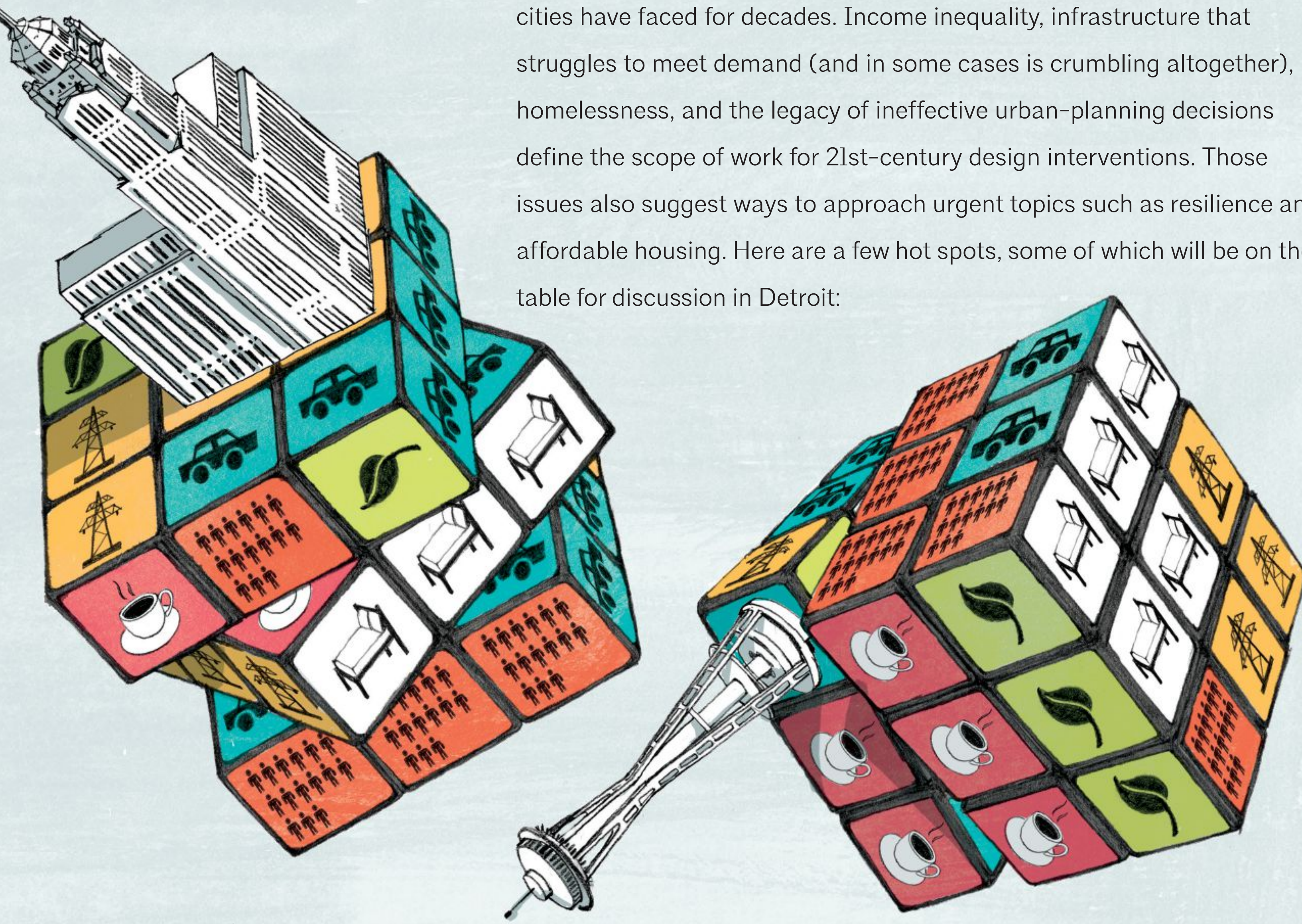


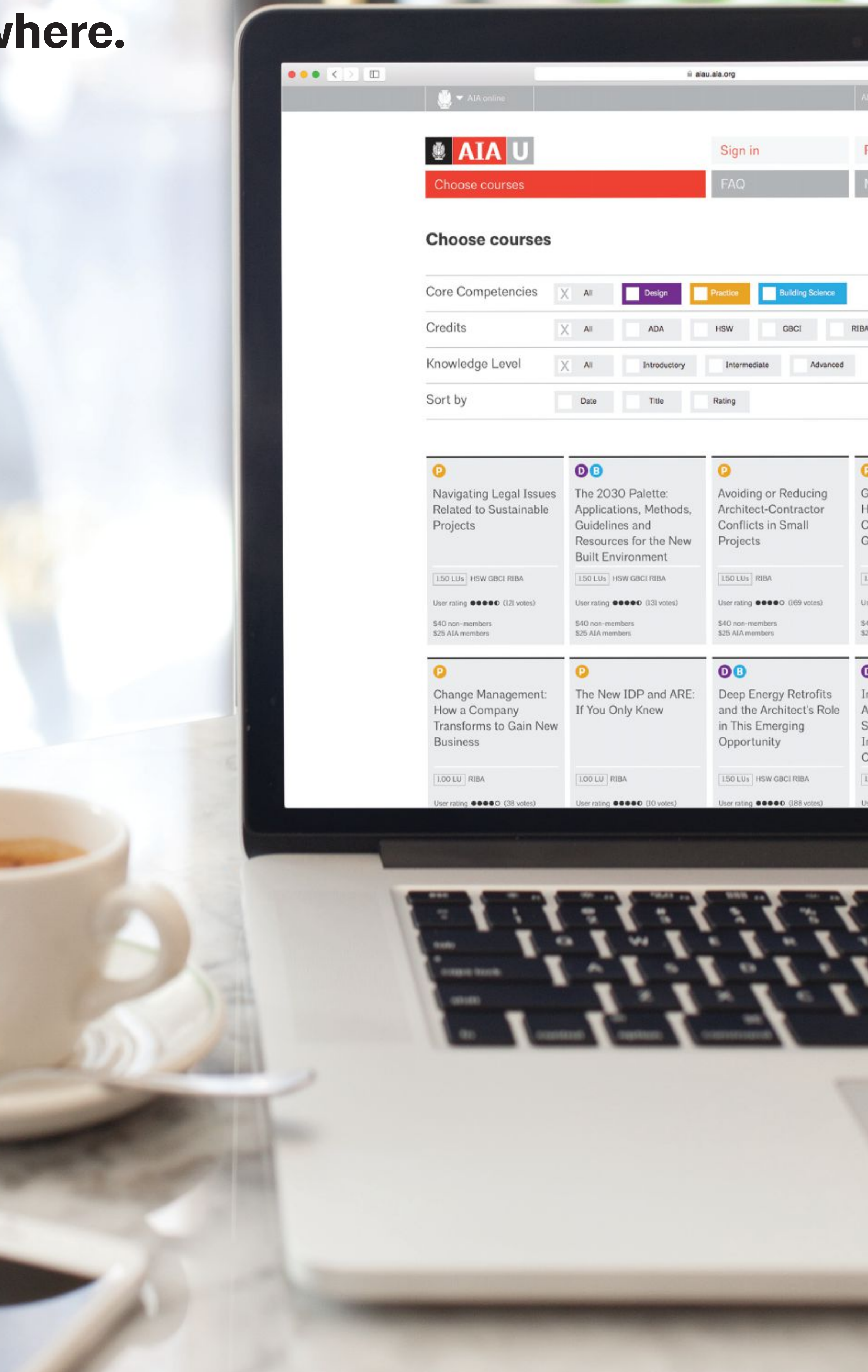
ILLUSTRATION: LAUREN NASEF

Columbus, Ohio
Population: 822,553 (2013)
Population change since 2000: +15.6%
Estimated median household income: $44,426
(Ohio: $48,081)

Ohioans drive more than 100 billion miles each year, according to the Buckeye Institute, much of it during commuting hours—and the combined annual cost of congestion for commuters and businesses is nearly $2 billion. Yet, according to the 2015 Texas A&M Urban Mobility Scorecard, Columbus commuters spend only 41 hours stuck in traffic each year (compared to the 82 hours that Washington, D.C., commuters spend), perhaps owing to the fact that the city invested $20 million in a system of bike trails connecting the suburbs to downtown and the newly restored $44 million riverfront park system.

Seattle
Population: 652,405 (2013)
Population change since 2000: +15.8%
Estimated median household income: $70,172
(Washington: $58,405)

The Downtown Seattle Association touted the city's boom in a 2011 report, noting that the crime rate is at a historic low and sidewalk café culture continues to expand. Yet a 2015 Boston Consulting Group report noted that the city's public transportation infrastructure struggles to keep pace with the nearly 16 point population uptick over the last decade. Homelessness, too, continues to surge alongside the city's growing affluence, creating a greater gap between poor and rich. In fact, Seattle is fourth in the nation for homelessness relative to population, behind only New York, Los Angeles, and Las Vegas.



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AIADesign

PHOTOGRAPHY: BRUCE DAMONTE

By the Bay

A personal history of the AIA's Twenty-Five Year Award recipient for 2016.

My family's most recent visit to the Monterey Bay Aquarium occurred while I was enjoying the 2015 Monterey Design Conference, around the point at Asilomar. Over dinner the other night, I asked them what stood out for them about the building, and our 15-year-old daughter said, "When you go in, the first thing you see is the bay." Which pretty well nails it.

The partners of Joseph Esherick, FAIA, at EHDD—George Homsey, FAIA; Peter Dodge, FAIA; and Chuck Davis, FAIA, the architect of the aquarium—were of one mind with Esherick's belief that "the ideal kind of building is the one you don't see." He wasn't talking about modesty, but about purpose and performance. For these architects, a window isn't something you look at; it's something you look out. If it's working as a window should, what you see is the view.

The purpose of the Monterey Bay Aquarium is to engage Monterey Bay, and the architecture serves that end. A vivid success is at the heart of the original building, completed in 1984: the world's first captive kelp forest. The magnificent plants thrive because they're not in a simulated ecosystem, just a well-framed one. The tank is open to the sun and the water comes directly from the bay. During the day, the water is filtered so you can see the fish. But at night, when no one's looking, it's drawn straight in, full of nutrients and tiny creatures and the other seaweeds that have taken root on their own, as well.

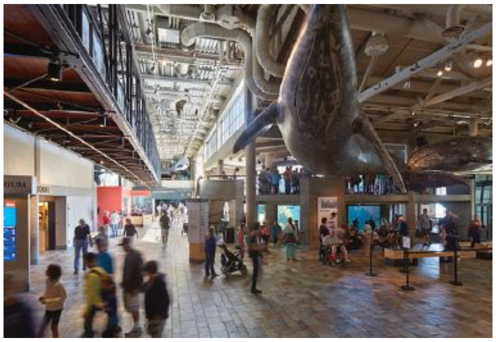
That sort of interconnection is omnipresent, as is the firm's technical prowess (seawater being, after all, about the most corrosive thing you can throw at a building). They're both products of the partnership between Chuck Davis and his client, David Packard, who—as Davis relates it—had just stepped down from Hewlett-Packard and was looking for something to do. Packard's two daughters were marine biologists and, as it turned out, Julie Packard became and remains the aquarium's executive director.

Davis describes the interview: "It was an hour and a half long, and at the end he stood up and said, 'When can you go to work?' I was shocked. It was the only time I've ever been hired on the spot. It was on a Wednesday, and the next Monday I was down in Monterey setting up an office."

Packard, Davis says, "was six foot eight and gruff, an archetypical business tycoon, tough and opinionated. I had never been around somebody who could take apart issues or problems and then make good decisions like he could make."

Chuck Davis is a big man, too. He's hardly a tycoon, but otherwise the description fits him just as well. They must have made quite a pair, meeting each week at the site, working through the deal that Packard had proffered: "I'm going to come every Friday to look at what you've done. If I like what you've done, we'll work another week. If I don't like what you've done, I'll pay you off and send you home," said Davis, who, with the support of his future partners Duncan Ballash, AIA, and Marc L'Italien, FAIA, added the Outer Bay wing in 1996 and completed an extensive renovation in 2011. Two years later, he retired from EHDD: He'd gone 30 years without getting sent home. AIA

Tim Culvahouse, FAIA



AIAFeature

Ritual Evidence

Jorge Otero-Pailos on the things we make and the things we think we throw away.

As told to William Richards

PHOTOGRAPHY: COURTESY OF PETER KELLEHER AND THE V&A

Commissioned by London's Victoria and Albert Museum (V&A) and exhibited in 2015, Jorge Otero-Pailos' "The Ethics of Dust: Trajan's Column" is a conservation-latex curtain hung from a metal ring armature (foreground) that recorded the layers of dust and dirt accumulated over a century and a half inside the 1864 cast of Trajan's Column (middle and rear). The cast (commissioned by Napoleon III, made from metal molds held at the Louvre in Paris, and purchased by the V&A in 1864) is a copy of the 113 A.D. original, which chronicles in dramatic bas-relief the Dacian Wars and, ultimately, Trajan's victory. The column, as it stands in Trajan's Forum in Rome, is 98 feet tall. It is presented here in two sections, owing to the height of the barrel-vaulted Cast Courts designed by the architect Aston Webb, and Otero-Pailos' latex cast is of the upper half of the column's brick-lined interior. "I see Trajan's Column cast as a supplement," says Otero-Pailos. "It's something I removed from the work to make the work visible."

“The Ethics of Dust,” an ongoing project by architect, historian, and artist Jorge Otero-Pailos, AIA, addresses both the moral implications of pollution and the practical implications of cleaning monuments. Pollution, he contends in the account that follows, can never be eradicated—it can only be displaced. Our shared cultural heritage, then, is about monuments and prosaic structures alike, but it is also about the residue of architectural production. Furthermore, says Otero-Pailos, we can design all the grand structures we like and even make copies of those structures in perpetuity—as his project for Trajan’s Column demonstrates—but our chief product as a species is nothing more (or less) than toxins.

I think of pollution as the chief product of the Anthropocene. It’s clearly the material that one can turn to as the evidence of the Anthropocene. It’s the anchor of this concept of a new geological era. That, to me, is really important, especially in light of the recent climate talks. The best they can do—the leaders—is look for solutions in preservation. But which date do we turn ourselves back to in terms of an ideal time when pollution was minimal?

What is amazing is this conceptualization of the atmosphere as an object of preservation. We have been talking about architecture as interior rooms—as buildings that go to a lot line, vistas, landscapes—and now we’re talking about not just air, but the entire atmosphere of the planet as one object that needs to be tended to. The idea of turning an object back to its original moment is suspect, though—it’s problematic for preservationists. But pollution is evidence of the lack of inventiveness and intellectual sophistication around the climate discussion. If the best we can do is to imagine the return of the atmosphere to some date in the past—1985? 1995?—that’s an issue.

This is a huge challenge for civilization to preserve our atmosphere, unlike the way you can easily preserve an interior or a building, a district or a park. With every increase in the size of the object to be preserved, we’ve had to imagine new institutions. We don’t currently have an institution in place capable to address this task for the atmosphere.

In preservation, we’ve made this claim for a very long time that the public good cuts across property. When you think about a view shed, it runs over many people’s private properties; but it’s in the interest of the public that we regulate all that private property. Nobody likes to talk about regulation, but, in fact, to recognize that regulation is in the nature of private property.

I think this is where the big challenge is, and it’s an incredible opportunity: to define the nature of atmosphere as an object. We have defined it in terms of technology—something that we can manipulate or exploit. We can even use technology to bring it back in time. But in terms of preservation, we are also dealing with the atmosphere as a cultural object—which by definition has significance across multiple generations. It’s about heritage. We cannot fix the problem by thinking just technologically. We do not have a global culture of understanding the atmosphere—and that’s the challenge. That is the basis of intergenerational equity—leaving the world to our children in the way we first found it.

We are consumers, so we consume. We are a species at the top of the food chain without a predator, and so we cannot regulate ourselves. But we must, and that’s where preservation comes in.

The interesting phenomenon for me is the idea that historical evidence is untampered. There really isn’t such a thing as untampered evidence. All evidence has to be prepared, cared for, manipulated to specific codes, and so on. Think about O.J.

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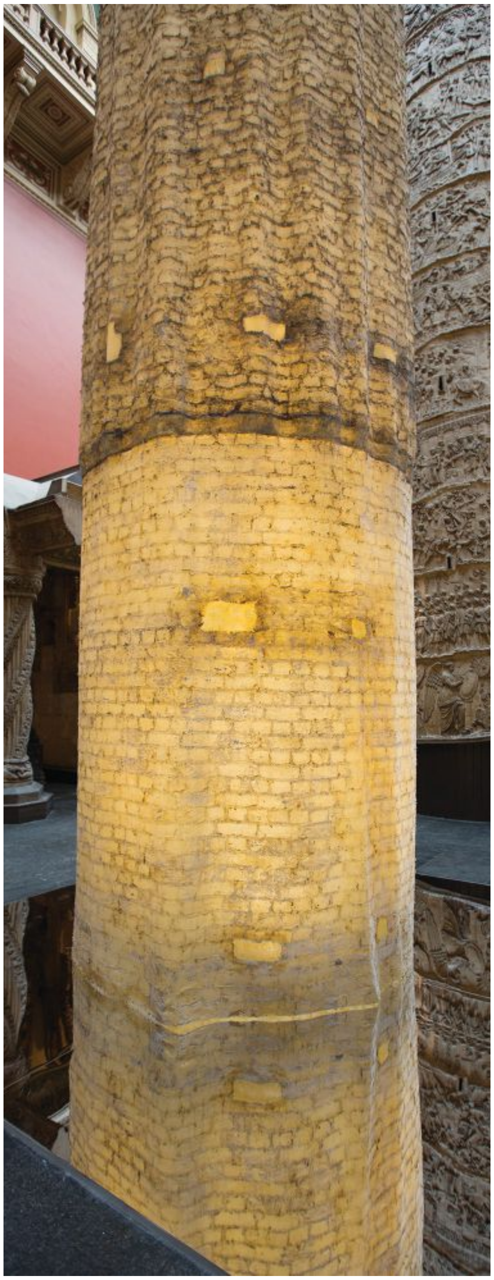

"This has been an ongoing project for me. I began cleaning buildings a long time ago—and became fascinated by cleaning in general. Why is it different to clean a building than to clean my car? From that, I began to take stock in what we, as preservationists, are doing. I don't take any field, whether it's preservation or art, for granted—and it's essentially to ask about the nature of that field, its cultural significance, its overt and unstated politics, and so on," says Otero-Pailos.

Simpson's glove—the whole conversation was how that glove was handled by the police. What are the standards of evidence? They are culturally specific. Over time, different objects have been considered historical evidence, and the threshold for what disqualifies objects as evidence has been moving. Nevertheless, we continue to think of evidence as something pure. The nature of preservation creativity is acknowledging the necessary manipulation of the record of evidence that is extraordinarily obvious, but is meant to be ignored. Forensic experts qualify evidence. It's the same thing with preservation. If you are not a preservationist and you begin manipulating a building, that building isn't considered a preserved object.

The world is constructed, and so is physical evidence. Naturally, that leads to a great deal of anxiety for people. We like certainties, but—I will tell you—it doesn't mean we cannot be certain about things. We can, but we have to be certain about the truth that our world is a constructed world. Truth is a claim on reality. We make claims on reality that are conceptual and physical, and one of the most exciting creative fields is preservation.

One of the ways to engage climate change is to recycle, but Trajan's Column was another way in which I could look at that phenomenon. Recycling is a physical ritual and reminder of the limited resources that we have. In my work, the idea of exhibiting the work of preservation as art is one of the ways in which I try to bring objects into a new narrative. In the end, my work is concerned with engaging monuments in today's conversation in a new way. We are told that monuments should mean a certain thing—evoke a certain memory or event. But they will have continued relevance if we can reinterpret them.

