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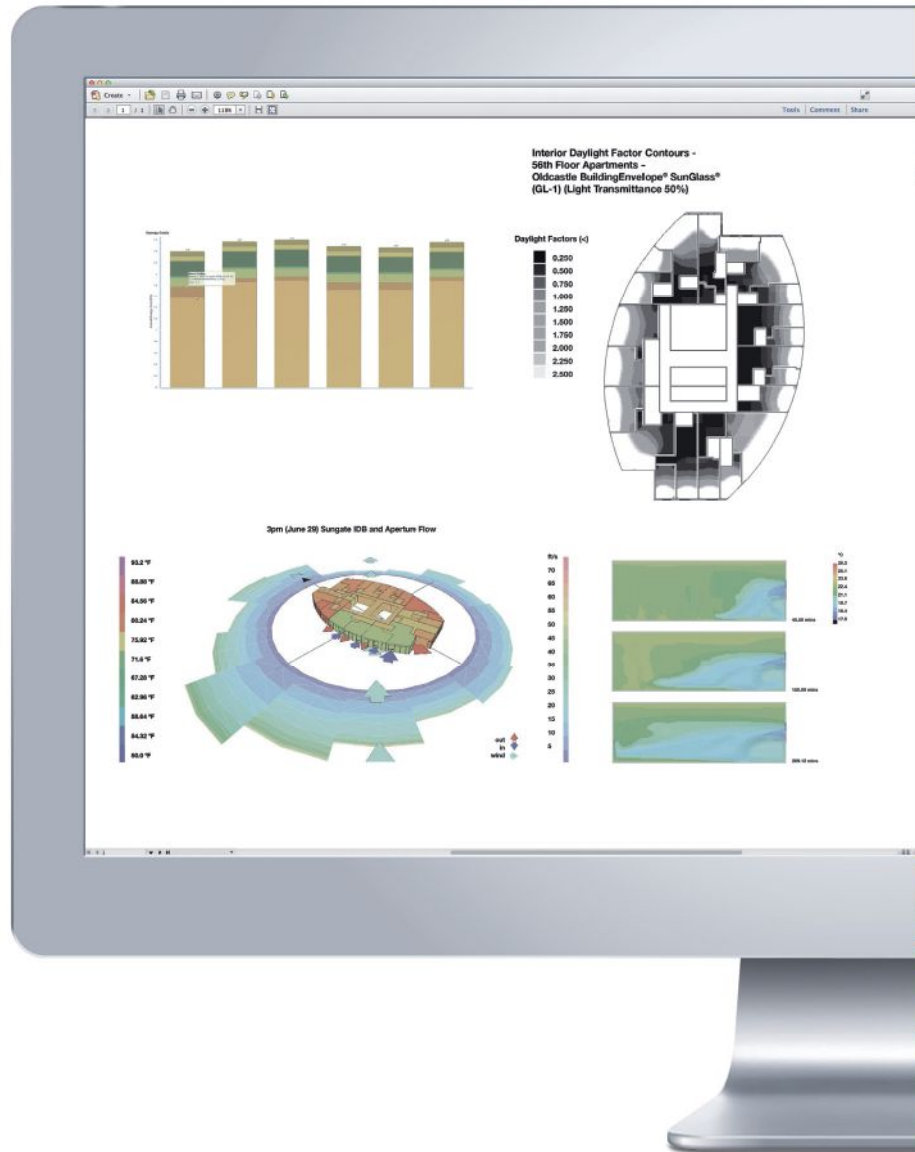
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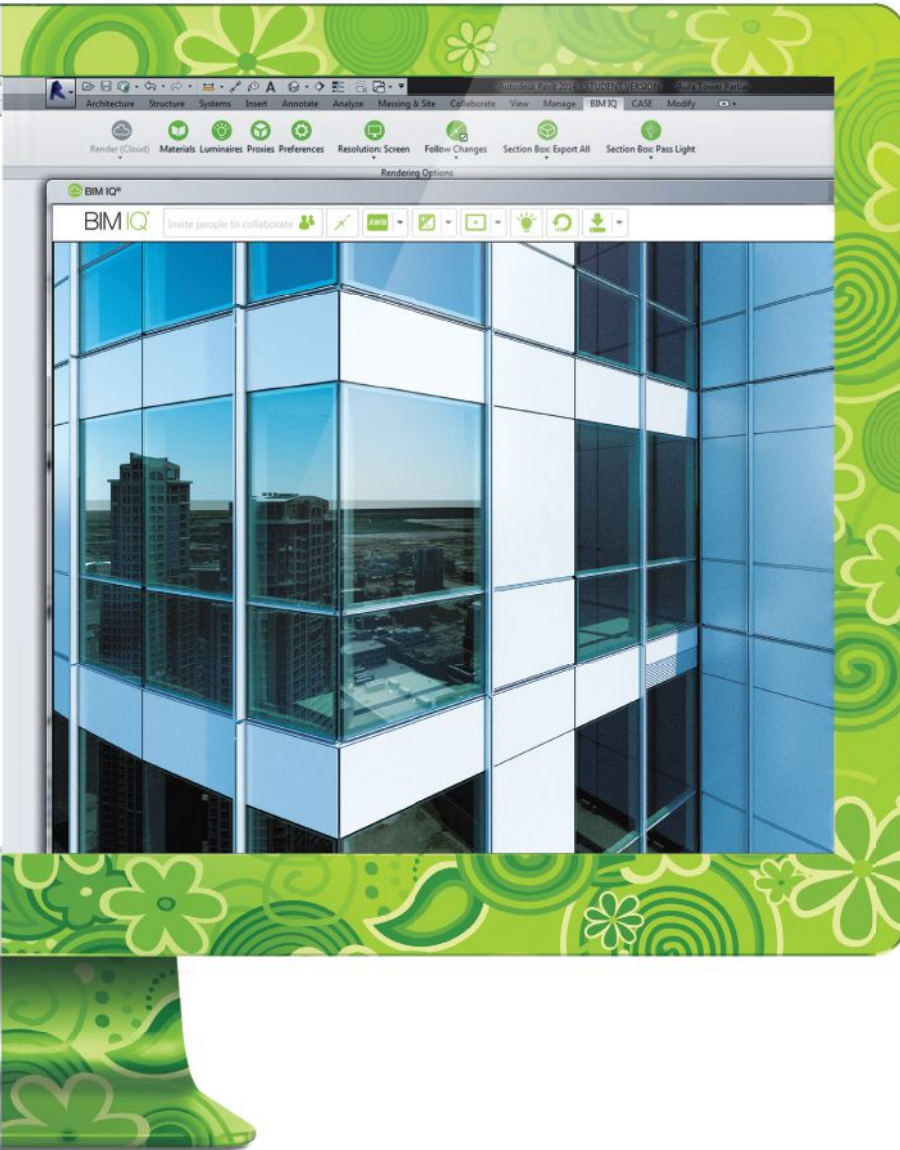
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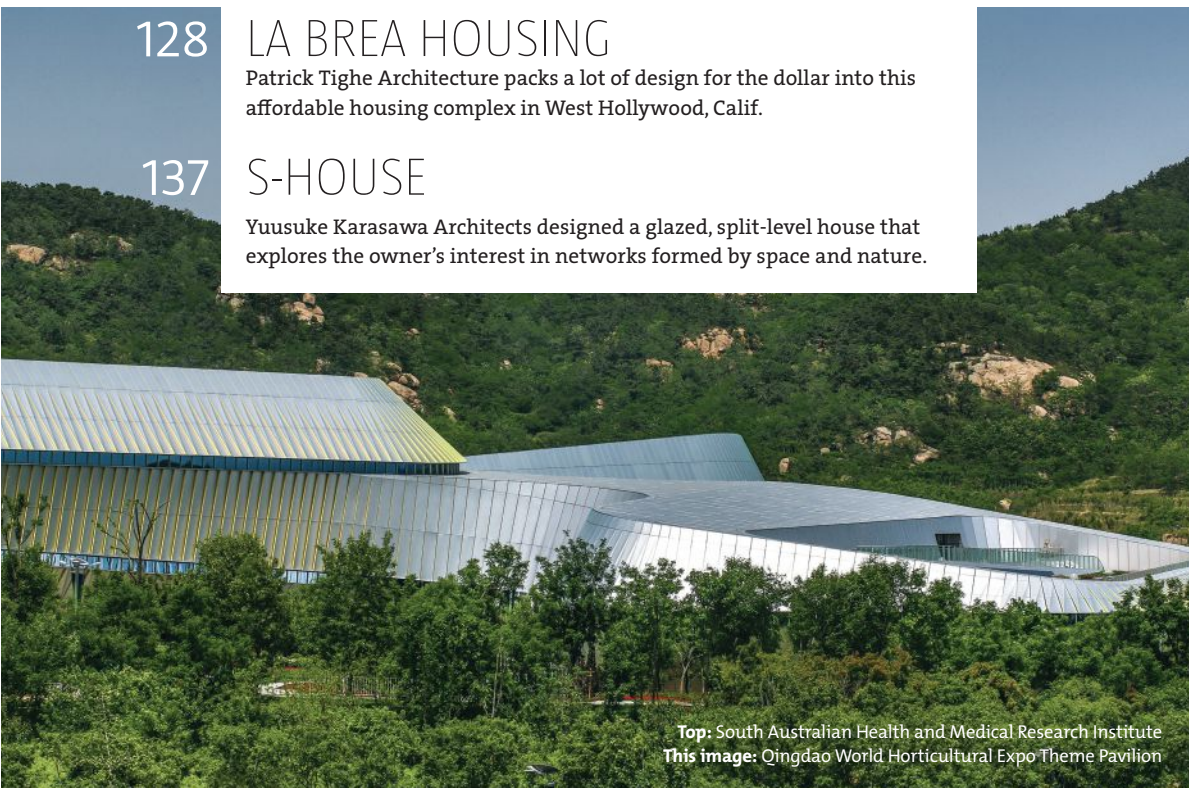
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Patrick Tighe Architecture packs a lot of design for the dollar into this affordable housing complex in West Hollywood, Calif.

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S-HOUSE

Yuusuke Karasawa Architects designed a glazed, split-level house that explores the owner's interest in networks formed by space and nature.



Top: South Australian Health and Medical Research Institute
This image: Qingdao World Horticultural Expo Theme Pavilion



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ON THE COVER

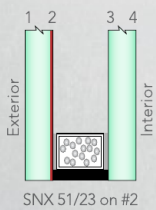
S-House in Ōmiya, Saitama, Japan, designed by Yuusuke Karasawa Architects. Photo by Sergio Pirrone.