Experimental preservation is a theoretically informed practice that's about testing hypotheses of what preservation can be. It is—by nature of this testing—pushing the notions of interdisciplinarity because preservation has always been interdisciplinary. But what are the relevant disciplines for preservation today? What is relevant knowledge and technology and aesthetics for the field? This push outward that experimental preservation is about is also a way to reaffirm the unique disciplinarity of preservation. Preservation has a very stable locus, but its borders are shifting through practical engagement with the world.

For example, I think artists and art are hugely important to preservation. They always have been; some of the greatest conservation scientists and restorers have been artists. But art has been pushed aside because of a fear that there is a divide between preservation and art—one being about conservation and the other about creation. That's a false dichotomy. Look at Ai Weiwei, who is going out and buying ancient wooden temples and preventing them from being sold in the market for real estate development. It's the same thing that happened in the 1920s—buying interiors and installing them in their homes. But that's an aside from the point that the major artists of today are seriously engaged in questions of preservation. So we preservationists have to seriously engage those artists.

> "I think artists and art are hugely important to preservation."
> —Jorge Otero-Pailos

I've never thought of myself as an activist, but I certainly am an actor in the world—as are we all. Preservation has an activist history, certainly.

I think of preservation as the organization of attention—at a very basic level: If you put a velvet rope in front of a monument, people line up. It's about telling you what to look at and what to value as important. It's about putting a frame on the world. Activism is one version of that—and it is part of the continuum of preservation. At a certain level, there are no frontiers between the arts. They are all connected, and what you strive for in life is to transcend barriers.

Architecture, preservation, art, and so on were all disciplines that were re-codified in the 19th century and accompanied the industrial revolution. I think these disciplines are radically changing now into new ones, and so I'm perfectly comfortable with inhabiting all of them. It's our responsibility to move them into the new reality—the world we live in.

One of the things I find interesting about our world is how many theories of the end that we have—positive theories, such as cyborgs, and negative ones, such as the Armageddon. Basically, we've all given up on human beings. That's not good. We need a new plan. And it's related to preservation because we talk about preserving everything except ourselves—monuments, buildings, the atmosphere. The thing is: We can't do one without the other. AIA

AIACollaboration

The Crown Jewel

A decade ago, restoration and sustainability met at Chicago's Crown Hall.

PHOTOGRAPHY: ARTURO DUARTE JR. VIA WIKIMEDIA COMMONS

It's said that windows are the eyes into a building; they're also often the most striking element, especially when it comes to a stylish midcentury modern edifice that broke the architectural mold.

But now that decades have passed and those gems from the mid-20th century are in need of a tune-up, architects are stuck with a conundrum: What should we do with windows that pass the visual test but fail the functional test. At a moment in the profession when sustainability and efficiency are finding their way into the preservation conversation, how do we best manage our modern heritage?

In 2005, Chicago-based Krueck + Sexton took on a mighty task in this field: Crown Hall, a masterwork from famed architect Ludwig Mies van der Rohe and the home of the Illinois Institute of Technology College of Architecture. The undertaking ultimately fell to founding principal Mark Sexton, FAIA, an award-winning architect who wasn't afraid to take on daunting projects.

"There is an art to restoration," he says. "You have to deeply understand the building and design around it."

When it came to Crown Hall, that meant windows. The walls are largely glass, the dazzling result of Mies' skeletal design but a concern when it comes to both modern building codes and the abuse sustained from housing hundreds of architecture students over the years.

Sexton knew that the line between success and failure on this project was thin; the windows were too reflective and miles behind technologically, but altering the aesthetics would raise the ire of the architectural community. Luckily, the fix proved both simple and indiscernible to the naked eye: employ thick upper windows made of low-iron glass that resembled the original panes plus thin lower windows that unify both the top and the bottom.

"Mies used raw sandblasted glass," he says, "and sandblasted coating technology had improved so much by then, we could coat the sandblast and have it appear as it was. It was a case where we actually improved it by bringing it back to the original, and improved the original because of technology."

Yet while modern window expertise resolved what could've been a sticky situation, the murky intersection between improvements and blasphemy reared its head in another way. Sexton suggested an automation system with light sensors for the building's venetian blinds, which need to be opened and closed at various points throughout the day, to greatly enhance its energy performance. The faculty did not take kindly to his proposal.

> We have an obligation to preserve the exact proportions of the building, but a higher obligation for life safety.

"They argued we were actually sabotaging the essence of the building by automating it," he says. "We argued that, given the conditions of the world, we had a moral obligation to develop some path—respectful of the original architecture—but a path to save energy. It's an obligation that wasn't on the radar 60 years ago when [the building] opened."

Sexton wasn't automating for convenience; he was doing so for function. But his proposal remained only that, despite similarities to another tweak they had already made.

"To meet building codes, we needed the bite of the windows to increase," he says, "so we sloped it. It's not visible at all; even the die-hards who were against the idea at first admitted that. So even though they said, 'How dare you put a sloped stop in this building?' for us it was easy: We were breaking the rules because you couldn't really see it."

That's how difficult a restoration project can be: It's possible to sneak in an imperceptible—and beneficial—tilt to your windows, but equally advantageous blinds that open on their own are roundly rejected.

It comes back to the question: What are we ethically allowed to alter with our current level of sustainable know-how? Or, perhaps more pertinently to some: What would Mies think about all this?

"I learned from Gunny Harboe, FAIA, 'Never question a dead architect,'" Sexton says. "[Because] they're dead! We have an obligation to preserve the exact proportions of the building, but a higher obligation for life safety. And, to me, energy savings is part of life safety." AIA

Steve Cimino

FABRIC STRUCTURES WITH RIGID STEEL FRAME CONSTRUCTION

Presented by:

LEGACY BUILDING SOLUTIONS

Innovation Beyond Fabric. Service Above All.

Figure 1 River Cree Resort & Casino: Before a New Year's Eve show at a casino. Fabric buildings have evolved from simple hoop structures to elaborate contemporary designs.

LEARNING OBJECTIVES

At the end of this program, participants will be able to:

1. List the different frame types traditionally used in fabric structure design and construction.
2. Compare the advantages of rigid steel frames in fabric structure design and construction over traditional methods and materials.
3. Identify specific architectural features available for fabric structures using a rigid steel frame.
4. Discuss how rigid frame design is superior in projects that require collateral loads and stringent deflection limits.

CONTINUING EDUCATION

AIA CREDIT: 1 LU

COURSE NUMBER: ARfeb2016.1

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR216Course1 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

By Andrew Hunt

INTRODUCTION TO FABRIC BUILDINGS

Fabric buildings, also known as tension structures, have been used for thousands of years as lightweight, portable shelters offering protection from the elements. While their design can vary tremendously, they all share the basic characteristics of having flexible material stretched tightly around and secured to a frame. This simple and efficient design concept has been used for millennia, however the materials have changed greatly over the past several decades. Modern tension structures are designed with traditional engineering methods using weather-resistant fabric stretched over a frame usually made of plastic, aluminum, or steel. Over the past few years, the industry has advanced to the point where engineered materials and techniques have made fabric structure design considerations similar, if not identical to, those for traditional building construction.

Fabric buildings can range from simple storage sheds or emergency shelters to large-scale outdoor music venues and sports stadiums. As the technology develops, architects are becoming more creative with their designs. Tension fabric architecture is a fairly new and innovative field that is changing the way some structures are being conceived.

BRIEF HISTORY OF FABRIC BUILDINGS

Fabric buildings are believed to have been in use for almost 40,000 years. They were first used by nomadic tribes across the world, who sought shelter that could withstand the elements and also be transported from place to place. Indigenous North Americans, North Africans, and East Asians all designed structures that met the environmental and cultural needs of the various tribes. Over time, other cultures adapted and modified the designs for their own purposes, whether providing shade from the sun or more substantial protection from the elements.

Modern fabric buildings and tension architecture leaped to the modern age after World War II. When the war ended, engineers were tasked with designing protective weatherproof enclosures for radar antennae, called radomes. These radomes needed to be constructed without traditional frame structures, and use materials that would not interfere with the radio frequency signals.

Air-supported fabric structures, which had been used in Europe, were a natural solution and soon fabric buildings were being considered for a host of applications.

In the 1960s, space exploration research resulted in some innovative new materials for space exploration apparel, and again, engineers recognized that this material was applicable for tension structures. NASA, with the help of industry partners, developed a strong, lightweight, fire-retardant fabric that was woven with glass fibers and coated with polytetrafluoroethylene (PTFE), now commonly known as Teflon.

Teflon-coated fiberglass was successfully used by NASA in spacesuits, and was later integrated into material for fabric structures. The characteristics that made this new fabric material desirable for protecting astronauts in harsh environments were easily transferrable into new building situations. The material is flexible, stronger than steel on a pound-for pound basis, and weighs 12 to 28 oz. per square yard. This new material opened the doors to flexible fabric building forms and designs.

Early modern fabric buildings coincided with the advent of computer modeling, which helped designers and architects predict the load requirements for tension fabric structures. In 1972, Frei Otto designed a stadium for the Munich Olympics. This structure was one of the first high-profile modern fabric buildings, and it is still in use today.

Today, the available fabrics are technologically superior to the earlier materials, and innovative designs are being created every day. Advances have extended the lifespan of the materials, decreased maintenance requirements to next to nothing in some cases, and have improved the translucency, which in turn reduces energy costs. The standard fabric choices of today include Polyvinyl Chloride (PVC), Polyethylene (PE), and Ethylene Tetrafluoroethylene (ETFE) film. Each material has its advantages and disadvantages, with some being better suited for certain conditions than others.

PVC fabric is very durable and relatively heavy, which means it can last a long time—often up to 25 years—and withstand tears. PVC fabric is also naturally flame-retardant, making it a good choice for high occupancy buildings. The two disadvantages of PVC are that its thickness means it is usually slightly less translucent than other materials, and it has a higher initial cost. PE fabric also has a long lifespan, often of 20 years,

Figure 2 Source Energy Services: Inside a frac sand storage structure. Modern fabric buildings are allowing for a wide range of new and interesting designs.

and it is considerably lighter and less costly than PVC. And because it self-cleans very well, PE fabric requires less maintenance. PE's light weight allows for better transparency, but it decreases its durability and tear strength. The newest material is ETFE, which is very strong, has high tear strength, and provides 80-percent translucency. Consequently, ETFE is an excellent replacement for glass, and it is frequently used for skylights and in greenhouses. The main disadvantage of ETFE is a significantly higher price tag.

PE and PVC fabrics are made up of a woven inner layer called scrim sandwiched between two layers of PE or PVC coating. The finished fabric is coated with chemicals to make it fire resistant, and often a fungicide to help keep the building clean. In order to create material necessary to cover the large spans in tension structures, the sheets of fabric are heat welded together through a radio frequency welder, hot air impulse, or hot wedge welder.

COMMON TYPES AND USES OF TRADITIONAL FABRIC BUILDINGS

In the fabric building industry, there are many different types and designs of structures, depending on the governing construction philosophy and on the intended use of the structure. Depending on the frame type and capability of the manufacturer, fabric structures can be as simple as large-scale bulk storage structures or as complex as world-class sports arenas and casinos. Different manufacturers use a variety of framing techniques, all of which have their own advantages and disadvantages depending on the situation. This section highlights the different frame and truss designs and briefly identifies some of their common uses.

Single tube arches are constructed of single, half-circle tubes that usually span 4- to 6-foot on center. They are commonly used as temporary shelters or covers, such as an outdoor carport. They are useful for projects with smaller spans ranging from approximately 10 to 30 feet. These types of frames are inexpensive, lightweight, and very easy to assemble and disassemble. Single tube arches are usually sold in kit form, and thus have predetermined sizes. Because they are not built to last, they are usually on a non-permanent foundation and anchored with wood posts or stakes.

Aluminum extruded frames are more substantial than single tube arches, and they work well as good-looking and portable structures, however, they can also be used as more permanent structures. They are designed for rapid installation, and the interior has a clean and neat look. These two factors contribute to their popularity as rental shelters and on construction sites to store materials and equipment. They have a high life-cycle cost, so established frame sizes that can be reused are far more economical than custom aluminum extruded frames. The aluminum is limited in terms of its ability to handle wide spans and environmental loads, which limits the potential uses of the buildings as more permanent structures.

Open web tube trusses, which are made of tubular steel chords with tubular steel or steel angles placed intermittently as web members, were for many years the standard in the fabric building industry. They remain an affordable option for small-scale projects, but are often effectively limited to pre-determined sizes since they are difficult to customize. While open web tube trusses have the benefits of being relatively inexpensive, the hollow metal tubes are susceptible to internal corrosion, which can go undetected and rapidly shorten the structures' lifespan.

The newest type of fabric building involves a once-untried approach—**rigid steel frames**. This game-changing innovation introduced by Legacy Building Solutions in 2010 has rapidly become the go-to design of choice for many reasons. Perhaps the most important characteristic is that the solid steel frame eliminated the problem of internal corrosion that is so common with hollow tube frames. Over the past few years, rigid steel frame structures have become increasingly popular because they offer so many flexible design options and building solutions. Most notably, they can be used on structures that require large spans over 300 feet wide. Rigid steel frames are designed and tested through a combination of sophisticated finite element analysis (FEA) software and manual quality checks. The software allows designers to customize the work, make changes easily, provide timely estimates, and create sound design proposals and solutions.

Figure 3 Rigid Steel Frame Structure: Fabric roof panels being kedered to a rigid frame building.

Because of the many benefits of fabric buildings, this design is used in a wide range of structures. Some of the most common and popular applications for fabric structures are occupied buildings like offices, casinos, retail outlets, and ski lodges. Indoor sports facilities often use rigid-framed fabric structures for tennis courts, hockey, soccer, volleyball, and more.

BASIC COMPONENTS OF RIGID STEEL FRAME CONSTRUCTION

As with most fabric structures, rigid steel frame construction includes the basic components of a frame, a fabric shell, and mechanisms for attaching the fabric to the frame.

Foundations are critical to rigid steel frame construction because they provide necessary stability for the structure. Any building that will be in place for more than a few weeks requires a foundation, however there are many options to meet the needs of different sites and uses. For example, structures that may eventually be relocated will benefit from helical anchors, micropiles, earth-anchors, or ballast blocks for situations where the surface cannot be penetrated. Other more permanent structures can benefit from either precast concrete foundations, which are useful for smaller fabric buildings and bulk storage applications, or cast-in-place concrete, which tends to be the most popular option because it is strong, versatile, and readily available.

Rigid steel frame construction uses a durable, rigid steel frame as the main support to the building. Solid steel also has a number of different coating options, such as hot dip galvanizing, oxide primer and powder coat or wet paint, all of which provide different levels of protection from corrosion.

In rigid frame fabric structures, the fabric is attached to the steel frame via a keder rail. Fabric panels, typically 20-feet wide, are individually attached to each rigid frame. The keder system allows each panel to be tensioned both horizontally and vertically and secured tightly to each frame. This is in contrast to a hollow tube truss building, in which a fabric monocover is typically attached only to the end trusses of the building.

Recent advances in these structures include Legacy Building Solutions' 2015 patent for a fabric attachment system that drastically improves the installation process. Where some manufacturers include complicated connections including TEK screws, which can weaken the structure, Legacy bolts extrusion directly to the steel frame with 1/2-inch diameter bolts. This system provides a simple, direct way to connect the fabric to the frame, and the design allows for quicker and safer installation. The attachment system also helps reduce waste and extends the structure's lifespan.

Figure 4 Oklahoma City Tennis Center: Indoor tennis courts and an LED lighting system.

ADVANTAGES OF RIGID STEEL FRAME CONSTRUCTION

The benefits of steel framed construction stem from every phase of the project, from quality control during the off-site frame design and fabrication, to the actual building process and building lifespan. These advantages include increased safety during installation, and a wide range of design choices, including the ability to connect to pre-existing structures.

DESIGNED TO RESIST CORROSION

While steel is known for its strength and durability, it requires protection against corrosion. During pre-fabrication, entire frames can be protected through a hot dip galvanization process to limit the risk of corrosion. These prefabricated steel frames are then shipped to the project site, and builders are able erect structures much more quickly and reliably than with wood framing and reinforced concrete; this translates into reduced project costs. From an installation standpoint, steel frames are relatively easy to assemble, which means that the required equipment such as cranes are on site for a limited time. The nature of the steel frame makes it very strong, durable, and relatively easy to inspect for safety issues; the material itself is relatively sustainable.

ADDING FABRIC TO STEEL FRAMES

While rigid steel frames work well for traditional building projects, they are limited by the nature of the construction and cladding, which requires the use of nuts, bolts, and nails, all of which are susceptible to rust. These problems are avoided when rigid steel frames are used for fabric buildings, namely in that the fabric is weather-tight and stretched over the frame, thus protecting the steel from atmospheric corrosive elements. While moisture can be a problem with a fabric building's interior, the fabric itself is joined to the frame with a keder rail, thus eliminating components that are susceptible to corrosion, such as nails and screws. Moreover, the architectural fabrics themselves are resistant to corrosive materials, for example fertilizers, salts or other chemicals used for road maintenance that are commonly housed within a fabric building.

In addition to the lack of corroded components, the benefits of fabric buildings on rigid steel frames extend from reduced construction time and cost, to improved safety and energy efficiency when compared with traditional construction techniques. Rigid steel frames are strong and versatile, and they can have alternative sidewall claddings, such as steel, concrete, or brick, which can enhance the usability of the interior space.

The benefits of using rigid steel frames for fabric structures are considerable when compared to just about every aspect of constructing traditional buildings. In terms of installation, most fabric structures can be constructed 2 to 3 times faster than conventional buildings. When compared with steel sheeting, a fabric structure requires .02 to .03 man-hours per sq. ft., where the steel sheeting requires .04 to .07. More efficient installation usually results in lower overall project costs.

One of the other benefits rigid steel frame fabric structures offer is that they are naturally non-conductive, which helps keep the building's interior cooler on hot days, and warmer on cool days. For example, a building constructed of steel sheeting will retain the heat from the sun for many hours after sundown; the higher albedo of fabric will naturally reflect the sun's heat, thus keeping the interior space cooler in warm weather. In cold temperatures, steel will conduct the cold temperatures into the building, but fabric will not, thus keeping the interior warmer. The comparison is impressive between the different structures, with fabric structures remaining more than 10 degrees Fahrenheit warmer on relatively cold days, and almost 10 degrees cooler on most hot days. This benefit can translate into considerable cost and energy savings when it comes to heating and cooling the interior of the building.

Maintenance of rigid steel frame fabric structures is also relatively easy in comparison to more traditional structures. As noted earlier, the fabrics used for these buildings are designed to resist mold, extreme temperatures, harsh chemicals, and the impact of UV light.

QUIZ

1. When were the first commercially available fabric structures popularized in the U.S?
   a. 1610 b. 1776
   c. 1950 d. 1973

2. What is a major downside to hollow web trusses?
   a. Internal corrosion b. Very expensive
   c. Only for use on large scale projects d. Are only made in three primary color options

3. What is the most important benefit of the different coating options for rigid steel frame construction?
   a. Color choices b. Protection from external corrosion
   c. Aesthetics d. All of the above

4. What is the main benefit of using fabric connectors instead of nails and screws?
   a. They attach from the outside, making it more convenient to install b. Nails and screws may come loose with weather
   c. They are stronger d. Nails and screws may rust or corrode

5. Typically, how much faster can fabric structures be assembled than conventional buildings?
   a. 1 to 1.5 times faster b. 2 to 3 times faster
   c. 10 times faster d. 25 times faster

6. True or False? Rigid steel frames can be made to accommodate doors and windows.

7. How much translucency does ETFE provide?
   a. 20% b. 50%
   c. 80% d. 100%

8. What are the small, triangle metal fixtures attached to eaves to catch and break snow that slides from a rooftop called?
   a. Icebreakers b. Snowcatchers
   c. Snow and ice lifters d. Eaves droppers

9. What type of fabric building frame can carry the most load?
   a. Single tube arches b. Aluminum extruded frames
   c. Open web tube trusses d. Rigid steel frame

10. Which of the following additional loads should be considered in the design process for steel frame fabric buildings?
    a. Catwalks and lighting b. Environmental concerns like wind, snow, and rain
    c. HVAC systems d. All of the above

SPONSOR INFORMATION

LEGACY BUILDING SOLUTIONS

Innovation Beyond Fabric. Service Above All.