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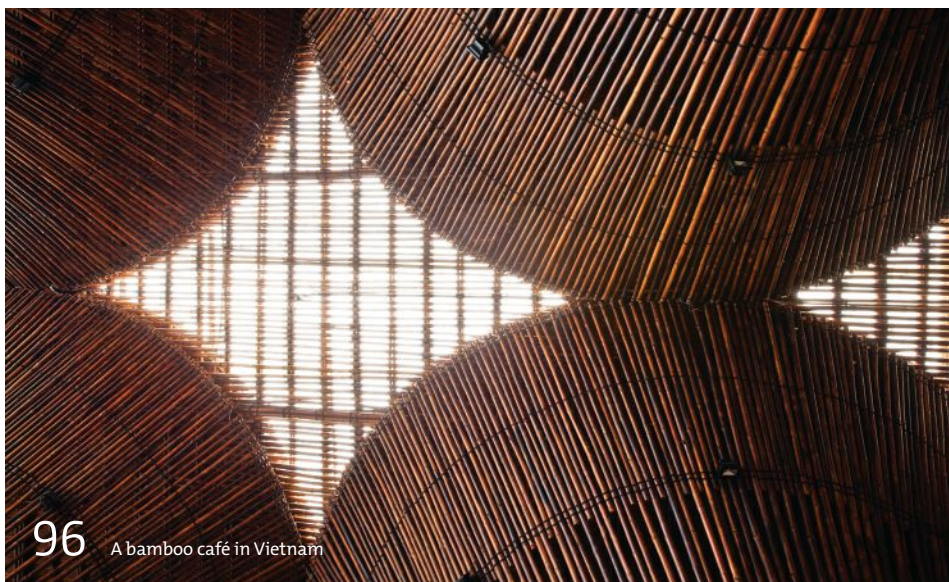
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INSIDE OUT



Want to know what goes on at the **New School**? Passersby need only glance at the institution's new **University Center** in Greenwich Village to understand that progressive design education happens here. The building by **Skidmore, Owings & Merrill** expresses the school's interdisciplinary approach through a brass-shingled facade crisscrossed by a series of glass-enclosed stairways that highlight a vivid tableau of students circulating within. The unique system encourages collaboration—and a new dialogue between campus and community that is sure to be conversation for decades to come.

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Architect: Skidmore, Owings & Merrill
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EDITOR-IN-CHIEF

Ned Cramer, Assoc. AIA
ncramer@hanleywood.com

MANAGING EDITOR

Greig O'Brien
gobrien@hanleywood.com

ART DIRECTOR

Robb Ogle
rogle@hanleywood.com

DESIGN

EXECUTIVE EDITOR
Katie Gerfen
kgerfen@hanleywood.com

ASSOCIATE EDITOR
Deane Madsen, Assoc. AIA
dmdadsen@hanleywood.com

PRODUCTS AND TECHNOLOGY

SENIOR EDITOR
Wanda Lau
wlau@hanleywood.com

ASSOCIATE EDITOR
Hallie Busta
hbusta@hanleywood.com

FEATURES

SENIOR EDITOR
Eric Wills
ewills@hanleywood.com

ONLINE AND RESEARCH

ASSISTANT EDITOR
Sara Johnson
sajohnson@hanleywood.com

EDITORIAL INTERN

Caroline Massie
cmassie@hanleywood.com

EDITORIAL INTERN

Chelsea Blahut

ART

SENIOR GRAPHIC DESIGNER
Alice Ashe
aashe@hanleywood.com

GRAPHIC DESIGNER
Jessica Rubenstein
jrubenstein@hanleywood.com

MULTIMEDIA

VIDEO PRODUCTION MANAGER
Kaitlyn Rossi
krossi@hanleywood.com

VIDEO PRODUCER

Lauren Honesty

COPY EDITING

Dena Levitz

CONTRIBUTING EDITORS

Aaron Betsky; Blaine Brownell, AIA; Thomas de Monchau; Elizabeth Evitts Dickinson; John Morris Dixon, FAIA; Thomas Fisher, Assoc. AIA; Joseph Giovannini; Cathy Lang Ho; Karie Jacobs; Vernon Mays; Ian Volner; Mimi Zeiger

CONTRIBUTING ARTISTS

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DESIGN GROUP

EXECUTIVE VICE PRESIDENT
Ron Spink
rspink@hanleywood.com 202.736.3431

EDITORIAL DIRECTOR
Ned Cramer, Assoc. AIA
ncramer@hanleywood.com

ADVERTISING

SENIOR DIRECTOR, STRATEGIC AND INTERNATIONAL ACCOUNTS, NORTHEAST, GREAT LAKES, GEORGIA, FLORIDA
Dan Colunio
dcolunio@hanleywood.com
202.736.3310

SENIOR STRATEGIC ACCOUNT DIRECTOR, WEST, TEXAS, OKLAHOMA
Mark Weinstein
mweinstein@hanleywood.com
562.598.5650

NATIONAL ACCOUNT MANAGER, LIGHTING
Cliff Smith
csmith@hanleywood.com
864.642.9598

STRATEGIC ACCOUNT MANAGER, CANADA
D. John Magner
jmagner@yorkmedia.net
416.598.0101, ext. 220

ACCOUNT MANAGER, CANADA
Colleen T. Curran
ctcurran@yorkmedia.net
416.598.0101, ext. 230

SENIOR DIRECTOR, DIGITAL SALES, MID ATLANTIC, SOUTHEAST
Christie Bardo
cbardo@hanleywood.com
202.736.3363

STRATEGIC ACCOUNT MANAGER, MIDWEST
Michael Gilbert
mgilbert@hanleywood.com
773.824.2435

STRATEGIC ACCOUNT MANAGER, UNITED KINGDOM, EUROPE
Stuart Smith
stuart.smith@globalmedia-sales.co.uk
44.020.8464.5577

STRATEGIC ACCOUNT MANAGER, CHINA, HONG KONG, TAIWAN
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86.13810325171

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LIST RENTALS

Statistics, Jennifer Felling
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EDITORIAL AND ADVERTISING OFFICES
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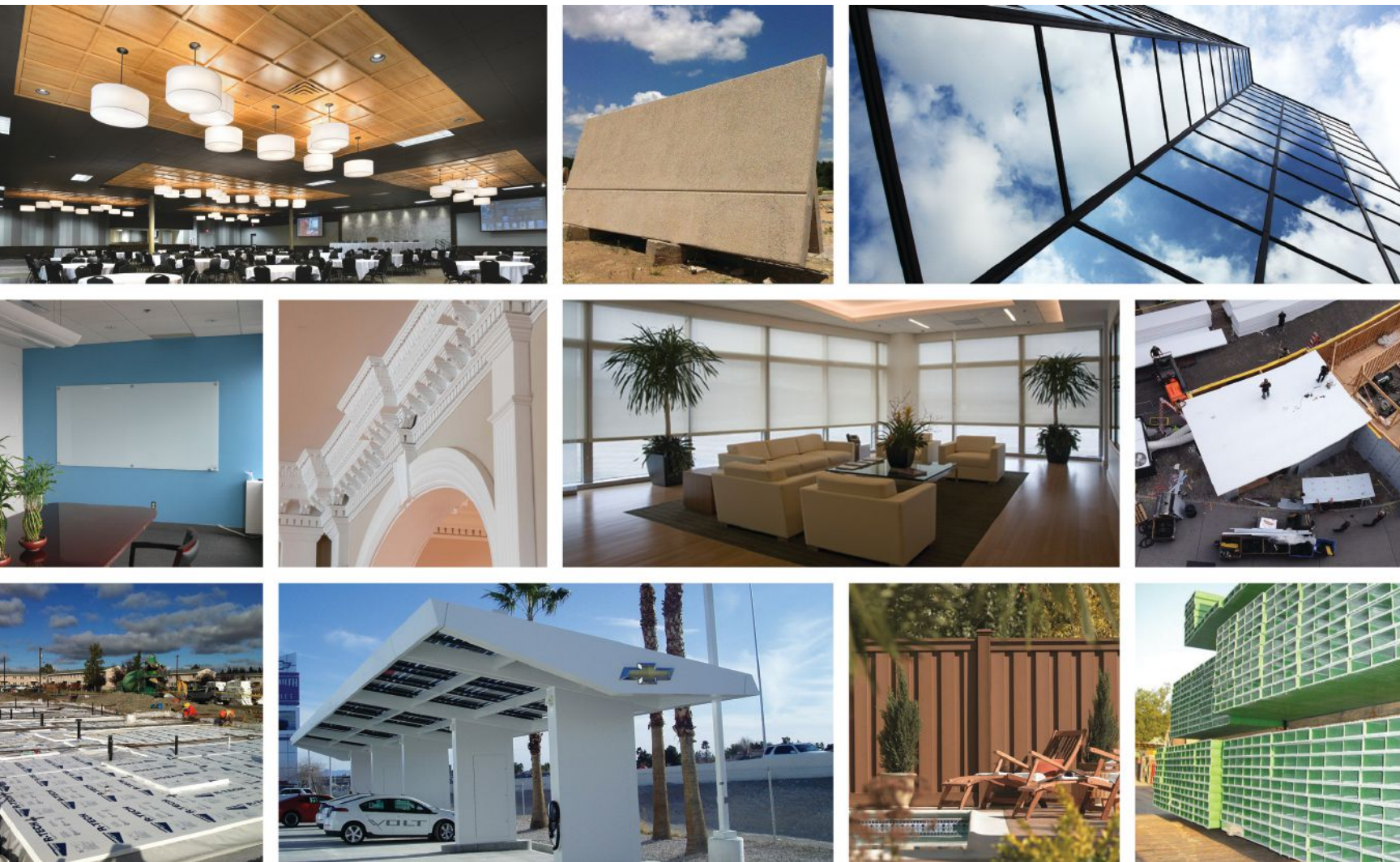
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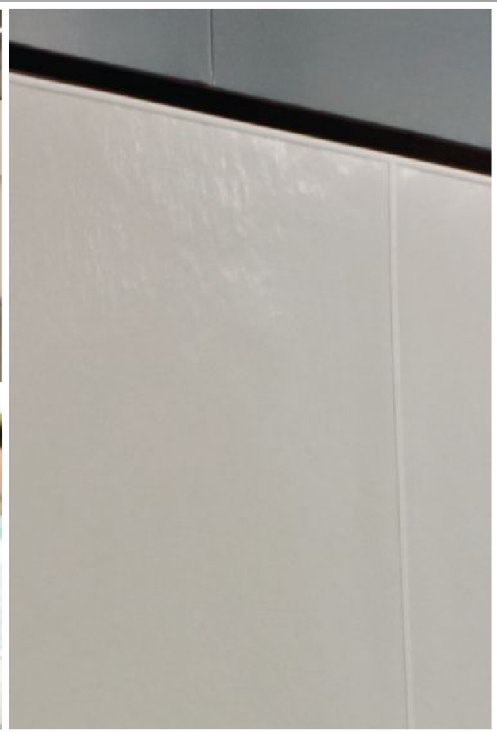
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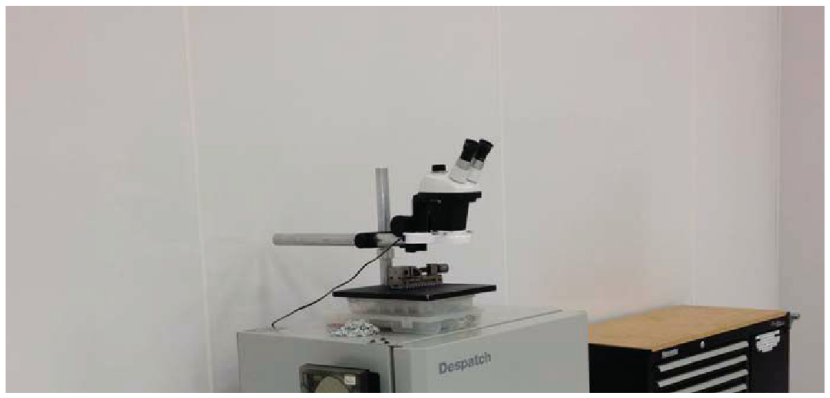
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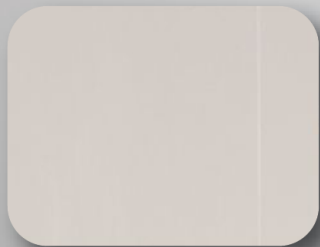
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THE EAST-TO-WEST STRETCH OF AFFLUENCE HAS NO COLLECTIVE NAME, BUT IT DIVIDES THE ST. LOUIS METRO AREA LIKE THE GREAT WALL OF CHINA.