Legacy Building Solutions designs, manufactures, engineers and installs large-scale custom fabric structures for a range of industries. The first to attach fabric cladding to a rigid steel frame, the now-patented process changed the industry in safety, quality and customer satisfaction. Legacy's process has achieved ISO 9001:2008 and CSA 660 certifications.

This article continues on http://go.hw.net/AR216Course1. Go online to read the rest of the article and complete the corresponding quiz for credit.

Presented by:

FLEXIBLE MODULE SOLAR POWER OPTIONS

Figure 1 Solar power systems can help commercial buildings and residential home owners avoid the unexpected fluctuations in energy prices as well as help reduce carbon emissions from fossil fuel power sources.

LEARNING OBJECTIVES

At the end of this program, participants will be able to:

1. Describe how traditional solar power generation operates in residential and light commercial applications.
2. Identify some of the common limitations and challenges with traditional solar power generation arrays.
3. Compare the differences between flexible solar modules and traditional rack mounted units.
4. List the benefits of flexible lightweight solar power systems.

CONTINUING EDUCATION

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By Andrew Hunt

INTRODUCTION TO SOLAR POWER GENERATION

Solar power is created through a process of collecting, and often storing, solar radiation through sunlight, and transferring that energy into a form that can be easily used to replace the power provided by standard sources of electricity such as burning fossil fuels. For example, solar power can be used to provide electricity for buildings, boats, cars, or personal electronics—anything that requires electricity to function.

In the most basic sense, the sun's radiation is collected through materials and devices, usually a photovoltaic (PV) cell—commonly known as a solar cell—strategically placed to capture the sun's rays in the most direct manner. This holds true whether energy is being generated to power small consumer technology, such as a cell phone or laptop, whether it is used to provide energy to heat and light a residential or commercial building, traffic signs and signals, or even satellites orbiting the Earth. PV systems are increasingly affordable and are being used more frequently because they are the least expensive option when considering onsite power generation.

In order to know whether solar power is appropriate for a particular location or purpose, you must first know the average amount of sunlight that falls in that location throughout the year. This value is usually referred to as *total radiation on a horizontal surface*, or as *total radiation on a surface tracking the sun*, and is estimated by measuring the amount of sunlight for a specific location at different times of the year. The geographic location, time of day, season, local landscape, and local weather of a site all factor into the decision of whether solar technology is beneficial.

Radiation data is critical in determining the benefits of using solar power in a given situation, and it has standard representations that are used worldwide. The amount of sunlight available in a specific location is often expressed as kilowatt-hours per square meter (kWh/m^2), however, direct estimates of solar power may also be expressed as watts per square meter (W/m^2). The radiation data for systems that provide solar water heating and space heating are usually represented in British thermal units per square foot (Btu/ft^2).

Over the last decade, solar technology has started to become an affordable alternative to fossil fuel based energy, and technological advances continue to make it more versatile every year. Already, in areas with good solar availability and high utility prices, solar power is competitive with traditional sources of electricity. Some estimates suggest that within the next ten years, solar power will be competitive with traditional sources of electricity in all locations

OVERVIEW OF SOLAR SYSTEMS

Photovoltaic solar systems are constructed of individual solar cells, which are then combined into modules that can then be connected to arrays. These solar arrays make up the primary part of a solar system. The cells themselves can be as small as a few inches across, however when connected together into modules they can be several feet long and several feet wide. Regardless of the size, solar cells are used collect solar energy, and convert it into electricity.

Solar cells are constructed of semiconductor materials, which are used to convert the absorbed energy from sunlight into useful energy. This process works by having the absorbed light transferred to the electrons in the atoms of the semiconductor. The electrons then escape from their standard positions within the atoms and that energy becomes part of the electrical flow, or current, of the electrical circuit. Solar cells have a special electrical property called a "built-in electrical field", which is used to separate the electrical charges, and to provide the specific force, or voltage required to push the current through an external load. This process is how solar energy can be used to provide light or heat, or to charge an electronic device.

A common technology used to create photovoltaic semiconductors is to use crystalline silicon cells. These cells are made of silicon atoms that are connected to form a crystal lattice, which provides the solid material of the PV cell's semiconductors. Silicon atoms have 14 electrons, however only four can be shared with other atoms. These four valence electrons are at the heart of how solar energy is produced.

In brief, in crystalline solids, such as those in PV cells, each silicon atom normally shares one of its valence electrons in a covalent bond with each of its neighboring silicon atoms. This ends up as the crystalline lattice, which, is made of the original one atom, plus the additional four shared valence electrons, for a total of five silicon atoms.

THE SCIENCE BEHIND SOLAR

In order to create useful energy from the silicon atoms, electrons must be dislodged from their covalent bonds; when they are dislodged, they become part of the electrical circuit. The energy required to dislodge the electrons is called the bandgap energy. When sunlight hits the silicon crystalline of a PV cell, it includes packets of light energy, known as photons. The only way an electron can be released is if a photon is at least as great as the bandgap energy. PV cells need to have their molecular structure tuned to best accept and make use of the photo energy so that they don't create any extra heat, which can happen in the photon's energy exceeds that of the bandgap energy. Crystalline silicon has a bandgap energy of 1.1 electron-volts (eV), and the ideal bandgap range for PV semiconductors is from 1.0 to 1.6 eV.

Solar systems can be very basic, or much more complex. For example, they can include batteries to store electricity for days when the solar modules cannot collect enough energy to meet the needs of the system. They can also be constructed to include electrical connections, mounting hardware, and power-conditioning equipment, to ensure that they can provide seemly energy output.

The two ways that solar energy is usually used in homes and other buildings are to provide power to the structure and to heat water through direct or indirect solar radiation. There are many different types and configurations for both ways to harness solar energy, and those vary depending on local climate, particularly whether temperatures generally go below freezing or not. Electricity is acquired through solar cells such as PV modules, solar thermal modules are used to acquire immediate heat, and are often used to heat water as it passes through pipes to a central storage area. These water heaters can save considerable energy costs in a home or business since the water is passively heated rather than actively heated in a boiler. Once the investment of the modules is paid off, the hot water is virtually free.

ADVANTAGES OF SOLAR FOR HOMEOWNERS AND LIGHT COMMERCIAL PROJECTS

Homeowners and light commercial project developers can both benefit from implementing solar technology onto their buildings. While the investment for the initial purchase and installation costs may seem higher than connecting to the electrical grid, the long-term savings can be significant, with a return on the initial investment accrued within the first few years of use. In addition to cost savings, solar modules allow homeowners and owners of commercial buildings to take advantage of valuable tax incentives, reduce their carbon footprint, lower susceptibility to changing energy prices through energy independence, reduce maintenance costs, and increase property values.

Recently, the US government has set in place numerous financial rewards to encourage both homeowners and businesses to integrate solar power systems. There are many incentives in place, such as the Investment Tax Credit, which gives business owners a 30% tax credit on installed systems, no matter what the system costs. New metering policies that charge only for energy used are another type of incentive. These policies allow businesses that integrate solar energy to bank unused solar energy to offset their electrical bills, and residences to more closely monitor their own energy use.

Both homeowners and commercial properties can often take advantage of cost recovery programs to help lower tax liability on the up-front costs of installing purchased systems. Alternatively, leasing is an option for residential and commercial properties that enables people to benefit from solar power systems for 15–20 years without committing to the upfront purchase and installation costs.

Figure 2 Onsite power generation, like solar power, is becoming more affordable and attractive to many homeowners.

Regardless of whether solar modules are purchased or leased, the energy savings can be significant, as well as immediate. Homeowners will benefit from avoiding volatile energy prices through using solar modules. If they do not wish to own the modules, they can instead lease them and take part in solar power purchase agreements (PPAs), which allow homeowners to finance their solar modules. In this model, homeowners pay the solar provider, rather than the utility company, for electricity, and the costs are considerably less.

For businesses that choose to purchase or lease solar systems, the advantages of using this alternative power source can be significant. Most notably, businesses can drastically reduce operating costs for the building, and those reduced costs can quickly pay for the initial investment of the solar system. Unlike power obtained from utility companies, solar power is much more stable. Businesses can then treat their power costs as more of a fixed expense, which can, in turn, stabilize an otherwise volatile element of business operation costs. This stability can significantly benefit businesses that operate 24 hours a day, such as manufacturing firms, or companies that have data centers. For larger commercial buildings that require water heating—for example, units that include rental tenants or businesses such as laundromats—indirect solar radiation heating can reduce energy costs significantly and can stabilize costs during energy-intensive months, such as winter or summer.

As noted earlier, solar systems are highly reliable, durable, and they require very little maintenance. Most solar module manufactures provide warranties that last for roughly 25 years, however because the modules are passive with no moving parts, they tend not to require much in the way of repairs. This guaranteed performance provides property owners with the benefit of a long-term, secure investment of energy independence.

Green buildings and sustainable design are quickly becoming recognized as something to strive for in newer buildings and retrofits. Installing solar modules can lower an individual or business's carbon footprint, all while increasing the property value. For example, a recent study by the National Bureau of Economic Research found that in California, PV systems added a $20,194 premium to the sale price of homes. In addition to having property values increased, businesses that integrate solar energy into their initial building design, or add solar modules to existing structures, may find that their decision to "go green" is positively recognized by both customers and the media.

ADVANTAGES TO GOING SOLAR

Building industry professionals, whether architects, builders, or designers, can all benefit from knowing how to best integrate solar systems into their work while at the design or build stages of construction. Solar energy is increasing in popularity for both residential and light commercial properties, and so building professionals need to be informed of the advantages so that they can discuss design options with clients who are interested in energy efficient, or even passive energy buildings. As an example of the electricity-saving benefit, it has been reported that a 2.4-kilowatt solar electric system installed in a California housing development can offset 40 to 50 percent of the electricity needs of an energy-efficient home.

There is a distinct difference between choosing solar for new buildings versus integrating solar into an existing structure, and building professionals need to be knowledgeable about and experienced in energy-efficient building design and construction. For new buildings, architects must have a full understanding of the building site, so that they can tailor their design to optimize sun access. Solar heating also allows for creative designs when it comes to energy efficiency of the whole building, and architects will be able to provide clients with a secure energy option that will immediately increase the value of the home or building.

Architects, builders, and designers who work with solar must also be informed of the challenges of integrating solar systems—particularly traditional rack-mounted systems—on older buildings. While some customers may wish to retrofit their property with solar, the roofs of the buildings themselves may not be strong enough to support the weight of the system. These older buildings should be fully inspected prior to having solar integrated during the design stage to avoid any potential safety hazards or damage to the building.

Figure 3 New technologies in solar power generation include flexible peel-and-stick style modules.

From a professional standpoint, building professionals who use solar often tend to have green building accreditation, such as Leadership in Energy and Environmental Design (LEED), which can be a distinct advantage in a competitive market. LEED standing identifies these professionals as understanding energy efficient building practices in a broader and deeper context than their non-accredited counterparts, and will help make sure that when solar is considered an option, it is done in the context of whole-building efficiency.

LIMITATIONS OF TRADITIONAL SOLAR MODULES

Rack-mounted solar modules have been the industry standard for both residential and commercial projects. Modules are typically mounted to rooftops, and thus are vulnerable to the elements, particularly in areas where weather can be severe. While solar modules are designed to be strong and durable, they are not indestructible, and in extreme cases they can be damaged by the impact of high wind, wind-blown debris, and hail. In many cases, the tempered glass of the modules may survive impacts, but the rack itself may be damaged.

Because of their exposed location on rooftops, the module arrays may experience sustained winds and higher wind loads than other parts of the building. In extreme conditions such as hurricanes, gusts have been known to exceed 150 mph, and roof-mounted solar modules may be torn from the mounting hardware, or the hardware itself may be damaged if the potential wind load was not calculated properly prior to the installation. Hurricanes are known for exceptionally high winds that often carry with them random debris, such as metal signs or building fixtures, all of which can damage solar modules upon impact.

Most solar modules are built with tempered glass and are tested against industry standards for strength, however some modules may be more fragile and thus risk damage from hail and debris during extreme weather. These challenges can compromise the potential benefits of including this alternative power source in the design.

While not a physical limitation, traditional rack-mounted solar modules are increasingly considered outdated from an aesthetic point of view. Architects will be challenged by the appearance of rooflines and the overall look of a building when they integrate a rack-mounted system onto the roof of a building. The modules are usually quite large and they add additional height onto the structure.

Figure 4 Flexible and flat, modern solar modules can help increase overall solar collection capacity while not interfering with the roof aesthetics.

FLEXIBLE SOLAR MODULES

Solar energy is an increasingly affordable and energy efficient alternative to energy drawn from utility companies. However, traditional rack-mounted solar modules are limited in their weight, installation requirements, and susceptibility to wind and debris damage. They also affect the aesthetics of building design, and as such may either be disregarded as an energy option, or present architectural challenges to better integrate the technology into the roof design.

A material that addresses many of the challenges with traditional solar modules is Copper-Indium-Gallium-Selenide or CIGS. This thin-film solar material has been demonstrated to be a viable replacement to rack-mounted solar modules because of its high efficiencies, durability, and versatility. CIGS can be manufactured through a number of different processes, but most include some version of having copper, indium, gallium, and selenide deposited overtop a backing, which is often glass or plastic, but sometimes stainless steel foil. Electrodes are attached on the back and front to collect the current when the cells are exposed to sunlight. The backing is treated, often with a physical vapor deposition process, and the end product is an extremely controlled, stable, and powerful flexible copper indium gallium selenide (CIGS) solar cell. The result is a solar module that performs with high efficiency under low light conditions and produces high energy yields.

This article continues on http://go.hw.net/AR216Course2.
Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. Which of the following is a name for the value referring to the amount of sunlight that falls on a location throughout the year?
   a. Sunlight squared times latitude
   b. Refraction indifference
   c. Ray's Method
   d. Total radiation on a horizontal surface

2. What is one major consideration when planning to install a traditional rack-mounted solar panel system on an existing older home?
   a. The weight of the system on the roof
   b. Too much total radiation overwhelming the system
   c. The cost will go up once the warranty expires in 25 years
   d. Older buildings don't store enough power to charge basic appliances

3. How are traditional solar panels typically mounted?
   a. Tongue and groove
   b. Rack mounted
   c. Gravity balanced
   d. With elaborate pulleys

4. Which of the following can flexible solar panels be installed on?
   a. Boats and Planes
   b. House or Commercial building
   c. Clothing
   d. All of the above

5. True or False: Flexible solar panels cannot be installed without reinforcing and retrofitting a roof.

6. Generally, how thick are flexible solar panels?
   a. 2mm to 3mm
   b. 10mm to 25mm
   c. 40mm to 50mm
   d. 100cm to 200cm

7. What type of roofing material is ideal to bond solar panels to?
   a. Wood
   b. Asphalt
   c. Metal

8. How many years is a typical warranty on power output for flexible solar panels?
   a. 1 year
   b. 2 years
   c. 5 years
   d. 25 years

9. Which is an immediate benefit of installing flexible solar panels?
   a. Increased property values
   b. Free installation on all models and types
   c. Coupons for home improvement stores
   d. Do it yourself TV show exposure

10. What does CIGS stand for?
    a. Calcium, Iron, Gold, Silver
    b. Cobalt, Iodine, Gadolinium, Silicon
    c. Carbon, Iridium, Gadolinium,
    d. Copper, Indium, Gallium, Selenium

SPONSOR INFORMATION

MiaSolé
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MiaSolé is a producer of lightweight, flexible and powerful solar cells. The innovative solar cell is based on the highest efficiency thin film technology available today, and its flexible cell architecture makes it ideal for a wide variety of solutions ranging from commercial roofing solar panels to flexible mobile devices.

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LafargeHolcim Forum

“The lesson here is important: You can’t hope to restore an architect’s reputation overnight. It took decades of activism and research—plus some lucky breaks.”

Why Hawksmoor’s Revival Matters by Amanda Kolson Hurley

Artistic reputations often rise, fall, and shift over time. Shakespeare, for instance, was once regarded as an uneducated bumpkin (a "poet of nature," as Samuel Johnson wrote). Contemporaries of the English painter J.M.W. Turner dismissed his abstract late works—now celebrated—as symptoms of senility. (John Ruskin, otherwise a fervent admirer, lamented that they were "of wholly inferior value.")

Even amid this context, the fall and rise of Nicholas Hawksmoor is an astonishing story. The master of the English Baroque—who worked on St. Paul's Cathedral alongside Sir Christopher Wren, left several other incomparable churches looming over London, and collaborated with Sir John Vanbrugh on the grand country estate of Castle Howard in North Yorkshire—was nearly lost to history. Critics long portrayed Hawksmoor as a minor and eccentric talent, an assistant to Wren and Vanbrugh who couldn't match them in any respect.

And those were the friendly verdicts. After the Palladianist Lord Burlington gained influence in the 1720s, Hawksmoor's esoteric blend of the classical and the Gothic fell out of favor. By the 19th century, writes Owen Hopkins in *From the Shadows: The Architecture and Afterlife of Nicholas Hawksmoor* (Reaktion Books, 2016), his churches were viewed by some Londoners as grotesque and prison-like (partly because of the soot that had blackened their white bands of Portland stone).

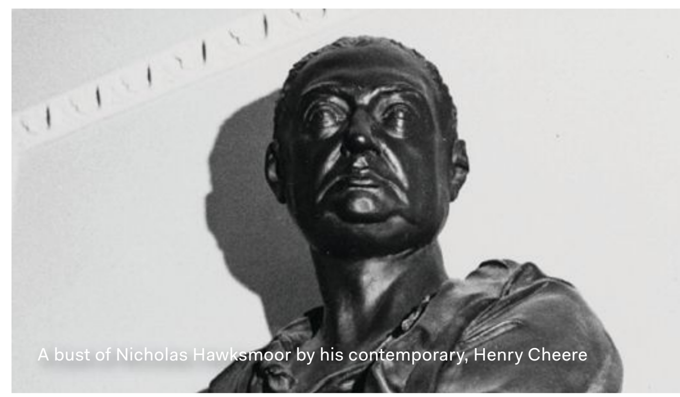
Although Wren enjoyed a mini-revival in the 1880s, Hawksmoor had no such luck; for Arthur Heygate Mackmurdo, the author of the 1883 book *Wren's City Churches*, Hawksmoor's St. Mary Woolnoth in London was just "a mass of piled-up plagiarism" by an architect who "never was able to refine his native coarseness."

Hopkins, an architecture curator at the Royal Academy of Art, traces two arcs in his new book: Hawksmoor's architectural career and his posthumous legacy, which went into a long decline before its recent and vigorous upturn. In just over 300 pages, Hopkins combines an engaging survey of Hawksmoor's buildings with a thoughtful assessment of his critical fortunes. The two halves don't form a perfectly satisfying whole, but Hopkins ably conveys Hawksmoor's genius while explaining how preservation battles over the churches, literary homages to Hawksmoor, careful research, and changing tastes all conspired to push Hawksmoor into the first rank of British architects.

A Quick Study

Like Shakespeare's, Hawksmoor's biographical details are sketchy. He was born to a farming family in Nottinghamshire, probably in 1662, and had at least some secondary education. He clerked for a justice and apprenticed in a plasterer's workshop before joining the household of Sir Christopher Wren as a factotum. A few years later, after a draftsman left Wren's office, Hawksmoor filled the vacancy. Thus began his rapid rise through the ranks; by 1685 he was working on drawings for St. Paul's, and in 1689 he was named Clerk of Works at Kensington Palace, a royal post that Wren secured for him.

Hawksmoor distinguished himself in Wren's office by being an extraordinarily quick study, as drawings in the book make clear. The first one we see


A bust of Nicholas Hawksmoor by his contemporary, Henry Cheere

is a topographical sketch of Oxford that Hawksmoor made while on a tour of English towns. He was 20 or 21, but the sketch could have been made by someone much younger; it shows a general sense of spatial awareness but is otherwise crude, as Hopkins acknowledges. The next drawing is an elevation of St. Paul's in gray ink and wash, dating from only a few years later, with a breathtaking level of skill in technical draftsmanship. It nearly defies belief that a person could learn so much in so short a time.

Hawksmoor worked under Wren for many years, serving as a project manager for the Royal Naval Hospital at Greenwich. His next boss was Vanbrugh, a brilliant amateur who turned to architecture after stints as a playwright and a spy. Their relationship was not that of mentor and protégé, as it was with Wren, but "a creative partnership," Hopkins writes, "which was to prove a vital catalyst for Hawksmoor's independent career." At Blenheim Castle (now famous as Winston Churchill's childhood home) and Castle Howard (where the TV series *Brideshead Revisited* was filmed), Hawksmoor and Vanbrugh held to the principle that the "air" of a building—that is, its overall impression—matters more than how it conforms to a specific style.

The decisive point in Hawksmoor's career came in 1711, when the 49-year-old architect was appointed as surveyor to the grandly named Commission for Building Fifty New Churches. In this capacity, Hawksmoor designed the six London churches (plus two more with John James) now regarded as his most important buildings. Hopkins vividly describes Hawksmoor's instinct for manipulating volume and mass, and the often visceral effect his buildings have on their viewers:

"Being confronted by one of Hawksmoor's churches today, it is still hard not to be bowled over by their colossal, almost overblown scale and the sheer intensity of their layered, abstract masonry. Thinking particularly of his three East London churches, approaching them from the side we see vast expanses of smooth white Portland stone, punctuated by windows and doors that are seemingly punched through the masonry. Exaggerated keystones weigh heavy, almost teetering above them. The towers and spires, too, resist the force of gravity with an almost tangible energy as they push upwards from the main body of each of the churches. ... It is architecture that wears its heart on its sleeve; it has a vigour and richness with few peers in London or beyond."

A Modest Man Has His Moment

If Hawksmoor's buildings are so moving, why did his reputation suffer? Hopkins blames a few factors: the rise of doctrinaire Palladianism (his description of how Lord Burlington actively interfered with an elderly Hawksmoor as he designed the mausoleum at Castle Howard is sad and infuriating), and the Victorian distaste for 18th-century "Gothick" architecture, on display in Hawksmoor's work at All Souls' College in Oxford (including the Codrington Library), and in his renovations to Westminster Abbey. But perhaps the biggest problem was Hawksmoor's own modest, self-deprecating personality. A commoner with no sense of entitlement, he was so good-natured that his achievements were eventually subsumed by the outsized legacy of Wren (and to a lesser extent, of Vanbrugh). "I never talk'd with a more reasonable man," one associate observed, "nor with one so little prejudiced in favour of his own performances."

The modest Hawksmoor is nevertheless having a moment right now: Hélène Binet's sumptuous photographs of his London churches were exhibited at the Venice Biennale in 2012, then packaged into a book, *Nicholas Hawksmoor: London Churches* (Lars Müller Publishers), released to some acclaim last year. One thing *From the Shadows* does well is to show just how gradual this rehabilitation has been, starting back in the 1920s—when the Church of England proposed demolishing St. Mary Woolnoth in a consolidation drive—and gaining momentum after World War II. Even as late as 1945, the architectural historian John Summerson, a passionate defender of Hawksmoor, could refer to him repeatedly and unwittingly as "Hawksmore" in print, the name was so unfamiliar.

The tide turned in the '50s and '60s, thanks to the pioneering research of an architectural historian named Kerry Downes and the formation of the "Hawksmoor Committee," a coalition of arts patrons, writers, and architects who lobbied to save Hawksmoor's dilapidated churches from oblivion. Summerson, Sir John Betjeman, and Sir Nikolaus Pevsner joined the committee, as did Denys Lasdun, the Smithsons, and Philip Johnson. In a funny anecdote, Hopkins describes how T.S. Eliot priggishly refused on the grounds that the letter announcing the committee was poorly written. (He returned the draft to an organizer with exclamation marks in the margins.)

The appeal that Hawksmoor held for Brutalist architects like Lasdun and the Smithsons is easy to understand. Early in the book, Hopkins includes a drawing of one church that is a startlingly abstract study of form and massing, the details hardly visible. Hawksmoor the proto-Brutalist is just one of multiple Hawksmoors who have sprung up in recent decades, joined by Hawksmoor the Postmodern precursor (an example for Robert Venturi, FAIA, and James Stirling) and Hawksmoor the devil-worshipping occultist, a figment of Peter Ackroyd's literary imagination (his novel *Hawksmoor* was published in 1985).

Some of the section on Hawksmoor's rebirth drags, after the brisk pace of the book's first half; we probably don't need to know, for instance, the back story of the publisher who released Downes' first book. But the lesson here is important: You can't hope to restore an architect's reputation overnight. It took decades of activism and research—plus some lucky breaks, like most of the churches surviving German bombs—to make Hawksmoor matter to Britons after hundreds of years of obscurity.

This might seem discouraging to those who worry about the ongoing destruction of Brutalist and postmodernist buildings. How many more will we lose before attitudes change? But the Hawksmoor Committee's patience paid off, and that was pre-Internet, when everything took longer. Perhaps, since we have learned to value his idiosyncratic work, the Hawksmoor revival will help in some small way to save "difficult" modern buildings that are monumental, or spatially complex, or highly allusive. It would be a nice and fitting next chapter to his story.

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“With most shows, you’re objectifying architecture. … I didn’t want to put any images of the buildings in the show. I wanted it to be about ideas.”

Unveiling the Models of Brad Cloepfil Interview by David Hill

Architectural models can be quite beautiful, and they are often exhibited in museums, but they tend to be little more than miniature versions of proposed buildings. Brad Cloepfil, AIA, founder of the Portland, Ore.–based firm Allied Works Architecture, creates models that are something else entirely. Made of wood, glass, resin, porcelain, copper, brass, and even pencils, they're more like abstract sculptures—and they're rarely seen by clients.

Dean Sobel, director of the Cloepfil-designed Clyfford Still Museum in Denver, argues that the architect's drawings and models—while never intended to be displayed as artwork—share similarities with works by post-minimalists like Richard Serra, Joel Shapiro, and Jackie Winsor. "Cloepfil," Sobel says, "has worked at the intersection of architecture, sculpture, and drawing since the beginning of his career."

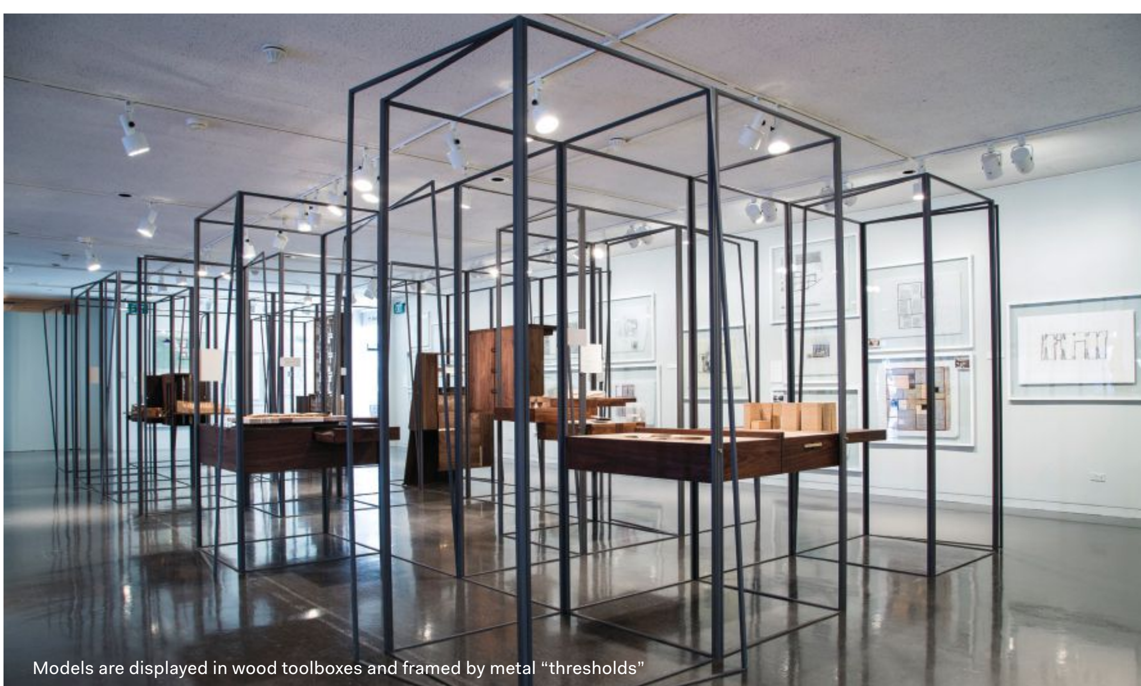
The architect has long been reluctant to exhibit his models, but Sobel has finally persuaded him. "Case Work: Studies in Form, Space, and Construction by Brad Cloepfil/Allied Works Architecture," curated by Sobel, runs at the Denver Art Museum through April 17, and will also be displayed at the Portland Art Museum in Oregon from June 4 through Sept. 4.

ARCHITECT sat down with Cloepfil and Sobel at the Denver Art Museum to discuss the ideas behind the exhibition.

How did the show come together?
Dean Sobel: It started from just seeing these things at the Allied Works offices in Portland and New York. And I was always really interested in them, particularly because they were never shown to me in a formal way. It was more that I'd have to reach out and ask Brad, "What's this? What project is this for?" They weren't on display. They were sitting on conference tables and desks, like stacks of paper. I think the timber model for the Clyfford Still Museum was just lying humbly by the front door.

I thought they should be brought together in an exhibition. And ultimately it was really Brad's ideas about how one would do that visually. I think I probably would have resorted to something more traditional, like pedestals and vitrine tops, and it would have been a very different show. But that's what collaboration is. You end up doing things that you would not have even considered.

Brad, had you ever considered doing an exhibition of your drawings and models?
Brad Cloepfil: No, not seriously. Years ago, I did a small exhibition in Portland of my charcoal sketches. Dean was probably the first one to see the depth and breadth of the objects. About five years ago, we thought, "We should probably do a show." But we never got around to it. And then the works started


Models are displayed in wood toolboxes and framed by metal "thresholds"

STEPHAN ALESSI

A toolbox featuring models for the following projects (clockwise from top left): the Contemporary Art Museum in St. Louis, the Dutchess County Estate in New York, the National Music Centre of Canada in Calgary, and the Ohio Veterans Memorial and Museum

accumulating. I began to see how they might be interesting to talk about, because they're all about how we work.

Sobel: And you knew what you didn't want to do. I think we had a very brief conversation about more traditional architecture shows: the presentation models, the computer drawings. There was a very early decision that you didn't want that.

Cloepfil: With most architectural shows, you're objectifying architecture. You're showing images of buildings, and architecture models that are like toys, but they're representational. I didn't want anything to be representational. In fact, I didn't want to put any images of the buildings in the show. I wanted it to be about ideas. I wanted the objects to communicate to us—that there's an idea in them, and that's what it's about. But then it did seem a little mean-spirited not to show the final product, so we included some postcard-size images of the buildings.

How do the models—which are really more like sculptures—inform the final design of your buildings?

Cloepfil: They're part of the intellectual and experiential investigation we do. The buildings come from that industry. Mostly, they inspire us. Take a sketch, give it form, learn from that form, go back, do more sketches, do some computer drawings. Work your way through it. Every time someone says they're about "process," I cringe a little bit. They're really about ideas. The models aren't objects that show steps between here and there. They're just tools for us. As soon as we make them, we sort of reject them and go on to the next one.

Wood model of the Clyfford Still Museum in Denver

Do clients see them?

Cloepfil: Three or four of them have—that's all. I've gained more confidence in talking about them. But in this era of buildings as objects, the instant commodification of architecture, you might show these to clients, and they might say, "OK, but when are you going to show us what the building will look like?"

Sobel: When we were working with Brad on the Clyfford Still Museum, I usually saw them in PowerPoint presentations. He never excitedly took me over to see them. It was always the other way around. I would ask, "Brad, what's that?"

Cloepfil: The notion that I could show clients an idea rather than an image—it took me a lot of time to have the confidence to assert that. And it's a rare client who will understand that, and see the potential of it, and trust the process to make a building out of that. It takes a client who wants to be a partner in the investigation, as opposed to people who just want to collect architecture. We do get some of those clients, but mostly we get clients who want to create something, who want to find something rather than just buy the architecture.

Brad, what's the story behind the Clyfford Still Museum wood model, which is in the exhibition?

Cloepfil: That came sort of midstream. We were trying to find the nature of the building. I think we had settled on where the building would be bounded, and I was upset by that at that stage, because I really wanted it to

TOP: JEREMY BITTERMANN; BOTTOM: COURTESY ALLIED WORKS ARCHITECTURE

Wisconsin Art Preserve study

blur into the landscape. So I did a charcoal sketch of a section where the trees and the building were the same height, then gave it to the folks in the studio, and I said, "Can't we rout this on a piece of wood?" They went downstairs and came back about a day or two later with the model. And then we all stood around and said, "This is what we're serving." And everyone could see it.

Some people may be surprised by the scale of the objects. Some of them are quite small.
Cloepfil: I think what always blows my mind about architecture is the transition in scale. No other art does that. You can start with a charcoal drawing, then you make objects that you share in the studio with 10 people, then you make working drawings that you share with 100 people, then 250 people build the building, and then it's given to a city. It's crazy! Your idea has to traverse those different scale evolutions. And sometimes they don't make it. You get into the middle, and it's not holding the building together, so you have to stop and rethink, "Where did we go wrong?"

COURTESY ALLIED WORKS ARCHITECTURE

Brad, why did you decide to display the objects in beautiful wood cases?
Cloepfil: The models were never conceived of as objects to be displayed. They're the tools of our visual industry. When you're tasked with doing a show, you consider the objects in an entirely new way. Now, they're suddenly public objects, so how do we present them? The idea of putting them on pedestals—I couldn't do it. It was hard enough for me to get to this phase of showing these things. They're for us, and occasionally for clients. So, I wanted to contextualize the objects by putting them in wood toolboxes and cases, and framing them with metal "thresholds" that you step through. They hold and present the toolboxes, but they also allow you to get lost as you wander through the exhibition. There's a sense of discovery.

Putting the models in a museum setting—that made me extremely nervous. Buildings are intended to be made public. When a building is completed, it's no longer mine. But the models are different.

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“The Sainsbury Centre represents a built chronicle of Norman Foster’s evolution as a designer.”

Biography of a Building by Witold Rybczynski, HON. FAIA

Most readers will be familiar with the Sainsbury Wing, Robert Venturi, FAIA, and Denise Scott Brown, HON. FAIA's postmodern addition to the National Gallery in London. But there is an earlier Sainsbury museum, the Sainsbury Centre for Visual Arts, named for a different branch of the same family. The building is located in the southeast corner of England and is part of the University of East Anglia, a campus planned and designed by Sir Denys Lasdun in the 1960s. Lasdun's Brutalist megastructure, all heavy massing and exposed concrete, appears dated and somewhat forlorn, while the Sainsbury Centre, which was designed by Sir Norman Foster, HON. FAIA, only a dozen years later, still manages to look visionary. In the opinion of many, including this author, it remains one of the architect's best works.

The Sainsbury Centre is notable in another respect. Over the years, Foster has been called back to expand, refurbish, and reorganize the building. This is rare in the museum world. Major museums are usually designed by established practitioners, and by the time more space is required, three or more decades have passed and the original architect is retired or deceased. Such was the case with Frank Lloyd Wright's Guggenheim, Marcel Breuer's Whitney, and Louis Kahn's Kimbell. Alternatively, the original architect may be passed over—the result of a new director, an opinionated donor, or just "let's try someone different." This happened to Venturi and Scott Brown with the Seattle Art Museum, Richard Meier, FAIA, with the High Museum of Art, and Mario Botta, HON. FAIA, with the San Francisco Museum of Modern Art. The Sainsbury Centre falls into neither of these categories. Foster was young when he designed it, and his client was steadfast.

In 2011, I wrote a book about the Sainsbury Centre. It was titled *The Biography of a Building* (Thames and Hudson), but it was equally a biography of the architect, since the center represents a built chronicle of Foster's evolution as a designer. Two years ago, the architect was called back to refurbish the building once again, adding another chapter to his four-decades-long involvement.

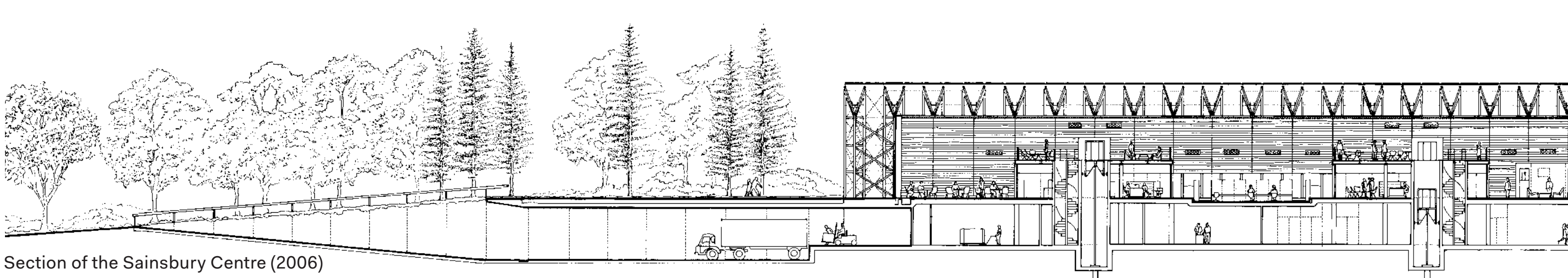
Bob and Lisa's Unlikely Choice

An architect's biography is a crowded place, peopled by coworkers, consultants, contractors, and not least, clients. The driving force behind the Sainsbury Centre was an unusual pair of collectors, Sir Robert and Lady Sainsbury, better known to the London art world as Bob and Lisa. Bob started collecting art early; he bought his first Henry Moore sculpture in 1932 when he was only 26. He worked in the family business, and with his brother Alan expanded a group of grocery stores established by their grandfather into a nationwide supermarket chain. But Bob was not simply a successful businessman amassing cultural trophies; he sought out—and befriended—unknown artists such as Moore, Alberto Giacometti, and Francis Bacon. His and Lisa's collection was unorthodox: In addition to contemporary art it included what was then called primitive art from Polynesia and the Orient, as well as Asian, European, and pre-Columbian antiquities. The common thread was depictions of the human figure.

In the early 1970s, when Bob Sainsbury retired, he and his wife decided to donate their valuable collection—more than 400 objects—to an educational institution. They chose the University of East Anglia, with whose vice-chancellor, Frank Thistlethwaite, they had struck up a friendship. They also provided the money for a new building to house the collection.