MUST GEOGRAPHY BE DESTINY?

IN MY HOMETOWN OF ST. LOUIS, SEGREGATION REMAINS A TRAGIC FACT OF LIFE, THANKS IN PART TO ITS RACIALLY AND ECONOMICALLY DIVISIVE PATCHWORK OF 115 LOCAL GOVERNMENTS.

MY FAMILY is from St. Louis, and by some quirk of fate, all the houses we've lived in since the early 1800s are still standing. Every few years, typically when visitors are in town, we pile into the car for what my partner calls, only half-jokingly, the "Roots Tour." The itinerary begins with the oldest house, an Italianate hold-out on the edge of the downtown business district. The city radiates outward from there like an old-fashioned lady's fan, bounded only by the Mississippi River. But my family consistently moved due west, further so with each house and each generation, along a thin ribbon of neighborhoods where the rich, big businesses, top universities, cultural institutions, and professional sports venues are settled.

The east-to-west stretch of affluence has no collective name, but it divides the St. Louis metro area like the Great Wall of China. Middle-class whites live to the south, poorer blacks to the north. And while the southern edge is porous, the northern boundary is definitive: Delmar Boulevard. It was well north of Delmar, the inner-ring northern suburb of Ferguson, that on Aug. 9 a white police officer named Darren Wilson shot and killed an unarmed black teen named Michael Brown, sparking sometimes-violent local protests and an international debate about race and segregation in the United States.

According to the *Washington University Political Review*, "Residents south of Delmar are 73% white, while residents north of Delmar are 98% black. The median home value south of Delmar is \$300,000, while the median home value north of Delmar is \$70,000. The median income south of Delmar is \$50,000, while the median income north of Delmar is \$18,000. Finally, 70% of the residents south of Delmar have at least a Bachelor's degree, while only 10% of the residents north of Delmar have a Bachelor's degree."

Complicating the clear north-south disparity, the city to the east and county to the west have been separate polities since 1876. And since the 1950s, when white flight began in earnest, the county's population and tax base

have grown at the city's expense. But that may be changing. The Near North Side, the city's historically black neighborhood and the site of the ill-fated Pruitt-Igoe public housing complex, is now largely depopulated and totally crime-ridden. A preservationist's nightmare, so much of the original housing stock has been lost that it's practically a greenfield: One local developer has bought 2,200 parcels and is pushing for a 1,500-acre redevelopment.

So, just as my family once fled west, blacks are fleeing north. Ferguson is one of 90 independent townships in the county. Its population was 74 percent white in 1990; today its 21,000 residents are more than two-thirds black. Yet, as has been widely reported, 49 of Ferguson's 53 cops are white, the police chief and mayor are white, and five of the six town council members are white. The asymmetry can be attributed to the political entrenchment of the remaining white community and low black voter turnout on election days.

Since the 1920s, state and county voters have resisted repeated efforts at reunifying St. Louis, which ultimately has had the same effect as redlining, exclusionary zoning, restrictive covenants, and other tactics once used to geographically isolate St. Louis's poor black citizens. Now, George Herbert Walker III, a cousin of the Bush presidents, is leading a study of the possible impacts of a consolidation for the Missouri Council for a Better Economy.

In segregated yet governmentally unified metro areas—Chicago's, for instance—property taxes on the rich help pay for schools and other services in poor neighborhoods. The added expense is offset by the absence of redundant bureaucracies. By contrast, in fragmented St. Louis, rich townships support only themselves, denying opportunities to residents of poor communities and dragging down the economy of the entire metropolitan area in the process. A city divided cannot stand.

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CONTRIBUTORS



CLAY RISEN

CLAY RISEN is an editor at *The New York Times* op-ed section and the author, most recently, of *The Bill of the Century: The Epic Battle for the Civil Rights Act* (Bloomsbury Press, 2014). Along with regular articles for the *Times*, his freelance work has appeared in publications like *Smithsonian*, *Metropolis*, *Fortune*, and *The Atlantic*. Risen returns to the ARCHITECT fold after a brief hiatus, during which he wrote *American Whiskey, Bourbon*

& *Rye: A Guide to the Nation's Favorite Spirit* (Sterling Epicure, 2013). In the past, he has covered the legacies of critics Ada Louise Huxtable and Herbert Muschamp for ARCHITECT, as well as written criticism of his own about an interpretive center addition to the Vietnam Veterans Memorial in Washington, D.C., social housing built in interwar Germany, and how to fix the Pritzker Prize on the eve of that award's 30th anniversary.

➔ Read Risen's account of Woods Bagot's South Australian Health and Medical Research Institute on page 118.



DANIELLE RAGO

DANIELLE RAGO is an independent curator in New York and Los Angeles, and a contributor to a number of international publications on art, architecture, and design. She has worked with the Metropolitan Museum of Art and the Guggenheim Museum in New York, as well as the A+D Museum in Los Angeles and the MAK Center in nearby West Hollywood. She is the cofounder and curator of On the Road Project LA, a yearlong series of architecture, art, and

design programs. Her writing has been published in *Abitare*, *The Architect's Newspaper*, *Architectural Record*, *CLOG*, *Domus*, *Log*, *PIN-UP*, *Tank*, and *Wired*, among others. Danielle holds a master's degree in architecture history and critical thinking from the Architectural Association School of Architecture in London. Her focus is on the shifting role of the institution and media, and how contemporary architecture and its public is being produced and mediated through the institution and curator.

➔ Read Rago's interview with Kerry Brougher, the new director of the Academy Museum of Motion Pictures, on page 28.

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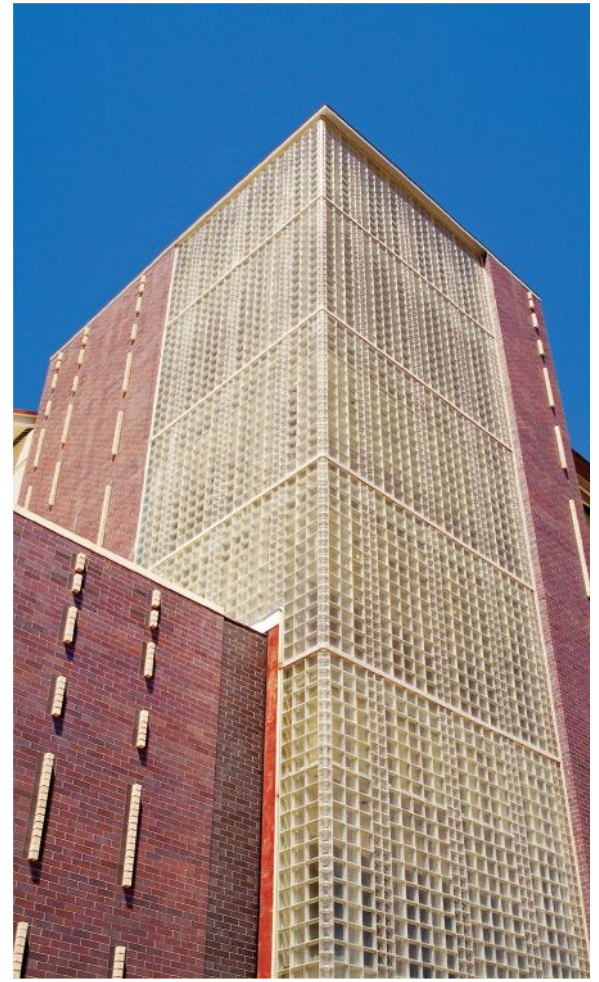
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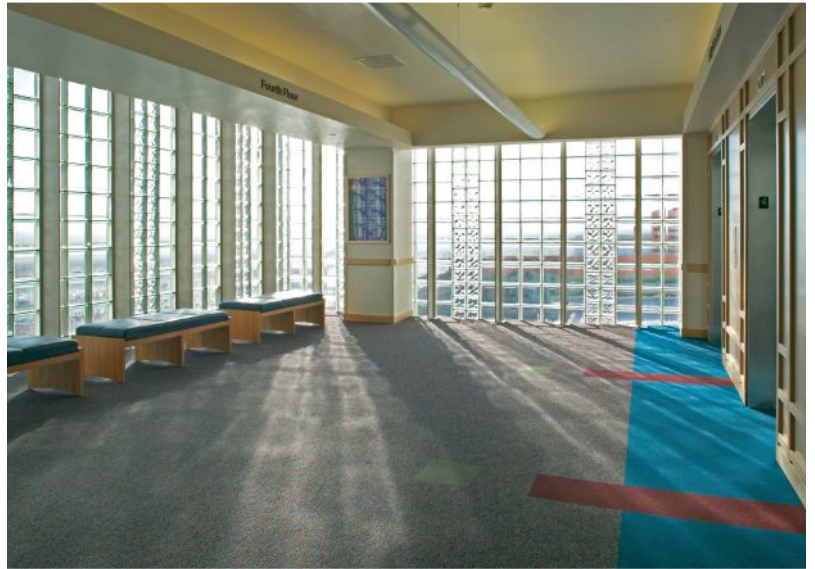
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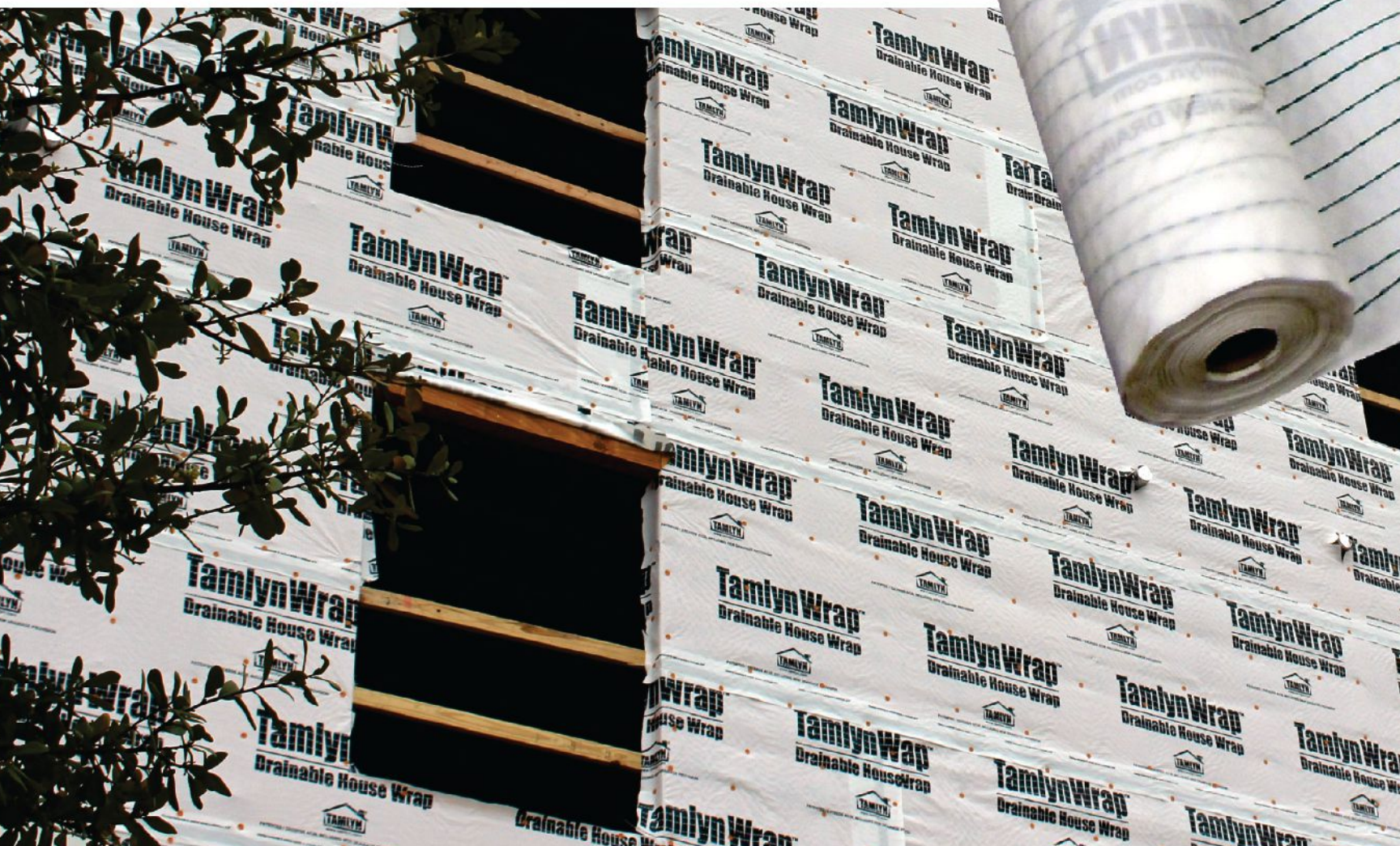
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H_HOMECOMING

Über-engineer Cecil Balmond designed “H_edge” as the site-specific centerpiece for his 2008–’09 show at Chicago’s Graham Foundation. An assemblage of thousands of X-shaped aluminum plates held in tension by stainless steel chains, the structure is now paying a visit to Balmond’s home, London, where it will be on public view in the Spitalfields neighborhood until Oct. 20.



Q+A: KERRY BROUGHER

THE DIRECTOR OF THE ACADEMY MUSEUM OF MOTION PICTURES DISCUSSES HIS FORTHCOMING BLOCKBUSTER: A RENZO PIANO-DESIGNED BUILDING IN LOS ANGELES.

➔ For an extended version of ARCHITECT's interview with Brougher, visit architectmagazine.com

THE PROPOSED museum building for the Academy of Motion Picture Arts and Sciences has been met with mixed reactions and some controversy. Renzo Piano, Hon. FAIA, of Genoa, Italy-based Renzo Piano Building Workshop and Zoltan Pali, FAIA, of Culver City, Calif.-based Studio Pali Fekete Architects drew up the original plans for the Academy Museum of Motion Pictures, but Pali left the project in May and Gensler was brought on. The project will renovate the 1939 May Co. building, designed by Albert Martin and Samuel Marx,

on the Los Angeles County Museum of Art's (LACMA) Wilshire Boulevard campus.

The museum's director, Kerry Brougher, joined the project from the Smithsonian's Hirshhorn Museum and Sculpture Garden in Washington, D.C., where he was chief curator and acting director. ARCHITECT sat down with Brougher shortly after he assumed his new position. DANIELLE RAGO

How does the design of the new building relate to your curatorial vision?

My feeling is that the moving image has to be the primary, core thing in the museum—that's the real artwork there. And I find Renzo feels the same way. I also feel that one of the things we have to do is unveil the mechanisms of cinema to the public, so they get a sense of how art and technology come together to drive things forward. I find that Renzo's architecture is doing just that; it's about creating immersive environments.

Do you feel the scheme is right for the location?

We're sort of going to be on a Renzo campus here, but I think that with this new building he's really pushing it—he's pulling all the stops out, and that's what I want. I really want a building that is a signature building and some people may love it and some people may not, but you're going to pay attention to it. What we're seeking here, both Renzo and I—as Renzo put it one day—is to be inventive.

How is the historic building being incorporated into the museum design?

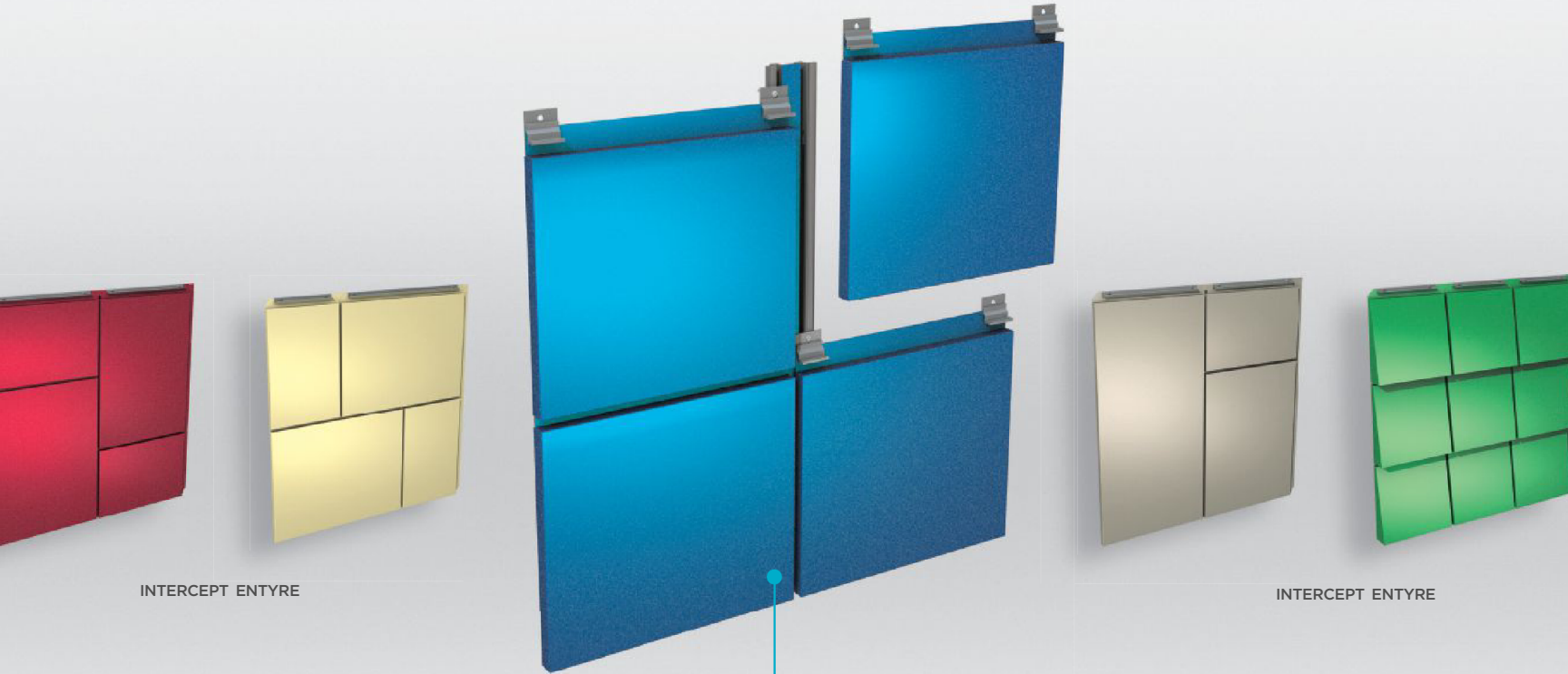
I have to say I'm so happy it's in this building for a couple of reasons. First of all, we're right next to LACMA, and this is a wonderful area for people to come. The other reason is that I'm just thrilled that this building will have a new life. While the outside of the building will remain about the same—its limestone façade will simply be cleaned up and the gold sphere on the front will remain—the interior will be transformed.

The interior spaces that the May Co. building provides is an open framework for us to work in whatever ways we want, and that's where Renzo and I have done a lot of talking about including as much open gallery space as possible. The existing lobby is fantastic. It has a very high ceiling that is over 20 feet tall, and Renzo envisions it as a continuous piazza from the outside.

The May Co. built an addition on the back of the building in 1946 that will be removed and will be restored to its original form. We're creating a concrete backing instead of the original limestone that was used, so you can see the difference between the old and the new. We will then connect the buildings with one of these wonderful Renzo spines that rises up so that people can move from floor-to-floor and into the sphere in an animated way.

Editor's note: The design was updated after our interview, and now connects the two buildings by bridges, rather than a spine.