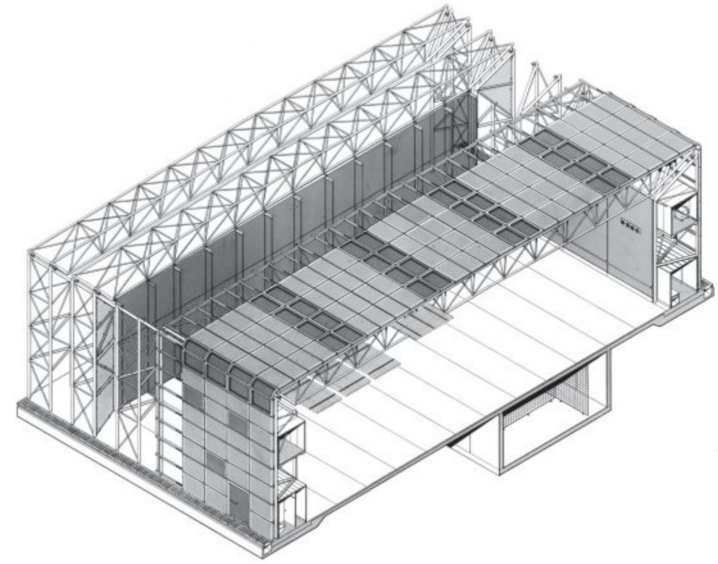
The canny Sainsburys set strict terms on the gift: They reserved the right to approve the building's architect, as well as its design. They selected Foster. It was an unexpected choice: The 38-year-old architect had never designed a public building, let alone a museum; in fact his fledgling firm, barely six years old, was known chiefly for utilitarian, albeit elegant, industrial buildings. It was the striking reflective façade of a small office building on the London docks for Fred Olsen Lines, a shipping company, that caught Bob Sainsbury's eye. "I decided that the man who designed that building was the man for me," he later recalled.

Sainsbury wanted his collection to be integrated with the life of the university, so he and Thistlethwaite concocted a potpourri program that included not only an art gallery but also a new home for the



Section of the Sainsbury Centre (2006)

FOSTER + PARTNERS



Axonometric of Sainsbury Centre (1977)

university's fine arts department, an art history library, a senior common room (faculty club), and, because the university did not have college dining halls, a student cafeteria.

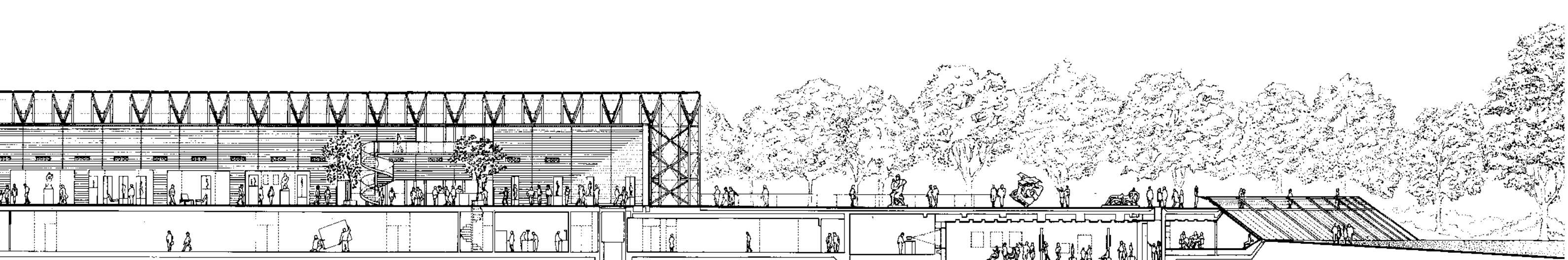
The conventional solution would have been to situate the different functions in a cluster of buildings. Instead, Foster Associates—Foster's architect-wife, Wendy, was an active partner (she died in 1989)—combined the disparate uses within a single space. While the firm was known for its technical expertise, the chief rationale for this non-hierarchical arrangement was not technical but social—that is, a desire to foster human interaction. Another consideration was adaptability, a theme that would emerge in later Foster buildings such as the Hongkong and Shanghai Bank headquarters in Hong Kong and Stansted Airport in England.

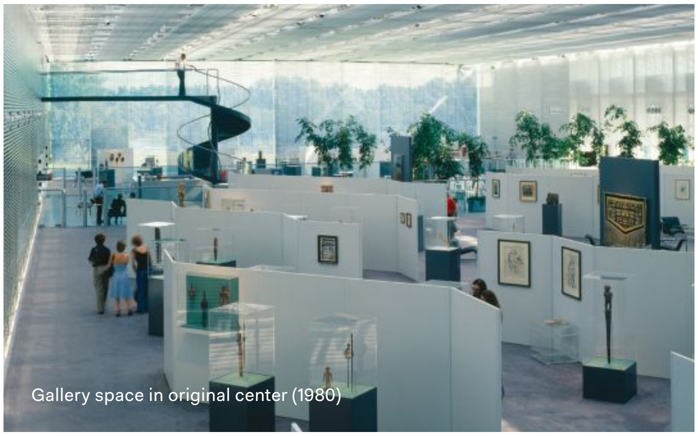
The Sainsbury Centre, a vast column-free space, 500 feet long, spanned by portal frames, resembles an aircraft hangar. The lightweight steel structure was the work of engineer Tony Hunt; Birkin Haward, Loren Butt, and a young Ian Ritchie, HON. FAIA, were also members of Foster's team. Skylights illuminate the interior, the light modulated by movable louvers; lighting and exhibits were the responsibility of two American consultants, Claude R. Engle and George Sexton, respectively. The art is displayed in cases and hung on freestanding, movable panels. Easy chairs and low tables are scattered among the artworks creating a relaxed, almost domestic atmosphere. Although sometimes described as "high tech," Foster's design had little in common with the contemporaneous and rather theatrical Centre Pompidou, designed by his ex-partner Sir Richard Rogers, HON. FAIA, with Renzo Piano, HON. FAIA—Foster concealed rather than dramatized the structure and mechanical services. Nor did the Sainsbury Centre share the Pompidou's high construction cost; it was a no-frills building, almost Calvinist in its unpretentious simplicity.

Foster as Mountaineer

The Sainsbury Centre was completed in 1978, shortly before the curvy glass Willis Faber & Dumas headquarters in Ipswich, England. These two acclaimed projects, which put Foster on the architectural map, were the work of a young idealist, ambitious, adventurous, pushing the boundaries of building construction. This last quality set him apart from his contemporaries. The late 1970s was the heyday of architectural Postmodernism, exemplified by the work of Venturi and Michael Graves, but Foster was uninterested in historic references and traditional symbolism—he was a technology man. Foster associate Richard Horden put it this way in a 1984 *Blueprint* interview. "I think we [architects] are all like mountaineers. Michael Graves is the kind of chap who goes all the way up alone with a walking stick. We use crampons, pitons, and oxygen ... and we go up higher."

But even well-equipped climbers have mishaps. The prefabricated insulated panels that covered the walls and roof of the Sainsbury Centre were made of superplastic aluminum, a material previously used only in aircraft construction. Seven years after the building opened, this innovative solution developed problems. It remains unclear who was to blame, but the outcome was that the entire skin had to be replaced with more conventional aluminum panels. Bob Sainsbury, a supportive patron who called the building "the gem of my collection," stepped forward





Gallery space in original center (1980)

Crescent Wing

to cover the cost, and the original corrugated silver panels were replaced by a sleek white skin.

During the following decade, Foster was called back to enlarge the center. There was a need for more exhibition space and an open reserve, as well as back-of-the-house functions such as a conservation lab, workshops, art storage, and office space. Although it would have been easy to simply extend the linear design, the Sainsburys, who as before were active participants in the design process, didn't want any visible alterations to the original building. The large extension, whose footprint was two-thirds that of the original building, was underground, its grass-covered roof interrupted by a sweeping arc of glass where the building emerged from the slope.

The architecture of what became known as the Crescent Wing was a departure from the original building, less rectilinear and more organic. Graham Phillips, who led the Foster team, told me, "We reasoned that it could be different, plainer, and more sculptural, more minimalist, and more about space." The shift signaled an evolution in Foster's architectural thinking. In the intervening decade he had built two important museums, the Maison Carré in Nîmes, France, and the Sackler Galleries at the Royal Academy of Art in London. The latter, a remodeling of a Victorian building, showed a different Foster, not just a technological maven but a stylish minimalist. Interestingly, it would be the restrained minimalism of the Sackler and the Crescent Wing, rather than the structural high jinks of the Hongkong Bank, that would come to characterize Foster's later work. At the same time, he continued to push boundaries: The glazed arc of the Crescent Wing is a very early example of fritted glass.

An Exercise in Preservation

When the Sainsbury Centre first opened, Sir Peter Cook of Archigram fame speculated in *Architectural Review* about the future of the building: "A strong object can take the addition of crap, high jinks, or inconsequentiality on the inside, without the destruction of the idea or the atmosphere," he wrote approvingly. In fact, Foster's brand of immaculate precision is easily undermined by even a small amount of "crap"—a dented panel, a rust stain, a piece of worn carpet. In 2003, David Sainsbury, who had chaired the family firm and was a cabinet minister in the Labour government, commissioned a study that found the 25-year-old building required refurbishing. David felt a responsibility to safeguard the legacy of his father, Bob, who had died in 2000, and he insisted that Foster oversee the work. The interior was stripped bare. Mechanical systems were improved, high-performance glazing was installed in the skylights, exhibition lighting was upgraded. Foster, who had dealt with historic buildings such as the Reichstag in Berlin and the British Museum in London, treated the refit as an exercise in preservation: the same Eames-designed chairs in the cafeteria, new but almost identical exhibition panels in the art gallery, the same patterned carpeting. The glass canopies added to the two entrances were a concession to practicality.

The refurbishment of the building also included new classrooms and studios for an expanded educational program, a relocated and enlarged museum shop, and a public underground link to the Crescent Wing. The last required excavating a section of the main floor of the existing building. Foster's style had become, if anything, even more stripped down, and also—paradoxically—more upmarket. David Sainsbury's charitable foundation funded the refit and alterations, which took almost two years, and, adjusted for inflation, represented three-quarters of the cost of the original building.

George Sexton continued to consult on the exhibition design and lighting. "Bob and Lisa knew exactly what they wanted; now our client was the university," he told me. "Inevitably, there were different visions and agendas." In 2013, following the arrival of a new director, the center saw another round of changes. Under Foster's supervision, the museum shop was relocated yet again, the open storage was moved to the main building, and galleries for special exhibits were consolidated in the Crescent Wing. As part of the reorganization, a large mezzanine that had previously been occupied by the senior common room (which had

TOP: KEN KIRKWOOD; BOTTOM: NIGEL YOUNG/FOSTER + PARTNERS long-since closed down) was converted into a gallery for visiting exhibitions. Since lenders require highly controlled lighting conditions, floor-to-ceiling scrim-like screens were installed across the full width of the building. The screens, which the museum staff refers to as "shower curtains," seem to me an insensitive intrusion that visually interrupts the open interior.

I ask Spencer de Grey, Foster + Partners' head of design, about the curtains, which were not designed by the architects. "I haven't seen them," he says, "but they are only temporary, as far as I know." He seems reluctant to comment, and steers the conversation back to other changes. "Swapping the galleries has located the Sainsbury collection together upstairs, which is nice," he tells me. "It has also made a huge difference to the way the center can operate, since it gives the opportunity for hosting major international exhibitions." De Grey mentions the recent "Francis Bacon and the Masters" show, organized with the State Hermitage Museum in St. Petersburg, Russia. He makes the point that the recent alterations didn't require massive physical changes, but rather a redefinition of how spaces are used. The flexible Sainsbury Centre has adapted to these changes. "A building is a living thing; it shouldn't remain static," he says. "I think it's important that architects can revisit their buildings, otherwise you can lose the original ethos."

In 1974, when Norman Foster was being considered for the Sainsbury job, one of his references was Sir Hugh Casson, the dean of British architects at that time. "[Foster] is a man of great energy, drive, and enthusiasm," Casson wrote to Thistlethwaite, "with enough granite beneath the charm to ensure consistency in any project to which he lays his hand." That consistency is evident in the various stages of the Sainsbury Centre. While Foster Associates grew from a small practice—about two dozen at the time of the East Anglia building—to an international operation with a staff of 1,500, and its architectural vocabulary became more refined, the ethos persisted, a curious combination of Calvinism and technological legerdemain. The result is a unique museum: delicate Tang-dynasty figurines and implacable Francis Bacons, side by side in a numinous aircraft hangar.


Clearly Evolving

63rd Progressive Architecture Awards

JURY
MATTHEW KREILICH, AIA
HEATHER ROBERGE, ASSOC. AIA
KIM YAO, AIA

Being rooted in as-yet-unbuilt architecture, the Progressive Architecture Awards are, by their very nature, forward-looking. Every year since its inception, in 1954, the program has challenged jurors and practitioners alike to define “progressive” for that given moment in the culture of architecture. This year’s jury awarded five projects, which vary widely in typology and scale. Yet each, the jurors agreed, pushes the boundaries of convention with a high degree of embedded material intelligence. If the winners on the following pages are any indication, the industry has plenty to look forward to.

Award

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With the Amant art space in New York City, SO–IL refines its signature approach into a curious cultural venue. The local firm's technical- and material-driven innovation produces avant-garde form without any preening iconicity. The series of noncommercial art studios and exhibition galleries, located in a Brooklyn warehouse district, features exposed cast-in-place concrete in both its structure and envelope. The interior is nearly edgeless, with concrete planes punctuated by clerestory windows.

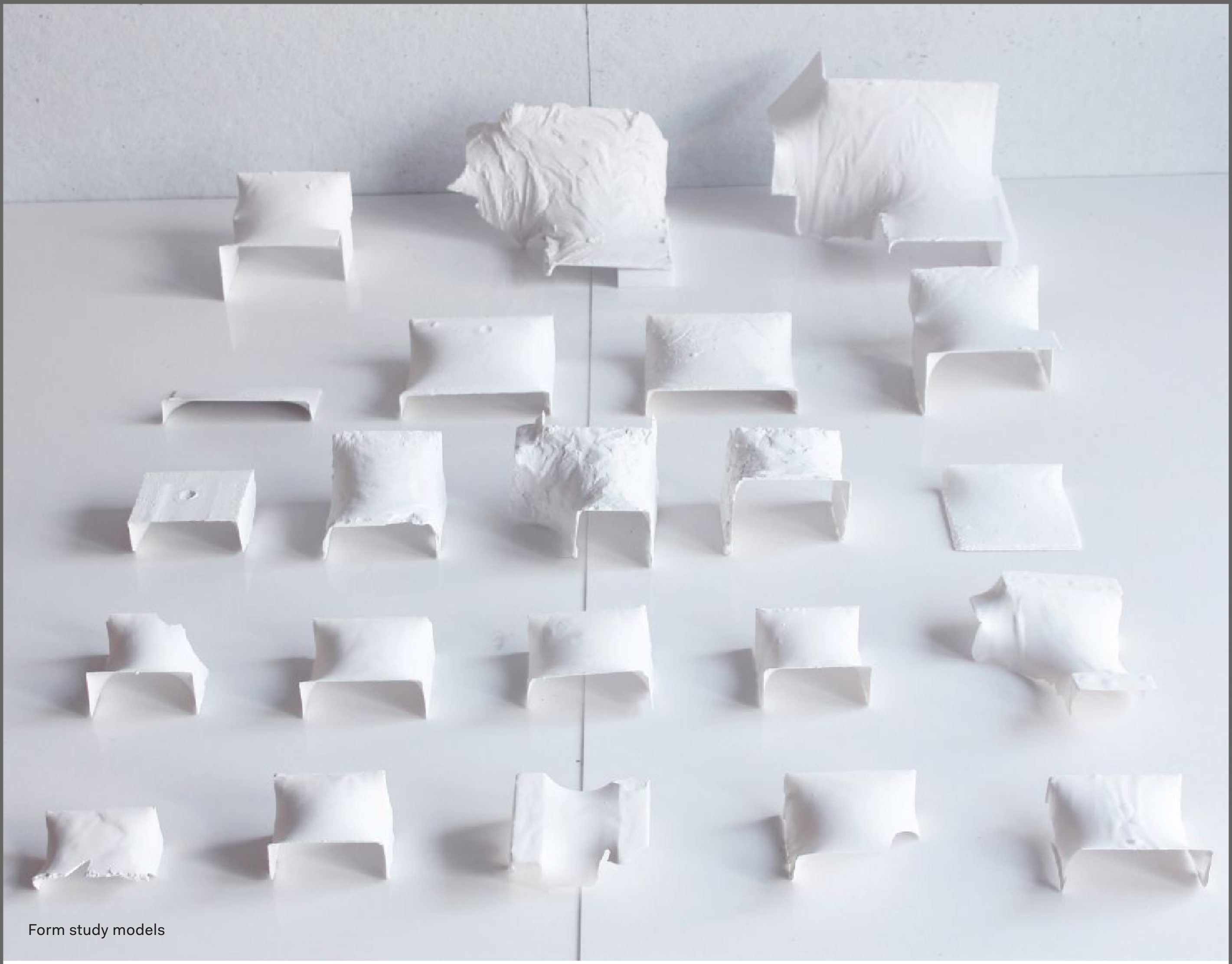
Outside, the monolithic structure wraps around a central terrace and is articulated to express the various programs of the four-level, 22,000-square-foot building. Four skylight-capped volumes stretch and morph skyward in a continuous transition from rectilinear to curvilinear. These contoured roof sections are composed of insulation and waterproofing liners sandwiched between two thin pours of cast concrete. Lighting, fire alarms, and sprinklers are integrated into these self-supporting shells.

SO–IL is currently experimenting with two methods for casting the roof and ceiling layers. For the most geometrically complex sections, CNC-milled polystyrene covered with a fitted membrane is the formwork for double-curved concrete shells. In simpler areas, plywood ribs support curved sheathing that forms the face of each concrete piece. The forms will be prefabricated, then delivered to the site for assembly and concrete pouring in multiple stages.

SO–IL calls the project an investigation of "soft-form," and its treatment of concrete demonstrates the material's elastic possibilities. The resulting design is the product of intensive material research, but also an experiment in aggregated sculpture: Concrete is manipulated to perform structurally but delicately. Amant's final form is a seamless whole that distorts material expectations but also diffuses the building's impact in its low-rise neighborhood with a quiet, dour material sensibility. —ZACH MORTICE

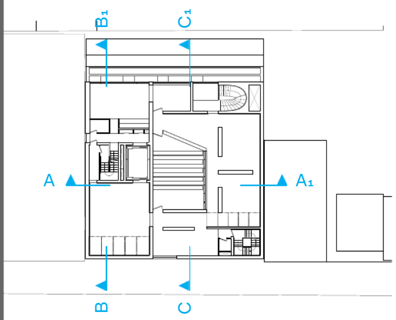
"I like the abstractness of the outside and the interior, and the simple mechanisms for bringing daylight into the interior art galleries in a very controlled way."

—Kim Yao, AIA



Form study models

Third-Floor Plan



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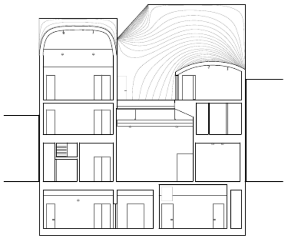

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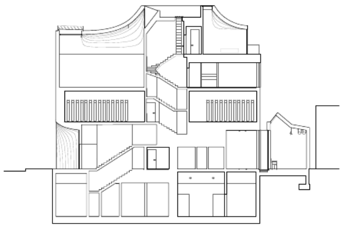

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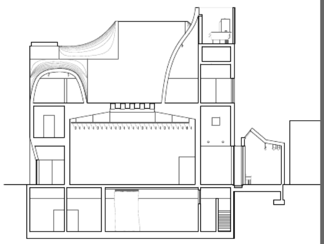
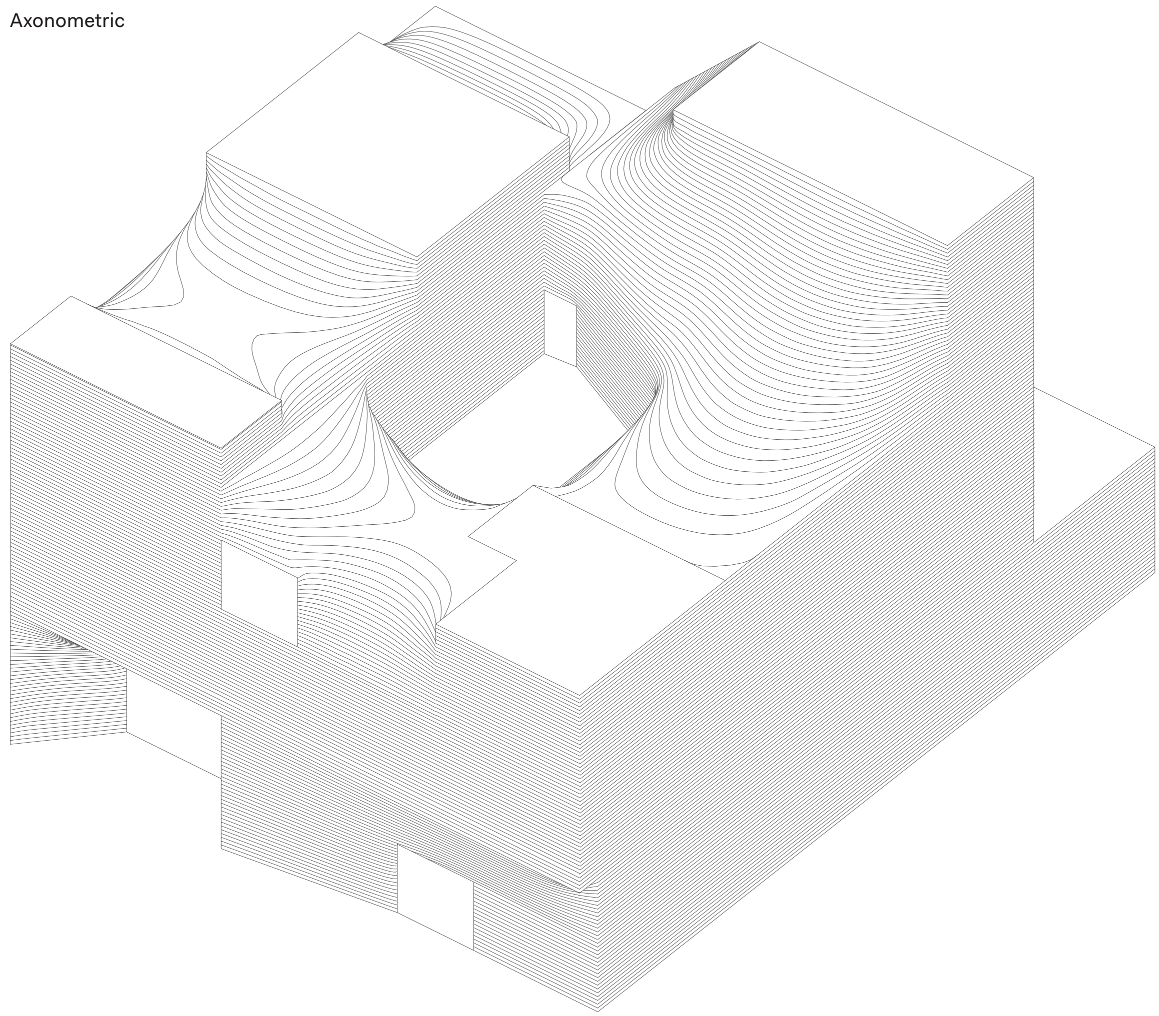
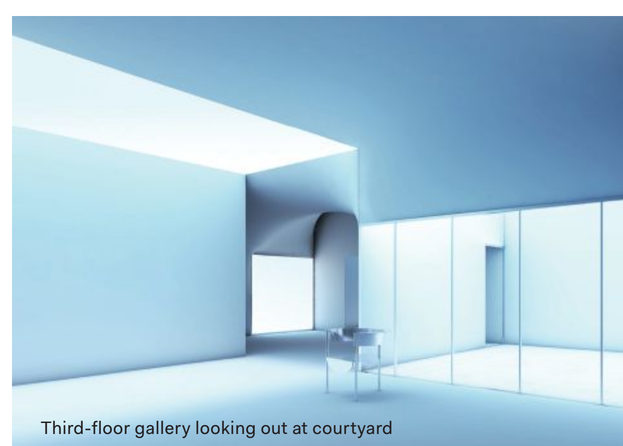


Axonometric





Third-floor gallery looking out at courtyard

Award

Hanking Center Tower
Shenzhen, China
Morphosis Architects

From the east and west, the 73-story Hanking Center Tower now rising in the tech hub of Chinese megacity Shenzhen almost seems to be two separate buildings: a boxy, vertical, aluminum-clad monolith and an angular torso of steel and patterned glass that juts out and up, whose sharp creases (pictured at right) give it a body-like profile as it rises. Designed by Los Angeles–based Morphosis Architects, the project is an innovative take on the skyscraper typology, relying not merely on simple formal tweaks but rather a more radical repositioning of its core.

When viewed from the east, it becomes clear that the rectangular monolith is a detached core and circulation spine for this new 1.19 million-square-foot office tower. Large diagonal braces connect the two volumes, and sky bridges offer a view of the city below as visitors filter from the elevators in the core to the offices in the tower proper.

Key to Hanking Center Tower is a robust steel frame, an almost superstructural exoskeleton that at once holds the building up and defines its shape. Its bends create a variety of sizes for the floors, making them more adaptable to different users and their spatial demands. Expanding on the tradition of Skidmore, Owings & Merrill's 1958 Inland Steel Building in Chicago, the tower's division revives a classic way to define the form, from the outside in, while creating nearly open floor plates for flexible use.

At the ground level, the building's plinth extends westward over the site and contains a low-rise shopping center, a rarity in this dense, purpose-driven part of the city. A fluidly tapered atrium brings light down into the mall's internal plaza, and the concentric levels of stores tighten as they climb, directing visitor's eyes up to the sky bridges and braces connecting the high-rise portions together. Although the tower façade and plinth are marked by dynamic angles, the separation and reconnection of the building and its core are the project's highlights. —NATE BERG

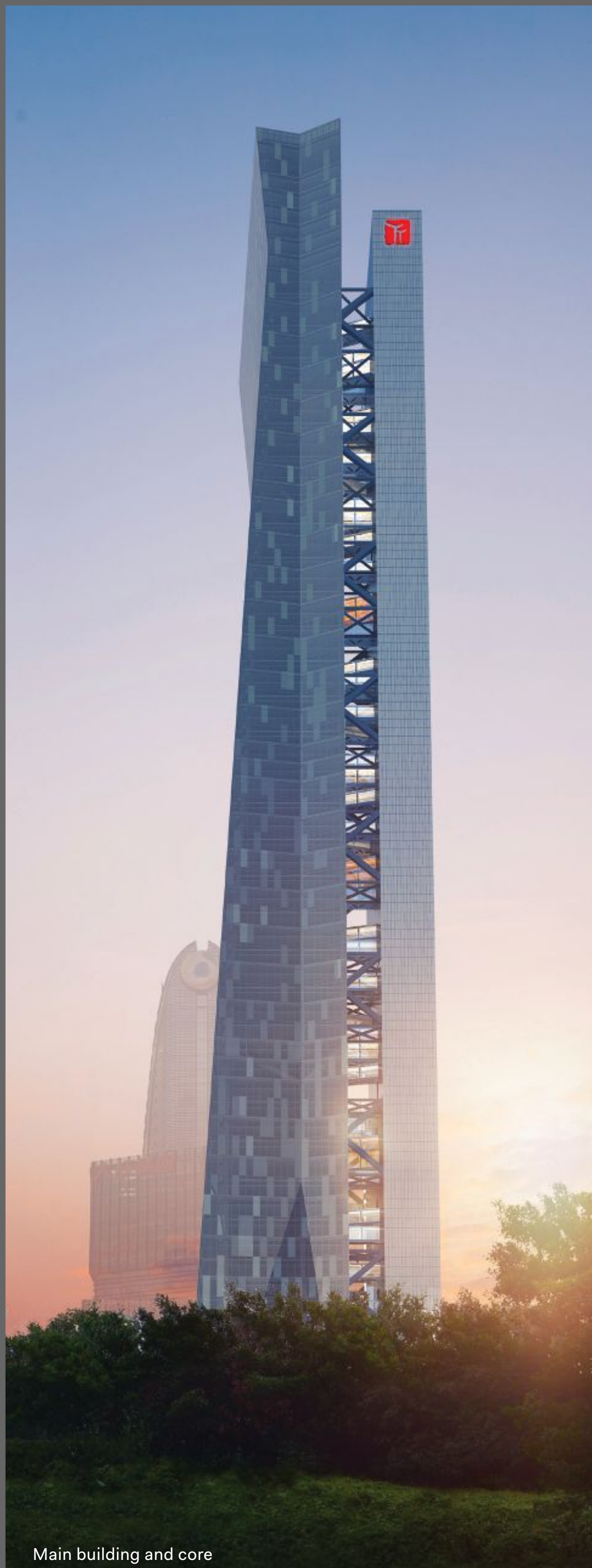
"The Hanking Center challenges the spatial and structural typologies of the tower."

—Heather Roberge, ASSOC. AIA

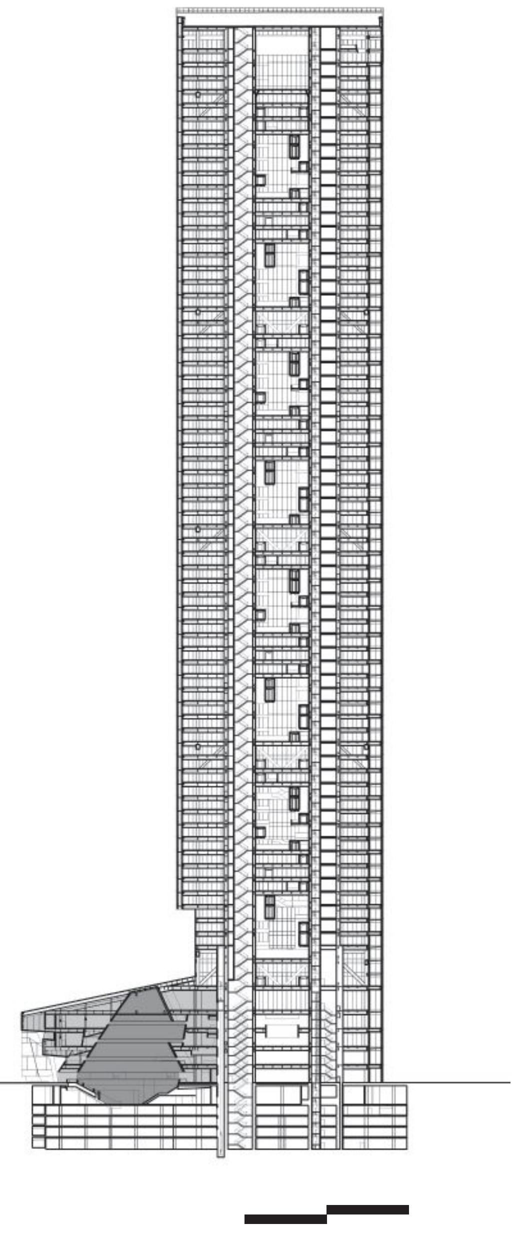

汉京中心


View upward from retail base


West entrance lobby


Main building and core

West–East Section



Award

Long Beach Mobile ArtSpace
Long Beach, Calif.
64North

The Arts Council for Long Beach, Calif., had one major requirement in its competition brief to design a new arts space for the city: The venue had to be mobile. With diverse neighborhoods and a glut of city-owned vacant lots, a movable venue could bring more arts to more of the population.

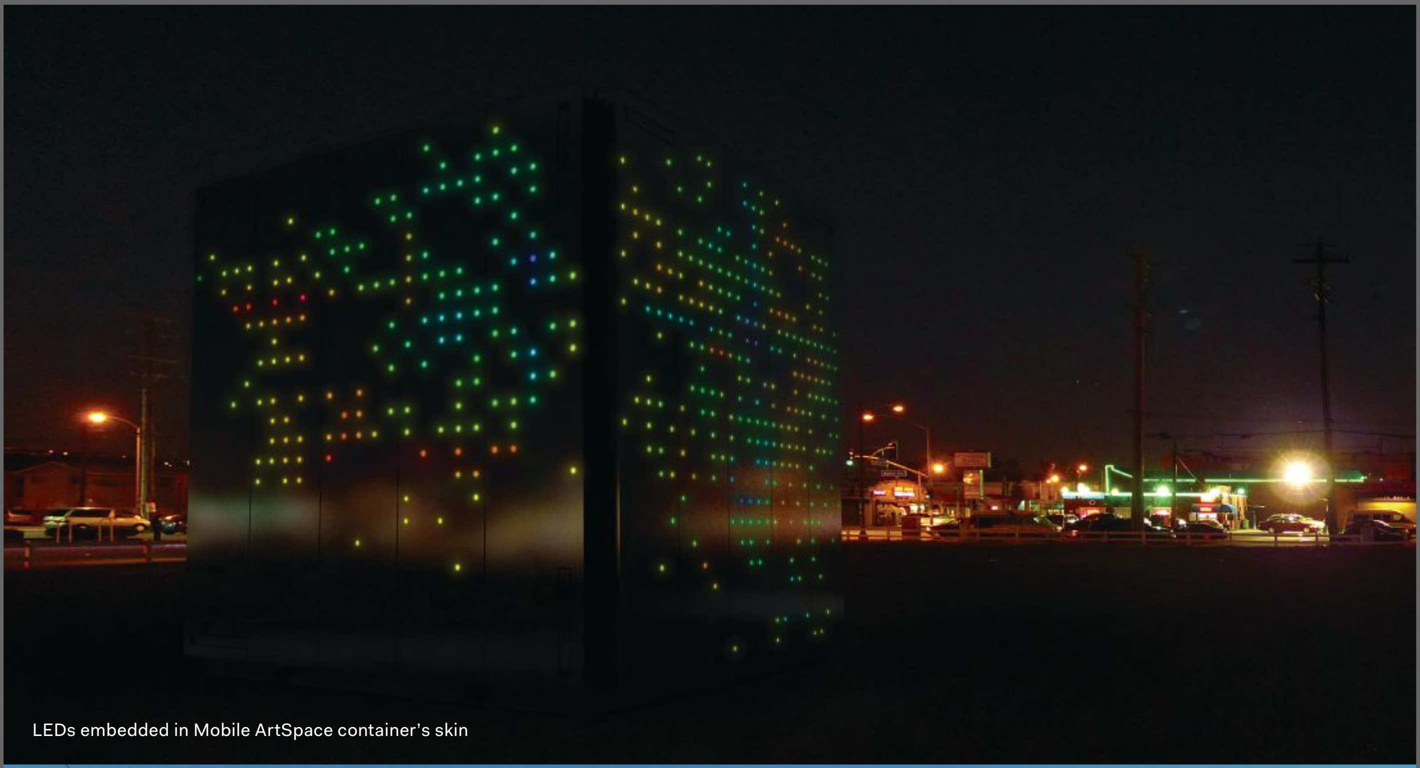
The winning design, from a team led by Los Angeles–based 64North, will arrive at these vacant lots on the back of a flatbed truck. A large black cube called the Long Beach Mobile ArtSpace, it is mysterious and seemingly inert. At night, however, its reflective sides come to life with an LED light show. And prior to shows, a solar-powered, internally lit balloon will float high above, acting as a beacon to lure people to the site and the strange black cube.

Instead of a curtain rising, the cube unfolds, its four sides dropping down to form a stage that is reconfigurable up to 930 square feet. Inside, the cube houses all of the necessary lighting, audio, and electrical gear, plus components like a steel armature to hold equipment. It also includes three more industrial-sized balloons that, when tethered to the stage, support the lighting rig, as well as fold-up shelving for a stand-alone green room—one configuration of the cube—for performers. Groups like the Long Beach Opera and a Cambodian dance troupe plan to use the stage, and the sides of the box can be raised and lowered to facilitate movie screenings, public meetings, or other events. After a series ends, the stage can be repacked into its black cube to await transport to the next site.

In its first year, the Mobile ArtSpace will host events in each of Long Beach's nine city council districts. The next year, it will travel to other Southern California communities that suffer from insufficient access to the arts. The Arts Council for Long Beach is currently conducting a $5.25 million fundraising campaign to cover construction and operations, and the project is anticipated to debut on its first vacant site in summer 2017. —N.B.

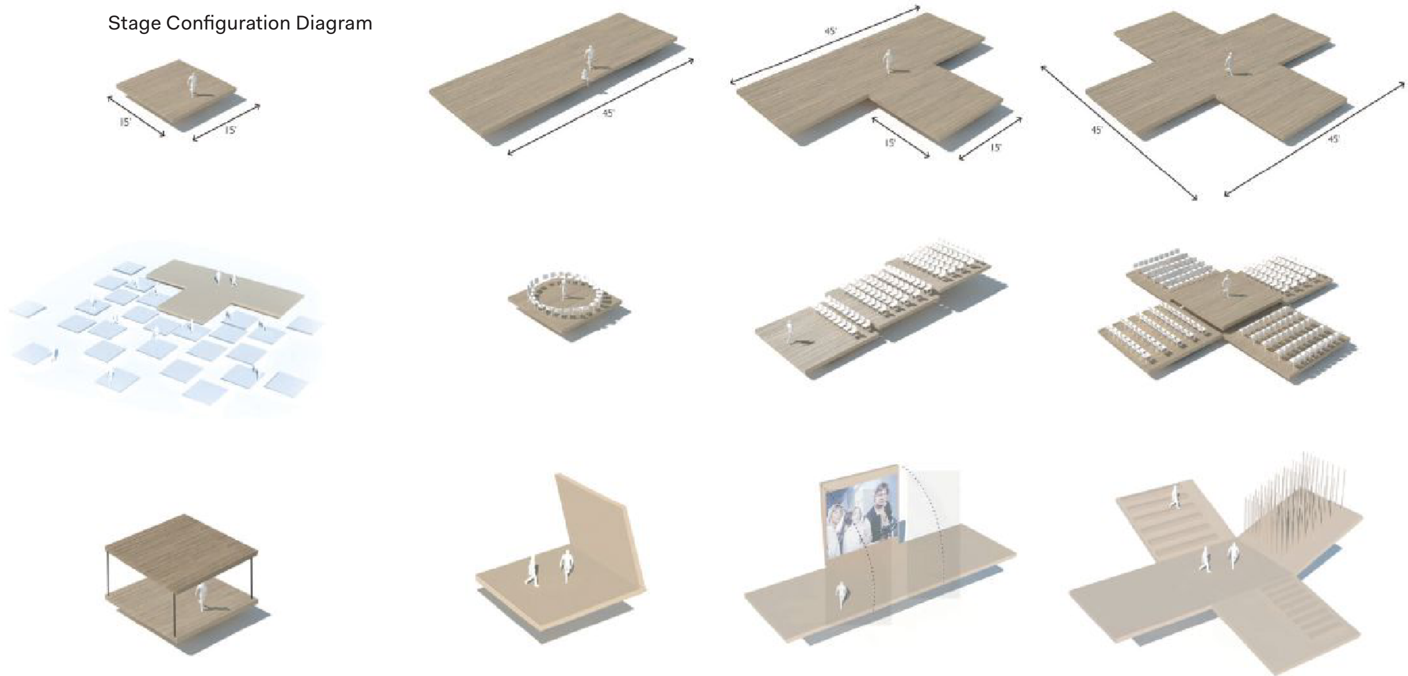
"The impact on culture is really powerful even with such a small project. It's doing some things most architecture isn't trying to understand."