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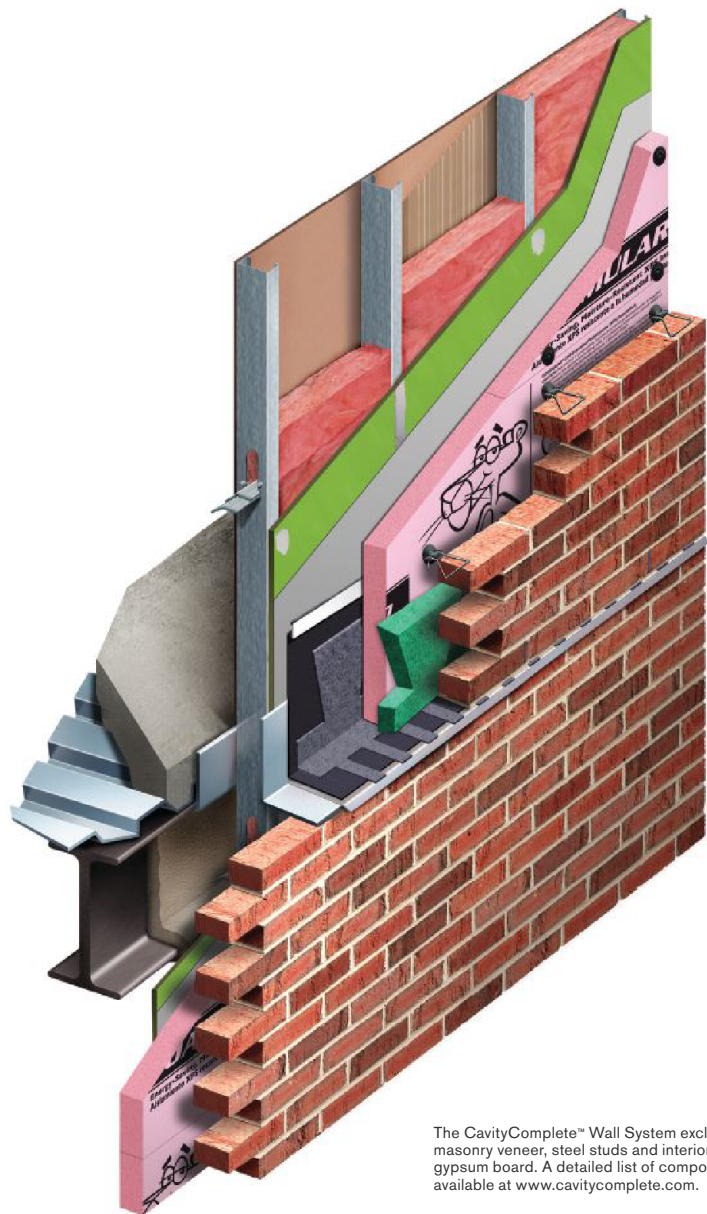
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DETAIL: THOMPSON RIVERS UNIVERSITY LAW SCHOOL

DIAMOND SCHMITT ARCHITECTS TURNS A FORGETTABLE LOW-RISE BUILDING INTO A FOCAL POINT IN BRITISH COLUMBIA.

THE BOXY, 1970s Old Main academic building at the center of Thompson Rivers University's (TRU's) campus in Kamloops, British Columbia, lacked the space and *dignitas* needed to house a law school. That changed when Toronto-based Diamond Schmitt Architects (DSA) capped the building with a two-story, 45,000-square-foot addition and undulating timber roof that rivals the mountainous setting.

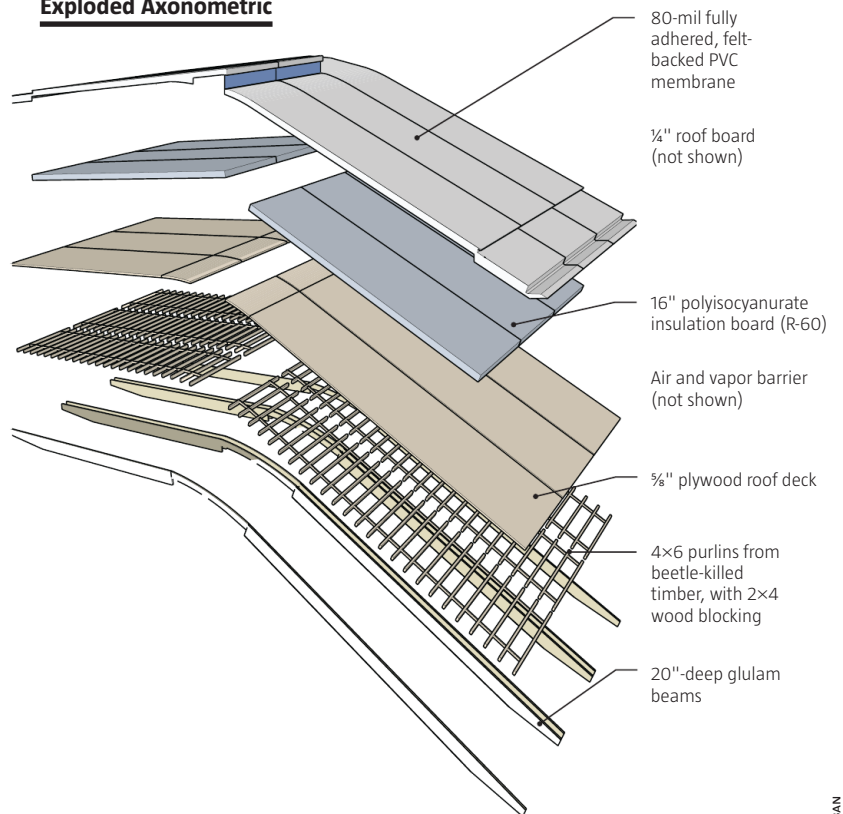
DSA principal Donald Schmitt, AIA, says that the 400-foot-long roof was inspired by the 1945 painting *Mount Paul* by A.Y. Jackson, a member of the Group of Seven landscape artists. "The visual connection between the building shape and Mount Paul and [the neighboring] Mount Peter was very important to creating that

cultural connection with the aboriginal people," he says.

The project had to be completed during the summer and meet its relatively tight \$6.9 million budget. So the team designed the roof to be prefabricated from 92 panels, curved in profile and rectangular in plan. Approximately 60 percent of the 12-foot-wide-by-36-foot-long panels shares the same geometry. StructureCraft Builders, in Delta, British Columbia, bent the glulam beams using a template to frame each panel and then infilled the frames with wood purlins. Each panel weighs about 4,000 pounds.

The panels were transported to the site in 42 tractor-trailer loads and installed in seven weeks. Classes in the building began this January. **JENNY JONES**

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Credit: Benjamin Benschneider

Federal Center South Building 1202—U.S. Army Corps of Engineers Seattle District Headquarters, designed by ZGF Architects LLP.

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— Allyn Stellmacher, AIA LEED AP BD+C,
Design Partner, ZGF Architects LLP

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TIP 1:

A basic calculation that any firm needs to make is how much money a project will bring in compared to how much it will cost to do the work. According to Michael Webber of Downers Grove, Ill.-based consulting firm A/E Finance, there's a simple and time-tested rule: bill out each employee at three times what it costs to pay them and the project will make money. Webber says that upwards of 70 percent of the operating revenue of a typical architecture firm goes towards the costs of employing people.

TIP 2:

Review your projects monthly to ensure they're bringing in enough money to keep the doors open. "We set an expectation for a project and we manage to that," says Jenifer Navard, principal and director of finance at the New Orleans-based firm Eskew+Dumez+Ripple. "I balance to make sure we have enough of a mix of projects—some where we will make a more generous profit, some where we aren't going to make as generous a profit—so that we balance out to an acceptable profit and can keep our business running."

TIP 3:

If you don't know the basics of project management, budgeting, or labor concerns, Webber warns, you should probably find someone who does. Navard suggests that it might make more economic sense to hire a financial manager, at least in the long run. "If you're spending eight hours a week on the business of sending out invoices, doing collections, preparing deposits, or worrying about contracts," she says, "think about that. ... You could spend those eight hours doing things that bring value to your firm."

TIP 4:

Financial information doesn't make for the most exciting reading material, which is why Navard presents her firm's monthly income statements with graphics. "The first three pages are pictures," she says, "and then behind that is the data." Navard uses a simple blue, green, and red system to indicate the financial health of projects. When project managers see red, they know to make adjustments. "You don't have to get into the nitty-gritty numbers to manage your business well," she says.

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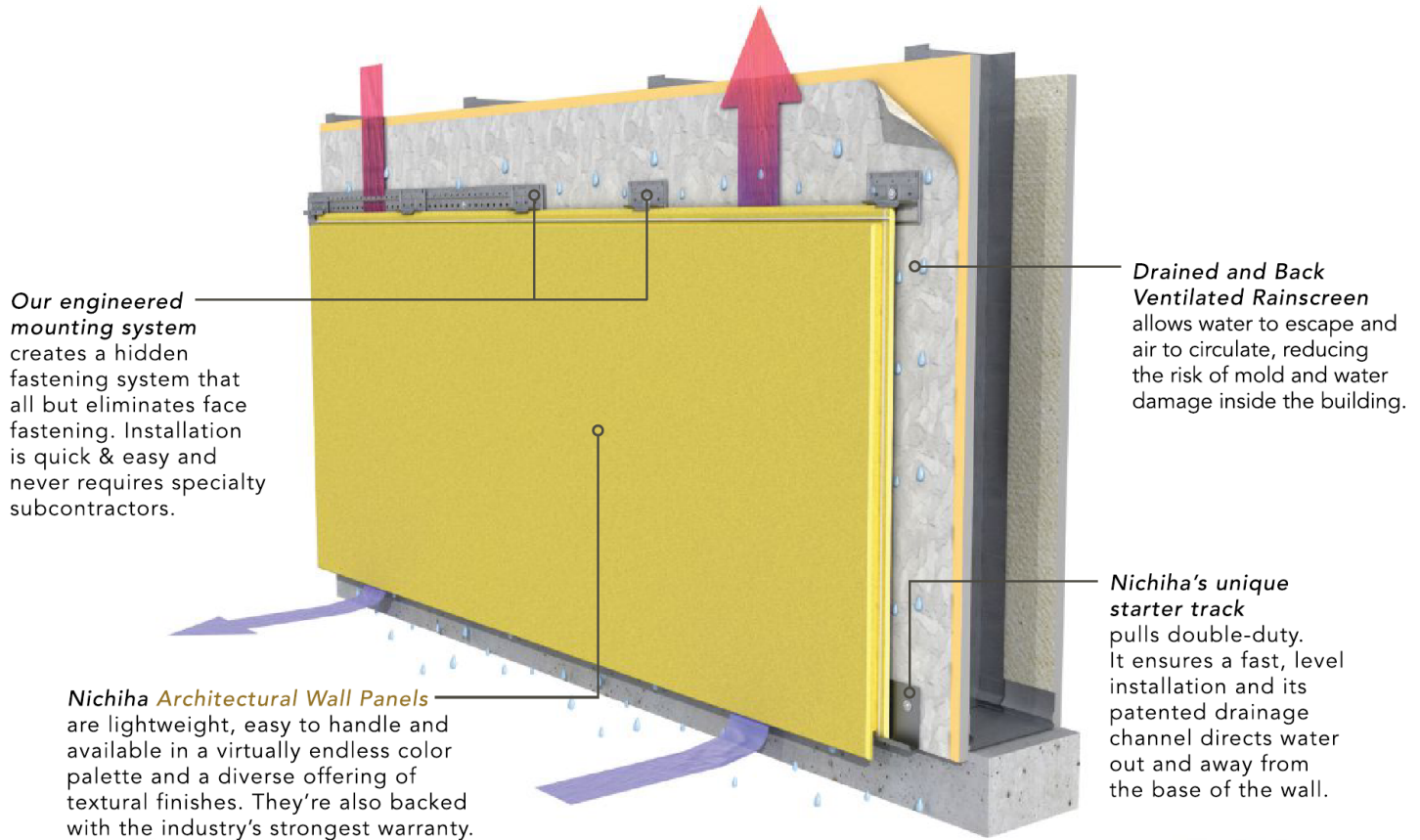