—Matthew Kreilich, AIA

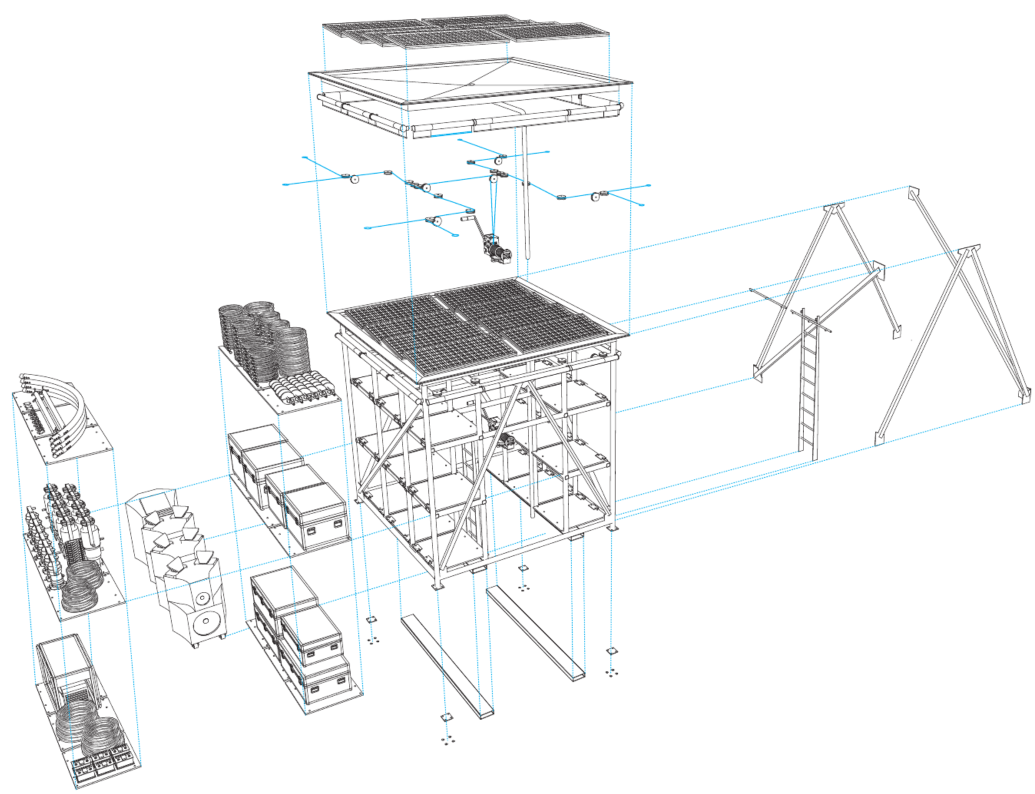

LEDs embedded in Mobile ArtSpace container's skin


Inflatables deployed from stage

Stage Configuration Diagram



Component Diagram



Award

Nelson-Atkins Museum of Art: Envisioning a Cultural Arts District
Kansas City, Mo.
Weiss/Manfredi Architecture/Landscape/Urbanism

One of Kansas City, Mo.'s pre-eminent cultural institutions, the Nelson-Atkins Museum of Art commissioned New York firm Weiss/Manfredi to study how to improve pedestrian connections to other local landmarks while working within the city's car-centric layout. The result, a master plan entitled "Envisioning a Cultural Arts District," forgoes the mid-20th century planning ideal of cultural oases, focusing instead on more strategic interventions (developed with extensive community input) that identify constraints while producing solutions that connect rather than separate.

Both topography and automobile infrastructure isolate the museum from its neighbors, which include several other arts institutions. The design team's interventions create what they call a "cultural charm bracelet" that extends and improves pedestrian connections between these institutions and the city.

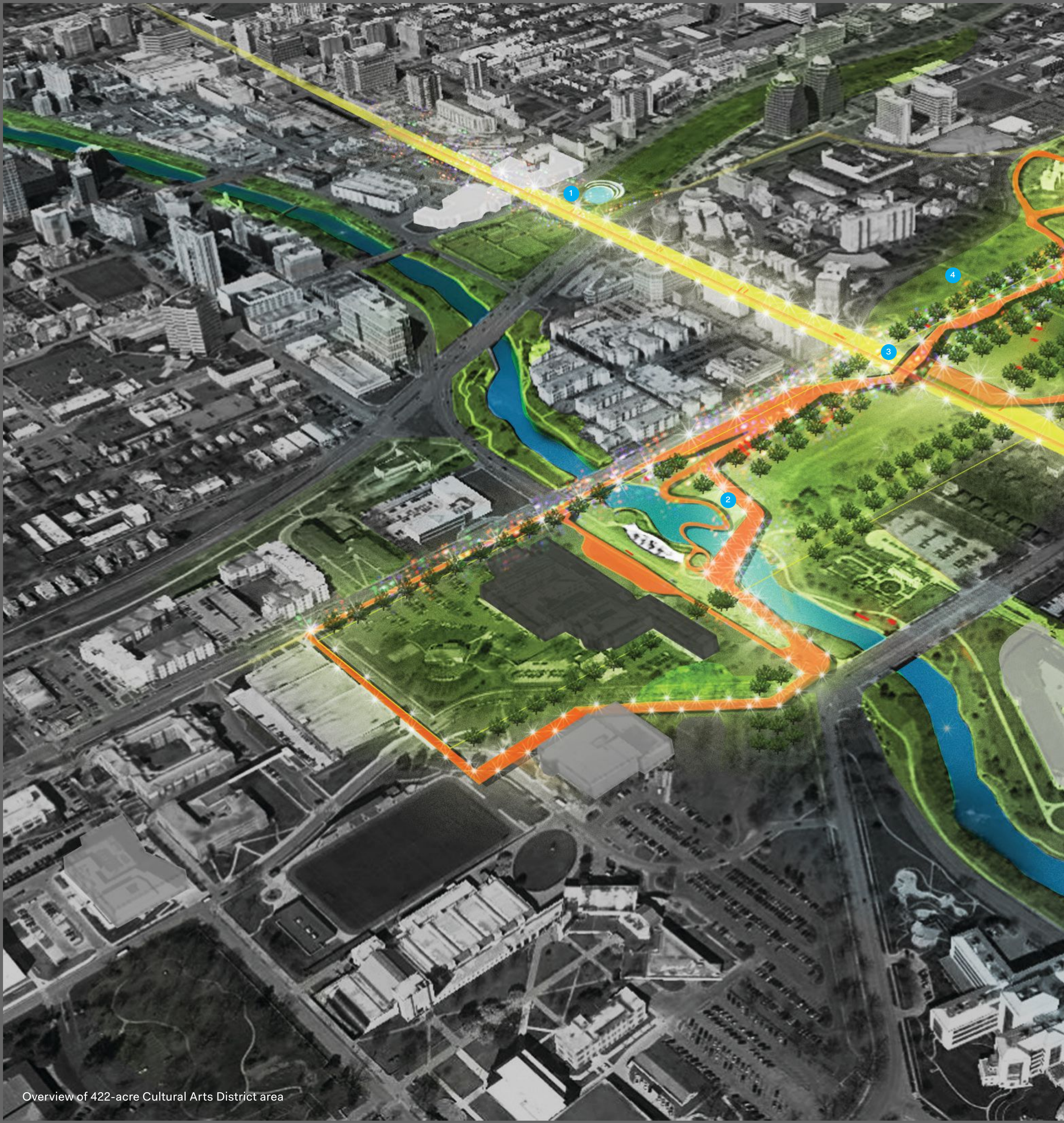
The plan establishes a loop of interventions across 442 acres, identifying destinations and extending major corridors through the site. "Cleaver Crossing," a wide sculpture bridge with a community café at grade (which can be seen in the image at right), connects the lawn south of the Nelson-Atkins to the existing Theis Park, across multilane Cleaver Boulevard.

Theis Park is extended further south toward Brush Creek via a second pedestrian bridge, while wetland walkways allow better access to the creek itself. Other interventions include a terraced amphitheater, landscape features that cover underground parking and expanded storage for the museum, and an Art Shed at the eastern edge of the district that brings art into an adjacent residential neighborhood.

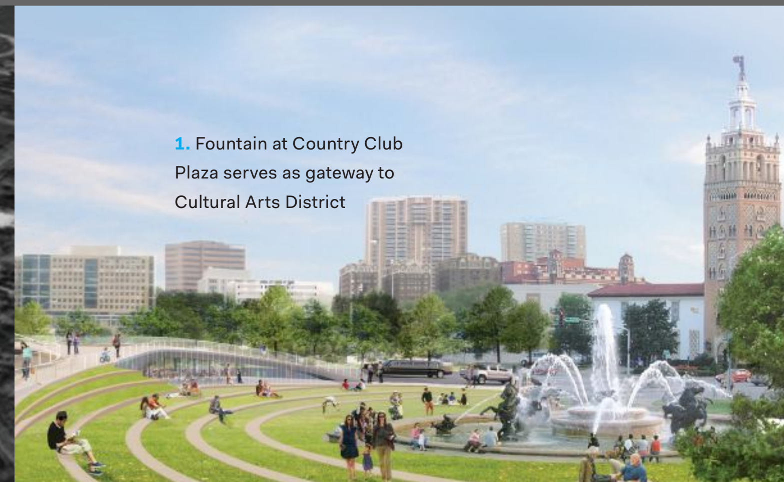
The plan mitigates overscaled roadways and unresolved topographic challenges with new and amplified pedestrian thoroughfares. These connections stitch together an array of cultural and environmental experiences that enhance and expand the already institutionally rich urban fabric east of downtown Kansas City. —EDWARD KEEGAN, AIA

"This demonstrates a thorough analysis of existing conditions with disparate moments, and makes a compelling case for how to tie them together."

—Kim Yao, AIA



Overview of 422-acre Cultural Arts District area



1. Fountain at Country Club Plaza serves as gateway to Cultural Arts District

2. Theis Park and Brush Creek connections

3. Cleaver Crossing

4. Southmoreland Park landscaped amphitheater

5. Landscaping over underground parking

Award

Project R6, Yongsan International Business District
Seoul, South Korea
REX Architecture

The 39-story Project R6 is located along the eastern edge of the Yongsan International Business District in central Seoul, South Korea, and is part of a master plan that calls for 22 multifunctional towers. Its architects describe the program as a transient "urban boutique residence" with a mix of 40-, 50-, and 60-square-meter (430-, 540-, and 650-square-foot) units and associated amenities. The designers base their configuration of the prescribed mix of studio sizes on a classic courtyard plan, with large chunks of structure pulled in and pushed out from a narrow connecting framework to create a distinctive zipper-like form.

A concrete-encased megabrace diagrid frame encircles the 1.24 million-square-foot building's courtyard and provides the primary support for the floor slabs. Two- to eight-story-tall blocks of floors cantilever from the east and west ends of the tower, creating a stretched form with a dramatic profile. Single-loaded balcony corridors face the interior courtyard, giving every apartment cross-ventilation and daylight on at least two sides.

Each unit is a wooden shell bookended by a bathroom and a kitchen, with a movable wall in between that defines living and dining spaces, allowing use to determine the amount of space allocated to each function over the course of the day. The wall itself contains many apartment necessities, including a Murphy bed, nightstands, couch, TV mount, task lights, and storage. Floor-to-ceiling, high-performance insulated glazing at the exterior and corridor walls open each small unit's spatial sensibility to include the courtyard and the city beyond, with privacy available through the deployment of blackout and roller shades.

A sense of community, often limited to activities at the base of an apartment building, is engendered through the courtyard, open corridors, roof terraces, and a series of conversation/reading/play pods that encourage casual encounters in the structure. —E.K.

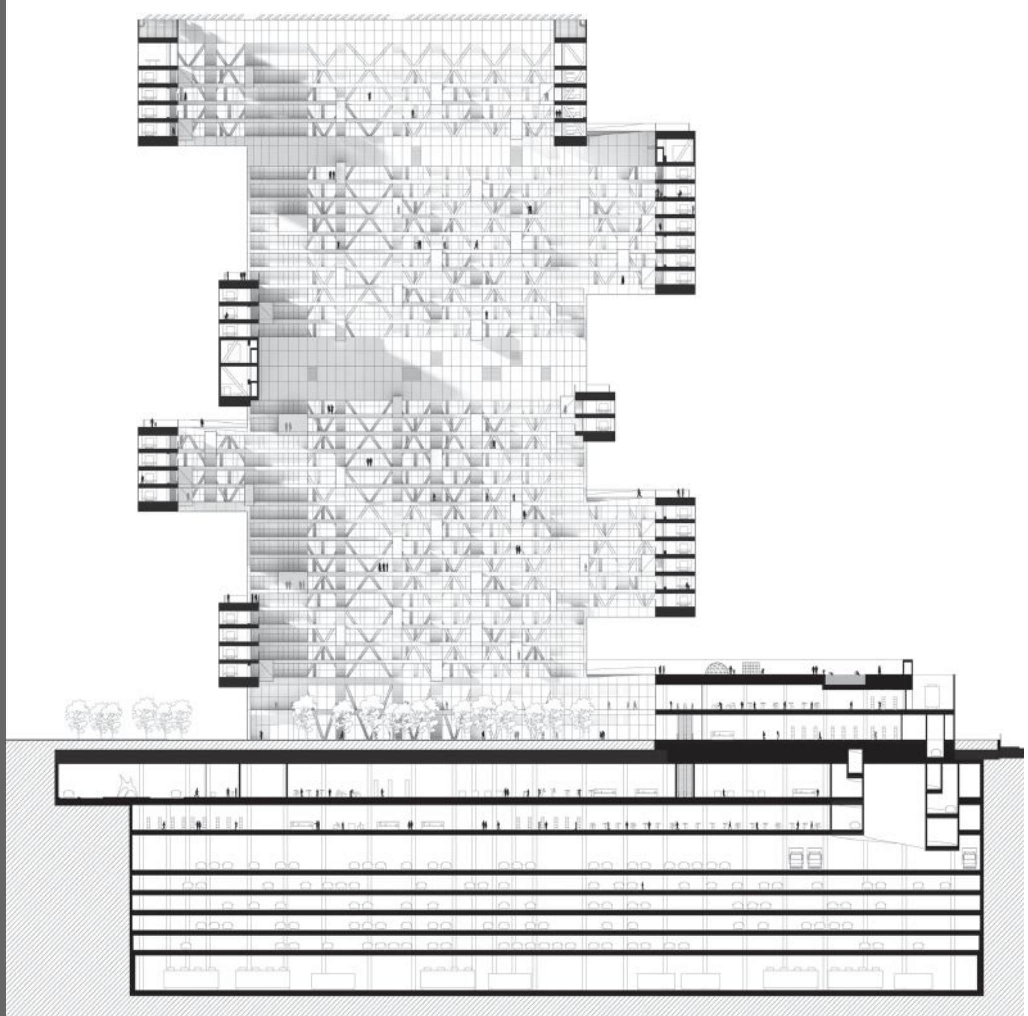
"This is a simple but powerful way to enhance the quality of light and air movement: to take the concept of courtyard to a superscale."

—Matthew Kreilich, AIA

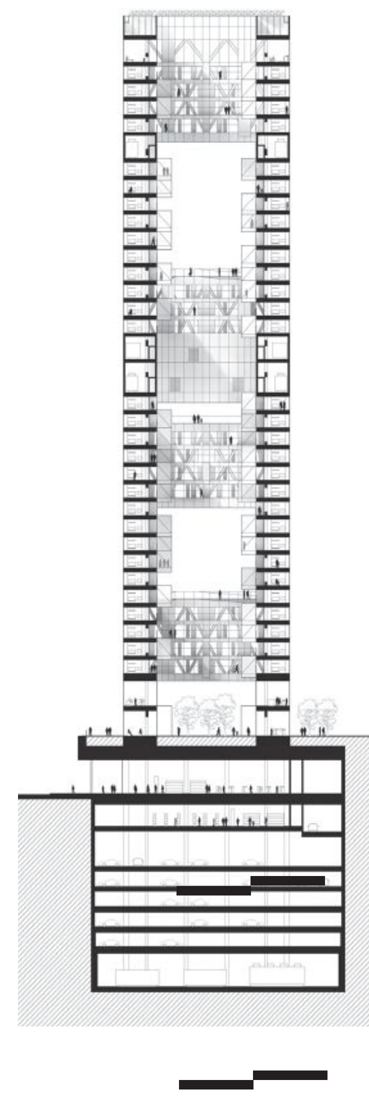

Interior courtyard


Residential quarters

West–East Section



North–South Section



Judges

As a design principal at Minneapolis-based Snow Kreilich Architects, **Matthew Kreilich, AIA**, has helped lead notable, collaborative projects such as CHS Field in St. Paul, Minn. Kreilich has also taught at the University of Minnesota's College of Design and lectured at the Harvard Graduate School of Design and Washington University in St. Louis.

Heather Roberge, ASSOC. AIA, founded her Los Angeles–based practice, Murmur, in 2008, and teaches at the University of California, Los Angeles Department of Architecture and Urban Design, where she also directs the undergraduate program. Roberge intertwines academia with practice to develop formal strategies evident in her built and speculative work.

Kim Yao, AIA, is one of the three principals of the New York–based Architecture Research Office (ARO), a firm that has won more than 70 design awards, including a 2010 Progressive Architecture Award for its Five Principles for Greenwich South: A Model for Lower Manhattan proposal. Yao also taught architecture at Barnard College for 10 years.