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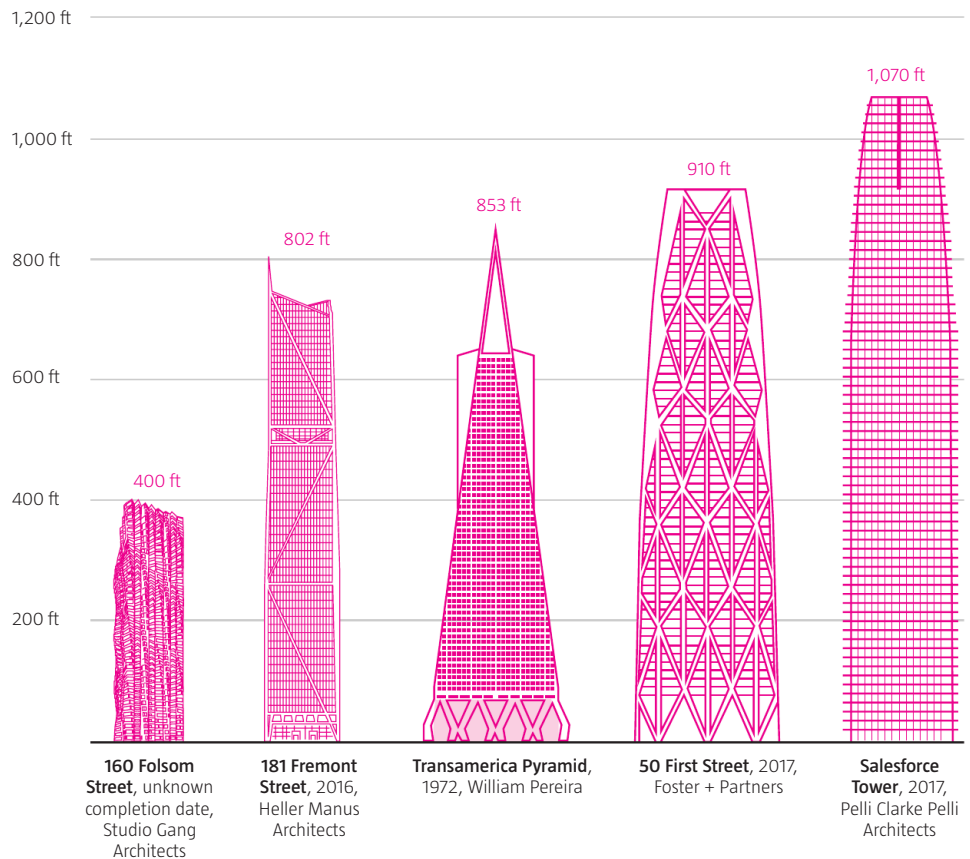
SAN FRANCISCO'S SKYLINE

AS THEIR CITY'S SKYLINE GROWS TALLER, SAN FRANCISCANS HAVE DIVIDED OPINIONS ABOUT THE VERTICALITY OF THEIR CITYSCAPE.

A RECENT REPORT by Watertown, Mass.-based firm Sasaki Associates and analytic agency Equation Research, "The State of the City Experience," outlines the results of a survey conducted with people who live and work in one of six major U.S. cities. When San Franciscans were asked how their city should invest to improve its architectural character, 25 percent said they wanted smaller buildings (the highest percentage of any city), while 20 percent said they preferred skyscrapers and iconic buildings (also the highest percentage of any city). With multiple towers in the works there, it seems the 20 percent will have its way.

The 1,070-foot Salesforce Tower, designed by New Haven, Conn.-based Pelli Clarke Pelli Architects, will dominate the skyline as the city's tallest skyscraper when it is completed in 2017. Foster + Partners' 50 First Street tower will climb about 20 yards above the current tallest building, William Pereira's Transamerica Pyramid, to come in second. This project includes an additional tower next door on Mission Street, which will rise to 605 feet. To design the two buildings, the London-based firm is working with San Francisco's Heller Manus Architects—the same firm that has designed the nearby 181 Fremont Street, a tower currently under construction. And rounding out a new class of high-rises, Chicago's Studio Gang Architects recently released renderings of the 160 Folsom Street skyscraper, but the building still faces zoning approval. **CAROLINE MASSIE**

San Francisco Skyscraper Comparison





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GONE GREEN

A MEAT-PROCESSING FACILITY IN CHICAGO GETS NEW LIFE AS A VERTICAL FARM AND BUSINESS INCUBATOR THAT IS NEARING ITS NET-ZERO GOAL.

URBAN AGRICULTURE is entrenching itself in derelict industrial centers, where former production and storage facilities serve as blank canvases for organized experiments in local industry. One such project is The Plant, a 93,500-square-foot vertical farm housed in an 89-year-old, repurposed meat-processing facility on Chicago's southwest side that is on its way to achieving net-zero energy. Since 2010, The Plant, with its nonprofit parent Plant Chicago, has grown to host 13 tenants and has received roughly \$2 million in local and state grants. Last year, it raised \$65,230 on Kickstarter to fund the construction of a living wall for the building's lobby.

The estimated \$6.5-million project is structured around internal loops that direct energy from one system into another. (For example, waste heat and humidity from one of six farms on site help to condition spaces where

mushrooms are grown.) The building is used to farm fish, bake bread, produce jam, grow fruits and vegetables, and brew kombucha—and, soon, beer. But its net-zero goal hinges on the installation, anticipated for early 2015, of an anaerobic digester—two stainless-steel hoppers that total 104 feet long and will compost up to 27 tons of biowaste each day from The Plant and nearby businesses into solids and liquids for use in fertilizers and on green roofs.

John Edel, The Plant's founder and executive director (shown above inside the digester), wants the nonprofit to continue to support its food-producing tenants while it becomes an educational resource for firms seeking to repurpose energy and waste. "The Plant will never be finished," he says. "It's intended to be a continuing laboratory for experimentation around loop-closing and biomimicry." **HALLIE BUSTA**



SOUND OFF

Jonathan Weiss, founder and CEO of audio-equipment maker Oswalds Mill Audio (OMA), takes cues from history to pair high-quality sound with display-worthy design. Inspired by the professional audio equipment used in 20th-century theaters, his two-way speaker systems feature cone-shaped horns to direct and amplify audio for a refined, full-bodied output. "Horns have very high efficiency, and that translates into effortless, natural sound with real dynamics," Weiss says.

The studio's newest design, Monarch, pairs a 15-inch woofer and midrange horn whose reverberations are unified by solid-wood baffles that flank the speaker like a pair of butterfly wings. The speakers are crafted in OMA's eastern Pennsylvania workshop from local materials, including black walnut, cherry, and ash wood.

Joined and finished like wood furniture, the speakers' unconventional forms and lack of right angles add to the complexity of their assembly. "Since our speakers are generally at least 10 times more efficient than conventional ones, they are also 10 times more revealing of any errors in acoustical engineering," Weiss says.

The full collection can be viewed and tested by appointment at OMA's New York showroom. oswaldsmillaudio.com



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No. of Employees: 60

Founded: 1953

Awards: AIA Honor Award for the Hyatt Regency Atlanta Hotel, Grand Architectural Creation Award from the Architectural Society of China

On The Boards: Yinchuan Greenland Center (right)

Notable Work: Norfolk State University's Brooks Library (above, completed 2011); Zhe Jiang Fortune Finance Center (above right, completed 2012); Beijing Yintai Center (below, completed 2008).

➤ Every month we dedicate this space to work that architects have uploaded to our online Project Gallery. Publish yourself at architectmagazine.com/projects.



Fallingwater®, Kaufmann Residence, Mill Run, Pa., c. 1936
Architect: Frank Lloyd Wright
Conservator: Western Pennsylvania Conservancy

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*Colorants added to this base paint may increase volatile organic compound (VOC) levels significantly, depending on color choice.

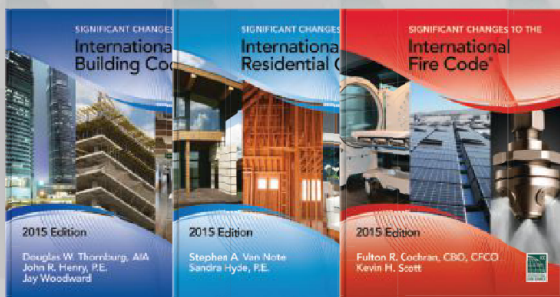
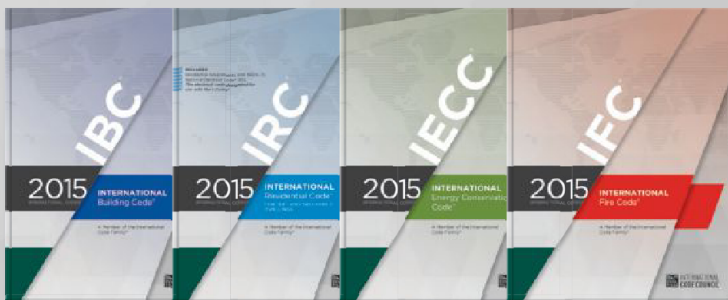
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53.3

↑ 1.9 pts

Mixed Practice

61.0

↑ 3.9 pts

Commercial

51.2

↓ 1.2 pts

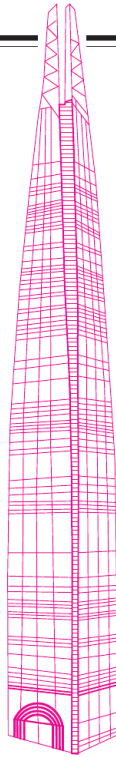
Multifamily
Residential

56.5

↓ 2.0 pts

THAT SINKING FEELING

When its construction is complete, New York-based Kohn Pedersen Fox Associates' Lotte World Tower near Seoul, South Korea, will be the tallest building on the peninsula and, at more than 1,800 feet, one of the tallest towers in the world. But the "construction complete" part is running into some issues. Sinkholes have been appearing in the neighborhoods around the construction site. Also, a lake nearby is reportedly shrinking. Water has appeared in the sixth basement level of the tower, and some have speculated that it came from the lake. Movement of underground water could potentially undermine the ground in the area—ground that supports several apartment buildings. The local government has ruled that the tower's construction is not the cause of either the sinkholes or the water levels in the lake, but the Seoul city government is also looking into the matter.