Project Credits

Amant, page 80
Project: Amant, New York
Client/Owner: Withheld
Architect: SO–IL, New York · Florian Idenburg, INTL. ASSOC. AIA, Jing Liu, Ilias Papageorgiou (partners); Kevin Lamyuktseung, Ted Baab, Pietro Pagliaro (associates); Kerim Miskavi, Ian Ollivier, Lucie Rebeyrol, Yuko Sono, ASSOC. AIA, Hannes Kalau vom Hofe, Max Hart Nibbrig, John Chow (team)
Architect of Record: Andrew Reyniak, AIA
Project Manager: Paratus Group
M/E Engineer: AltieriSeborWieber Consulting Engineers
Structural Engineer: Schlaich Bergermann Partner
Civil Engineer: P.W. Grosser Consulting
Geotechnical Engineer: Langan Engineering & Environmental Services
Lighting Designer: Renfro Design Group
Cladding: Simpson Gumpertz & Heger
Envelope Geometry: Certain Measures
Expediter: J. Callahan Consulting
Concrete: Reginald Hough Associates
Acoustics, Audiovisuals, and Security: Harvey Marshall Berling Associates
Vertical Transportation: IROS Elevator
Specifactions Writer: Construction Specifications
Size: 22,000 square feet
Cost: Withheld

Hanking Center Tower, page 84
Project: Hanking Center Tower, Shenzhen, China
Client/Owner: Hanking Group
Architect: Morphosis Architects, Culver City, Calif. · Thom Mayne, FAIA (design director); Eui-Sung Yi (project principal); Hann-Shiuh Chen (project manager); Mario Cipresso, AIA, Amit Upadhye, Jamie Wu (project architects); Daniel Pruske, Ben Toam, Natalia Traverso Caruana (project designers); Cory Brugger, AIA, Kerenza Harris, Stan Su (advanced technology); Ilaria Campi, Sarah Kott, Daniel Leone, Michael Nesbit, Carolyn Ng, Atsushi Sugiuchi, Kwo Wang (project team); Natalie Abbott, Viola Ago, Marco Becucci, Paul Cambon, Carmelia Chiang, Sam Clovis, Tom Day, Ryan Docken, Chris Eskew, Bart Gillespie, Greg Gyulai, Parham Hakimi, Yoon Her, Jonathan Kaminsky, Hunter Knight, Onejae Lee, Katie MacDonald, Nicole Meyer, Sille Pihlak, Jon Rieke, Ari Sogin, Derrick Whitmire, Pablo Zunzunegui (assistants); Jasmine Park, Nathan Skrepcinski, Sam Tannenbaum (visualization)
Associate Architect: Zhubo Design
Structural Engineer: Halvorson and Partners
M/E/P, Fire Protection, and Vertical Transport: Parsons Brinckerhoff
M/E/P and Façades: Stantec
Façade Consultant: SuP Ingenieure
Lighting Consultant: Gradient Lighting Design
Landscape Architect: SWA
Traffic: MVA
General Tower Consultant: w.erk studios
Visualizations: Luxigon, Aveson
Size: 1.19 million square feet
Cost: Withheld

Long Beach Mobile ArtSpace, page 88
Project: Long Beach Mobile ArtSpace, Long Beach, Calif., and surrounding cities
Client/Owner: Arts Council for Long Beach
Architect: 64North, Los Angeles · Wil Carson (design director); Andrew Smith-Rasmussen (senior associate); Melissa Diracles, John Brockway (team)
Structural and Electrical Engineer: BuroHappold Engineering
Environmental Designer: Formation Association
Artist: Steve Roden
Lighting Designer: Sean O'Connor Lighting
Theater Design & Acoustics: Stages
Audiovisuals/IT: Sonitus
Size: 930 square feet (stage); 1,100 square feet (canopy)
Cost: $2.3 million

Nelson-Atkins Museum of Art: Envisioning a Cultural Arts District, page 92
Project: Nelson-Atkins Museum of Art: Envisioning a Cultural Arts District, Kansas City, Mo.
Client/Owner: The Nelson-Atkins Museum of Art
Architect: Weiss/Manfredi Architecture/Landscape/Urbanism, New York · Marion Weiss, FAIA, Michael Manfredi, FAIA (design partners); Patrick Armacost (programming director); Joe Vessell, Todd Hoehn (project architects); Jeffrey Blocksidge, Scott Chung, Peter Stone, Barbara Wilson, Noah Levy, Allison Wicks, Beth Arnold, Seungwon Song, Isabella Marcotulli, Kao Onishi, Christine Hoff (team)
Size: 422 acres
Cost: Withheld

Yongsan International Business District Project R6, page 96
Project: Yongsan International Business District Project R6, Seoul, South Korea
Client/Owner: Dreamhub Project Financing Vehicle Co.
Architect: REX Architecture, New York · Joshua Prince-Ramus, AIA (principal-in-charge); Roberto Otero (project leader); Tiago Barros, Adam Chizmar, Danny Duong, Luis Gil, Gabriel Jewell-Vitale, Seok Hun Kim, Armen Menendian, Romea Muryń, Se Yoon Park, Lena Reeh Rasmussen, Yuan Tiauriman (team)
Executive Architect: Mooyoung Architects and Engineers
M/E Engineer: BuroHappold Engineering
Structural Engineer: Magnusson Klemencic Associates
Landscape Architect: Scape
Façade Consultant: Front
Lighting Designer: Tillotson Design Associates
Audiovisuals: Shen Milsom & Wilke
Vertical Transportation: Barker Mohandas
Acoustics: Level Acoustics
Size: 1.24 million gross square feet (115,500 square meters)
Cost: Withheld

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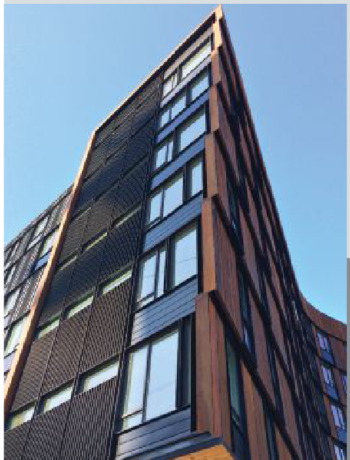

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Photo courtesy of The Bryer Company, Auburn, WA

Residential: Shokan House Shokan, N.Y. Jay Bargmann

TEXT BY IAN VOLNER
PHOTOS BY BRAD FEINKNOPF

Into the otherworldly tranquility of architect Jay Bargmann, AIA's new house in the Catskills, there comes a burst of squeaking. "That's her toy," says wife Cindy Potash—"her" being Ray, the couple's spirited Weimaraner. "She loves to chase deer," Bargmann says. "I'm just worried she might go after a bear one day."

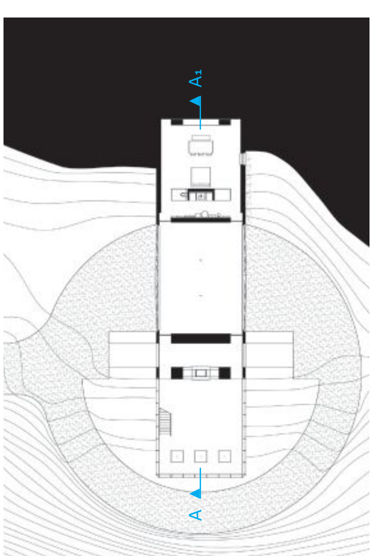
There are indeed bears on the couple's 20-acre property, high above the Ashokan Reservoir about two hours from Manhattan, as well as a man-made pond and a half-mile gravel road that ascends precipitously to a broad circular turnaround that passes through the house. Jutting out of the hillside, the structure is all black steel and clear glass, and the little furniture that fills the 6,000-square-foot interior includes a pair of black Eames lounges in front of an enormous south-facing window. "We named the dog after Ray Eames," says Bargmann, whose modernist obsession dates at least as far back as the 1960s, when he studied at the University of Pennsylvania with Louis Kahn.

Since 1983, the Iowa-born Bargmann has been a partner at New York–based Rafael Viñoly Architects (RVA), the firm he helped start with its namesake principal. The Shokan project isn't exactly a dream house, if only because Bargmann never really dreamed of having one: After a visit to a friend's country place a couple years ago, the couple thought it might be fun to have one of their own, and started shopping around for properties in upstate New York. "The design came about after that," says the architect, whose work at RVA has included few single-family houses.

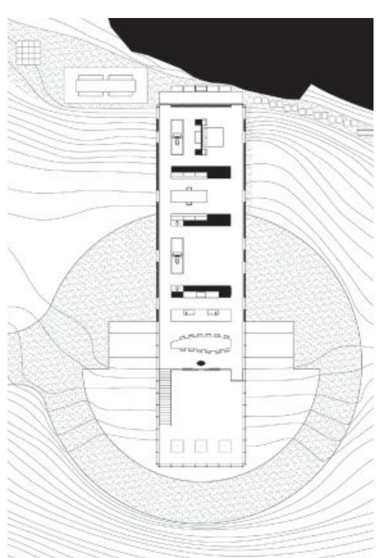
Coming to the project with so little architectural baggage, Bargmann was quick to seize on a key motivating principal: "The whole thing should be able to be packed up and trucked away," he says. Turning to a host of trusted fabricators and contractors, he took an almost kit-of-parts approach, assembling the house from simple—though exquisitely customized—components. While not modular, the house is more easily demountable than most, and all of its components can be recycled. Economy was his watch word: "The structure for the glass and the structure for the house are the same thing," Bargmann says, the slender steel piers acting "as columns, in a sense, but also mullions." Nearly the only other reinforcing member is a large diagonal brace to address lateral loads—a dramatic punctuation mark between the ground-floor den and second-floor kitchen.

Bargmann and Potash are still new to country living, but are adapting, coming up every weekend to spend hours watching the weather move across the valley. For all its austerity, and even without any art on the walls, the Shokan house is definitely a show place, one Bargmann has enjoyed sharing with friends. "I gave some photos to a British friend, looking down on the house from above," the architect says. "He took one look and all he said was, 'That's America.' "

Ground-Floor Plan



Second-Floor Plan



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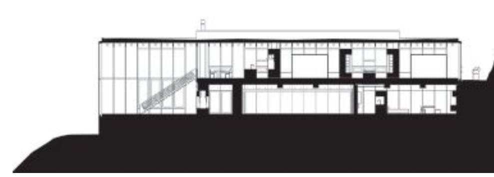

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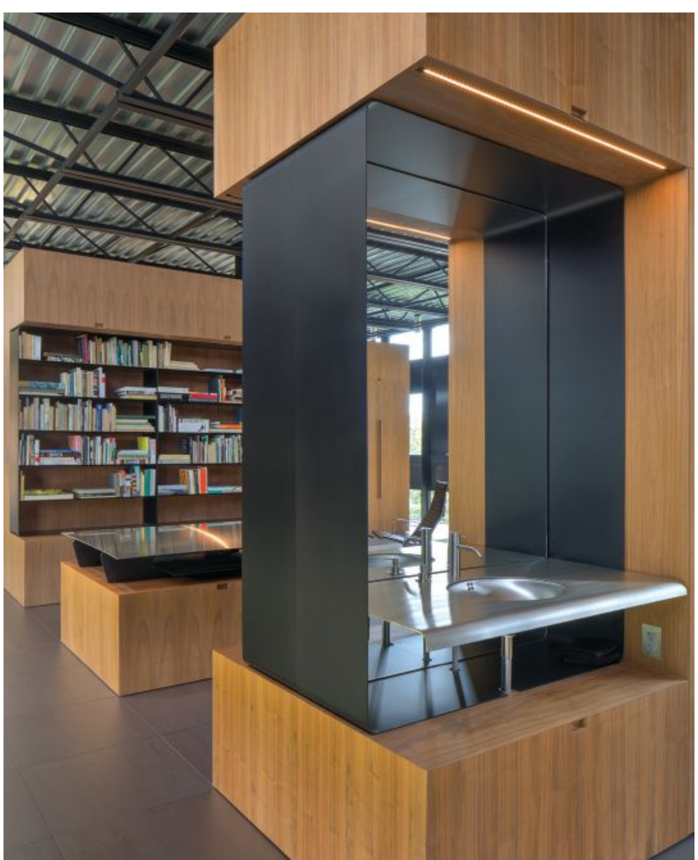
N

Previous Spread: The circular driveway at the Shokan House goes through the residence, thanks to wide-span garage doors on either side of the ground floor of the structure.

Above: All systems and ducts in the double-height living room at the south end of the house (with its view to the kitchen and dining area on the floor above) run underneath a ceramic-tile, raised access floor to maintain an uncluttered interior.



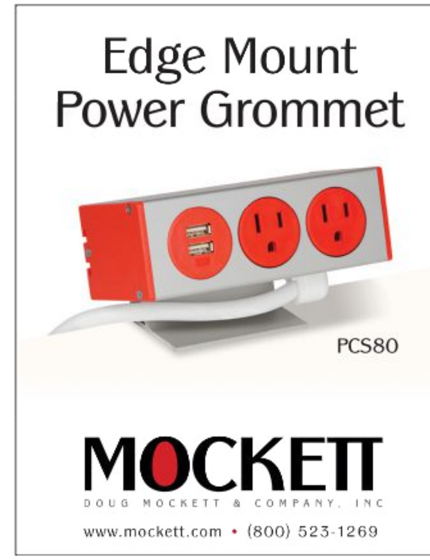
Above: A bedroom at the north end of the house is flooded with light—sometimes too much. Bargmann is considering installing roller shades in addition to the stainless steel sunshades shown here.

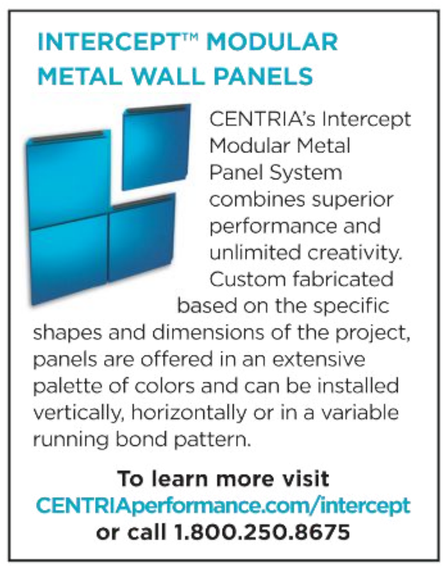
Left: Walnut cabinets divide spaces in the largely open-plan second floor, and provide shelving for the second-floor library.

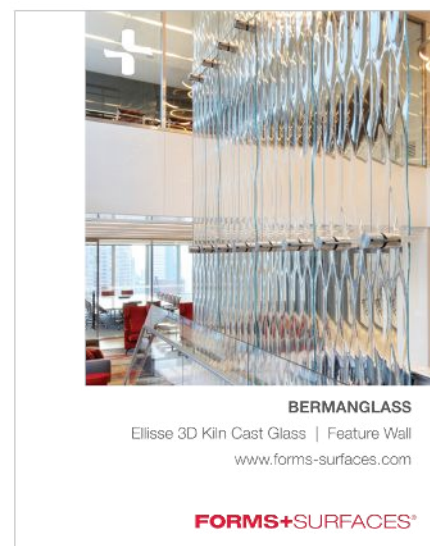
Opposite: The steel T-section frame for the house's glass enclosure is bolted to the concrete foundation for stability, and the thin profiles of the piers minimize disruption of the view over the valley below.

Project Credits

Project: Shokan House, Shokan, N.Y.
Architect: Jay Bargmann, AIA, New York
Project Manager: James Rund
Reinforced Concrete: Darlind
Steel Fabrication: Fall Fittings
Steel Erection: Styles Steel Erectors
Mechanical and Plumbing: B. Murphy's Plumbing & Heating
Electrical: Rondout Electric
Curtainwall: Dante Tisi
Stair and Balustrade: TriPyramid Structures
Access Floor: Tri-State Computer Flooring Co.
Millwork: Thomas Jerome
Steel Furniture: Super Square Corp.; KD Metalworks
Site Work and Road: CPS Excavating
Landscape: Green Valley Landscaping
Structural Engineering: Yoshinori Engineering and Design
Lighting Design: One Lux Studio
Size: 6,000 square feet
Cost: Withheld







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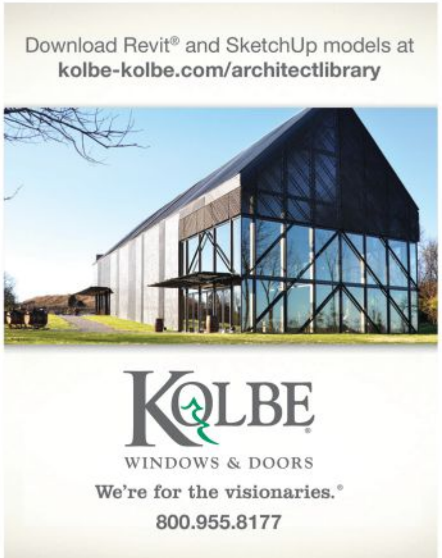
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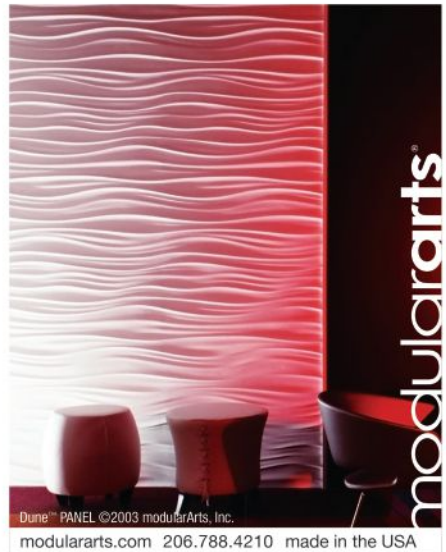
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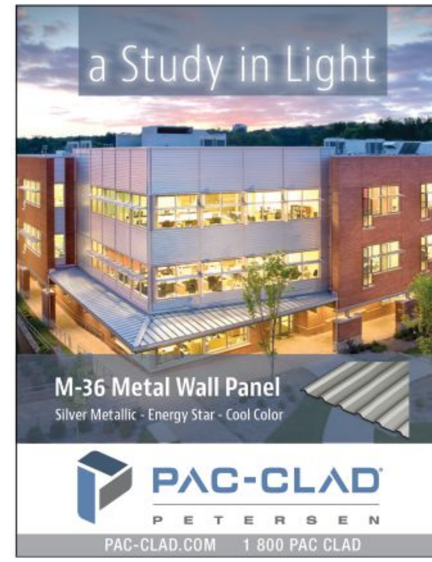
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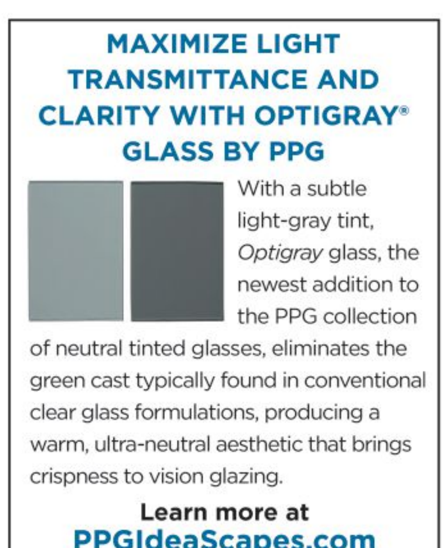
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Editorial: Net-Zero Enthusiasm

Back in 2008, comedian Louis C.K. did a bit on *Late Night with Conan O'Brien* that starts, "Everything is amazing right now, and nobody's happy." To those who get upset when their smartphone connection is slow, he snapped, "Give it a second! It's going to space!" To those who complain about airline delays, "Oh, really? What happened next? Did you fly through the air, incredibly, like a bird? Did you partake in the miracle of human flight, you non-contributing zero?" The point, as Conan observed, was that we take technology for granted. The rant clearly struck a nerve, because it promptly went viral.

To Louis C.K.'s examples of technologies so ubiquitous that we only notice them when they're gone, I wish we could include the net-zero building. The most significant technical innovation in architecture since the advent of computer-aided design in the 1970s, the net-zero building could positively reshape our way of life, promoting energy independence, reducing drought and carbon emissions, creating jobs. Alas, it has nothing remotely close to the smartphone's penetration (the International Living Future Institute has only certified 21 examples).

So where's the public dialogue, the demand? Why isn't net-zero as familiar in our technology-worshipping culture as the iPhone? Why don't we talk about it with as much awe as the Tesla Model S? At this point in our social evolution, the prospect of buying all our water and electricity from the grid should be alien. Yet the vast majority of us (those of us, that is, who live in postindustrial economies) view our reliance on the grid as far more normal than having a windmill or rain cistern on our own property.

Net zero doesn't lack industry support. There are numerous organizations, events, and individuals committed to promoting a conservational relationship between energy, water, waste, and architecture—among them the AIA, ARCHITECT, and our sibling publication *EcoBuilding Pulse*. And yes, we have friends in high places: President Barack Obama's Executive Order 13693 mandates that "all new construction of Federal buildings greater than 5,000 gross square feet … is designed to achieve energy net-zero and, where feasible, water or waste net-zero by fiscal year 2030."

Yet obstacles remain. At the moment, for instance, the AIA is justifiably alarmed because Congress is considering new legislation (S. 2012, the so-called Energy Policy Modernization Act of 2015) that would repeal the requirement that new and renovated federal buildings be designed with a reduced carbon footprint. In January, Nevada's utility company decided to cut the rate it pays to buy solar power from homeowners, forcing solar companies out of the state, one of the sunniest in the union. How insanely shortsighted. Even oil-rich Gulf states such as the United Arab Emirates and Saudi Arabia are investing massively in alternative energy.

After decades of innovation and advocacy, architects and designers may think of sustainable design and net-zero buildings as received wisdom, or even as old hat. But we cannot afford to step back the evangelism. We cannot stop until everyone in the United States—everyone around the globe, really—considers the net-zero building to be a fact of life, and its absence to be unacceptable.

STEPHEN VOSS