CONTINUING EDUCATION

HOT UNITS

POST-FRAME PROJECTS

The lowdown on the cost and time of construction for typical post-frame building projects. bit.ly/1BunfEZ (1 AIA)

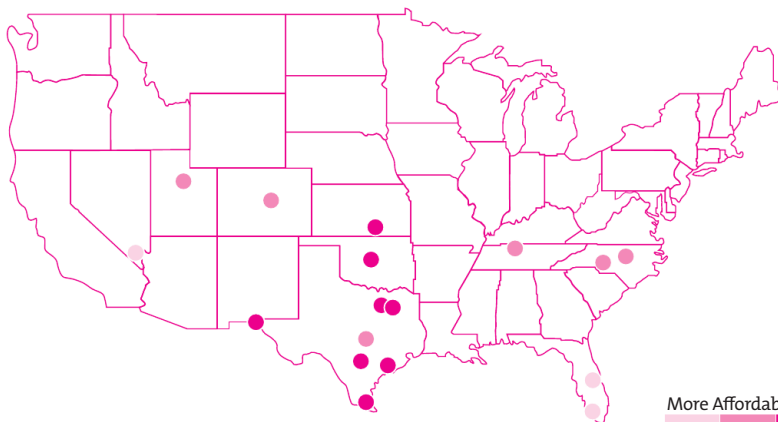
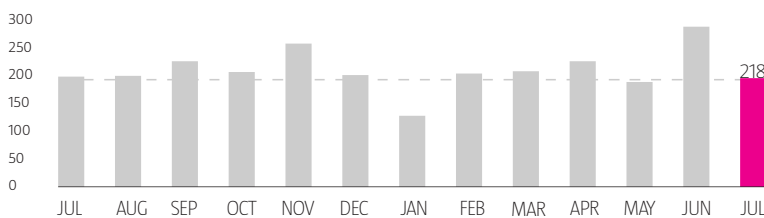
SLIDING DOORS

Learn what you need to know about interior sliding door systems in single family, mid-rise, and high-rise buildings. bit.ly/1pWrH9u (1 AIA)

QUICK-DRY SOLUTION

One solution to moisture-related problems is rapid drying concrete, a ready-mix solution for preventing moisture-related floor covering failures. bit.ly/1v96gDN (1 AIA)

ADP NATIONAL JOB GROWTH IN THOUSANDS



17 Fastest Growing U.S. Cities and Their Rate of Growth (2006–2012)

Austin, Texas 22%
Raleigh-Durham, N.C. 18%
Charlotte, N.C. 16%
Provo, Utah 16%
San Antonio 16%
McAllen, Texas 15%

Las Vegas 13%
Cape Coral, Fla. 13%
Colorado Springs, Colo. 12%
El Paso, Texas 12%
Houston 12%
Fort Worth, Texas 12%

Nashville, Tenn. 12%
Orlando, Fla. 12%
Dallas 10%
Oklahoma City 7%
Wichita, Kan. 7%

July Jobs Report

New construction jobs reported by the U.S. Department of Labor's Bureau of Labor Statistics



STEP UP

Kimberly Bowes

Director
American Academy in Rome

Massimiliano Gioni

Artistic director
New Museum

Lourdes M. Castro Ramírez

Assistant secretary for Public and Indian Housing

On July 31, President Obama nominated Ramírez, who is currently president and CEO of the San Antonio Housing Authority, for the role.

Jennifer Jones

Executive director
AIA San Francisco

Jones joins the AIA chapter following a nearly eight-year stint at the International Association of Lighting Designers.

Amanda Sturgeon, FAIA

Executive director
International Living Future Institute

Sturgeon was formerly ILFI's vice president and director of the Living Building Challenge program.

Eric Corey Freed

Vice president of global outreach
International Living Future Institute

Freed previously ran OrganicArchitect for nearly two decades.

Rebecca Dorris Steiger

President
International Interior Design Association
New York chapter

STEP DOWN

Emily Rafferty

President
The Metropolitan Museum of Art

Rafferty announced that she will retire in 2015.

Ted Landsmark, Assoc. AIA

President
Boston Architectural College

On July 25, the college's board of trustees announced that it let Landsmark go after a tenure of 17 years.

Carol Galante

Commissioner
Federal Housing Administration

Galante will step down this fall to join the faculty at the University of California, Berkeley.



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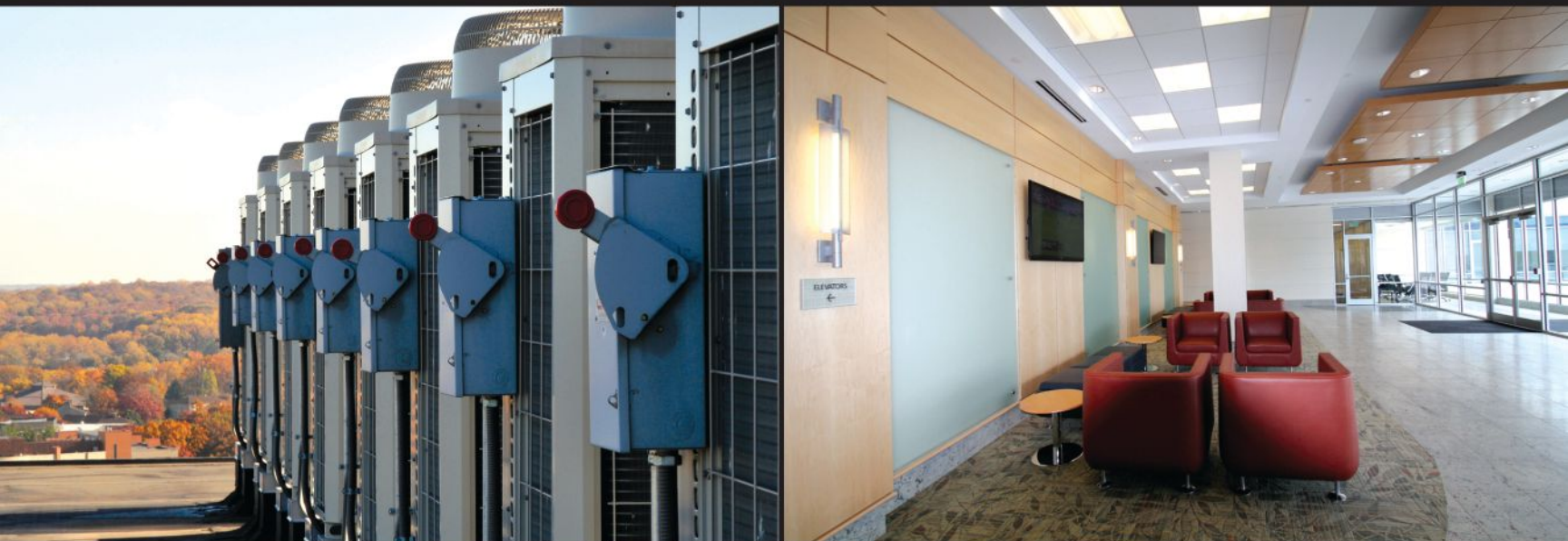
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▶ **SUCCESS STORY: TOWSON CITY CENTER, MARYLAND**

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feet on the 13th floor. As a result, a floor that had once been a mechanical room became leasable space. And, 70% of the shaft required by the previous outdated system was filled in, significantly increasing usable space on each floor.

Not only was space saved, but energy needs were dramatically reduced as well. Mitsubishi Electric's VRF zoning system provided 11 LEED® energy points, and resulted in a \$422,000 rebate through Baltimore Gas & Electric's Smart Energy Savers Program.

By saving energy and space, Mitsubishi Electric brought the Towson City Center into the 21st century. And beyond.



▶ **PROJECT SUMMARY**

Building Type:

- 15-story Office with 170,000 sq. ft.

Equipment Installed:

- R2-Series Air-source Outdoor Units
- Wall-mounted and Ceiling-concealed Indoor Units
- LonWorks® Interface
- GB-50 Central Controller
- CITY MULTI® Controls Network (CMCN)

System Capacity:

- 272 Tons of Simultaneous Cooling and Heating

Results:

- LEED Silver with 11 Energy Points from Mitsubishi Electric HVAC
- \$422,000 Energy Rebate
- Fully Leased



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Get more details about Towson City Center and see how Mitsubishi Electric solved other HVAC design challenges at **MitsubishiPro.com**.

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COOLING & HEATING



PHOTO: GREGORY COWLEY

AIA VOICES

THE SKIN DOCTOR | PHYSICS AND BUILDING ENVELOPES

Matt Williams is an associate principal at Arup, where he serves as the firm's Los Angeles-based Façade Practice leader. His work on the Sainsbury Laboratory at Cambridge University, which received the 2012 RIBA Stirling Prize, integrates building performance and design to ensure optimal working conditions for scientists and technicians. "I don't think of a façade as just a 'skin' that wraps around a building," he says, "I think of it as the first 5 or 6 feet of the building—it has an influence on what happens inside and outside."

OUR FAÇADES PRACTICE GREW OUT OF ARUP'S RESEARCH AND Development group, which started doing specialty façade work in the 1980s. About four or five years ago, we began integrating the façades practice into the buildings group globally. Ideally, every Arup building project should have access to a façade engineer.

Building types and building geography have a major influence on each design. That's a key thing we investigate first before looking for a prescriptive approach. A building design that is very energy efficient in one location may not translate well to another location, or from residential to commercial. We have guidelines, sure, but the performance-based approach has taken a huge lead in our practice.

The Sainsbury's laboratory was very challenging, even though it looks simple. Laboratories are energy-intensive, and a huge amount

of effort went into how the interior spaces are lit. The client wanted to encourage world-class scientists to move to Cambridge, and one way to do so was to offer a collaborative, adaptable environment so they could have ad hoc meetings, eat together, and work together. They wanted scientists to meet up in these breakout spaces along the west elevation of that building, which meant striking a delicate balance between maximizing daylight into the social spaces while mitigating the high solar gains. It's about how users influence the space, and that conversation is held over a set of iterations that can offer useful comparisons to reach an optimum solution.

A façade has to have an integrated approach, as it encompasses such a broad range of skills and disciplines, from mechanical systems to materials. When I worked with Arup in London, we'd start with a few standard approaches—a façade system or cladding type—but in the last five to 10 years what we've termed "building envelope physics" has become a more dominant factor in the early design phase by informing the energy efficiency of buildings. And we have that conversation with other engineers about things like integration and holistic solutions.

In the end—and in the beginning, frankly—the understanding of how a façade works depends on the people you work with. It's about the quality of that collaboration. —As told to William Richards **AIA**

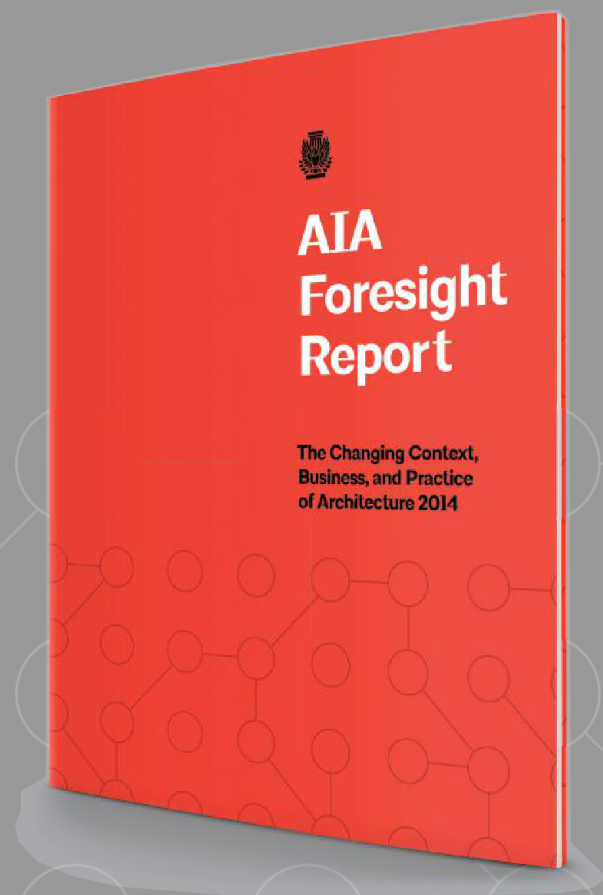
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- Shifts in the operating Environment
- Evolution of the business of architecture
- Trends and change in Professional practice
- Design with purpose



FREE to AIA members to download

AIA NOW

By William Richards

1 Renewables 2.0. As with the burgeoning resilience industry, the renewable materials industry is trying to define itself relative to older notions of sustainability and newer benchmarks for progress. To that point, organizers of the Renewable Energy World Conference & Expo (Dec. 9–11) in Orlando have divided their energy tracks by size, application, and region to cover large-scale renewables, distributed generation, and renewables in the global marketplace.

➤ Learn more at renewableenergyworld-events.com.

3 Critical Moment. Reducing energy consumption and carbon dioxide emissions: two noble goals that may ultimately become historic I-told-you-so's. What is the AEC industry really doing about them? Join ASHRAE and the American University of Beirut for the International Conference on Efficient Building Design in Beirut to learn more about advanced research in future proofing the way we build and renovate.

➤ Learn more at ashrae.org.

4 Market Forces. If you've been to architecture school in the last two decades (as a student or an instructor), you've grappled with community resilience, design representation, history, structural loads, and other curricular areas—all couched by energy efficiency, quality of life, social equity, and thermal performance. The economic argument for sustainability, however, still needs to be made—the topic of the Association for the Advancement of Sustainability in Higher Education conference and expo next month in Portland, Ore.

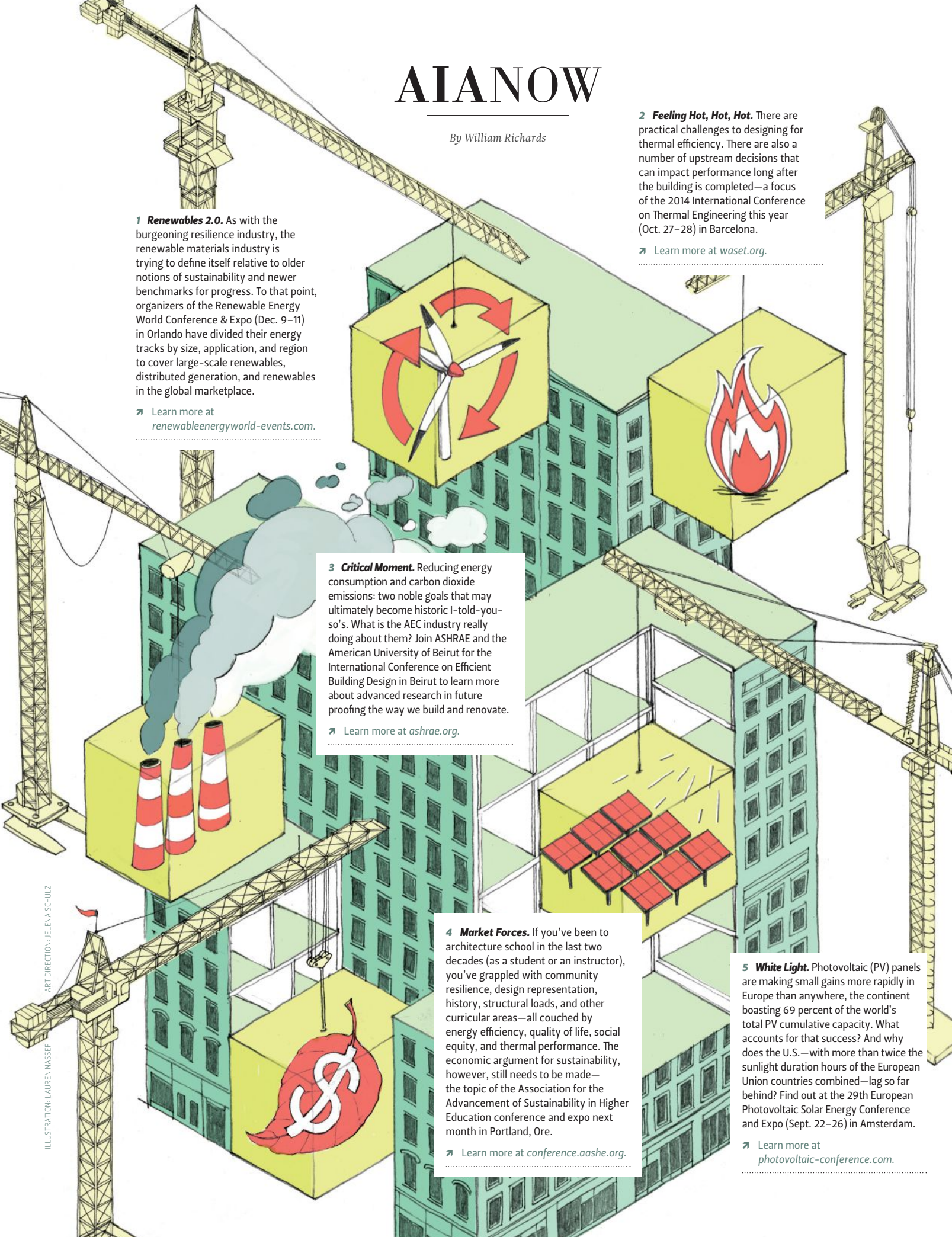
➤ Learn more at conference.aashe.org.

2 Feeling Hot, Hot, Hot. There are practical challenges to designing for thermal efficiency. There are also a number of upstream decisions that can impact performance long after the building is completed—a focus of the 2014 International Conference on Thermal Engineering this year (Oct. 27–28) in Barcelona.

➤ Learn more at waset.org.

5 White Light. Photovoltaic (PV) panels are making small gains more rapidly in Europe than anywhere, the continent boasting 69 percent of the world's total PV cumulative capacity. What accounts for that success? And why does the U.S.—with more than twice the sunlight duration hours of the European Union countries combined—lag so far behind? Find out at the 29th European Photovoltaic Solar Energy Conference and Expo (Sept. 22–26) in Amsterdam.

➤ Learn more at photovoltaic-conference.com.



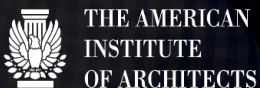
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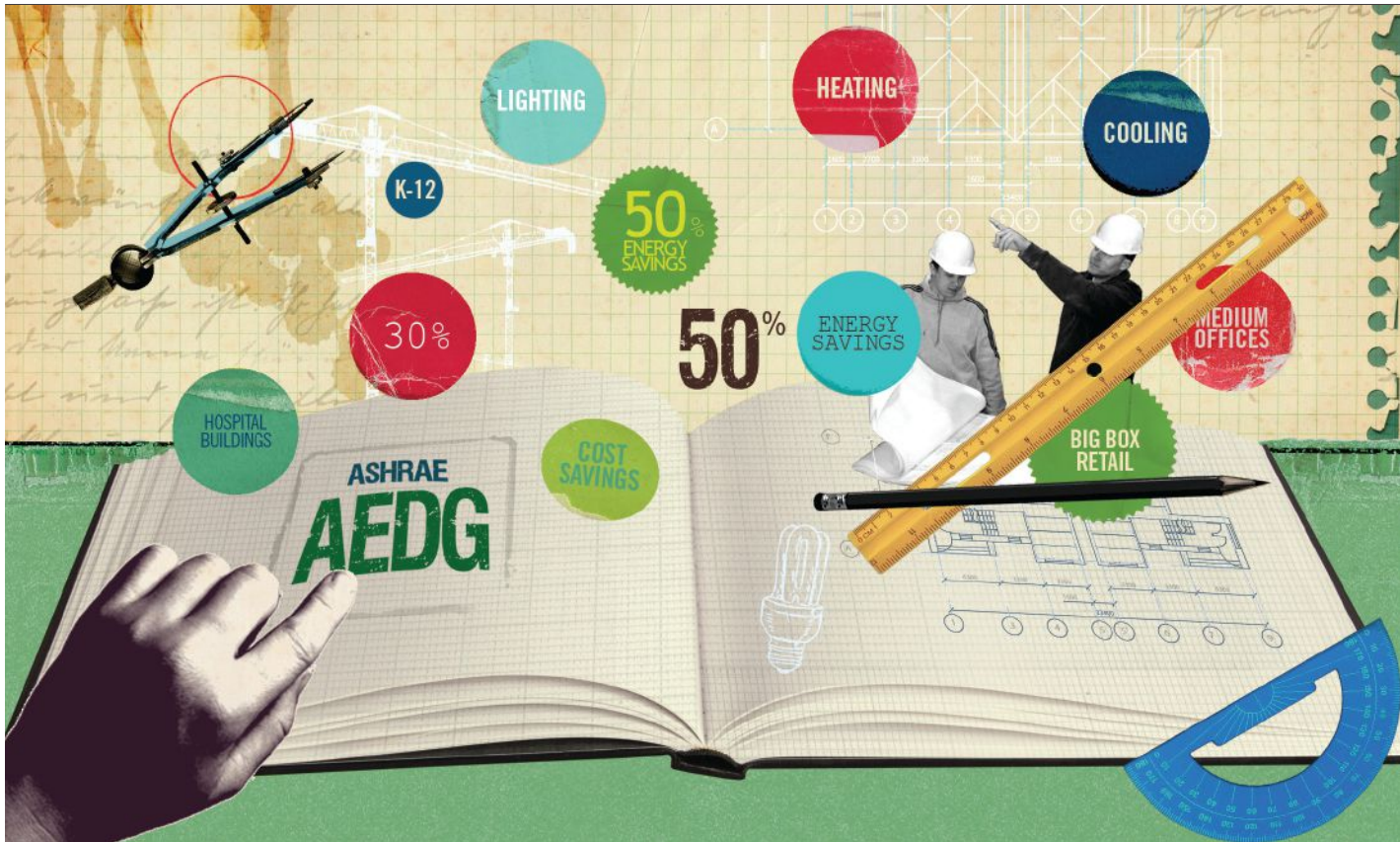


ILLUSTRATION: SARAH HANSON

THROUGH A SERIES OF PUBLICATIONS FOCUSED ON ENERGY optimization, four industry groups and the U.S. Department of Energy are providing guidance to help move the building industry toward market-viable net-zero energy and carbon-neutral buildings.

Over the last decade, ASHRAE (which changed its name from the longer American Society of Heating, Refrigerating and Air-Conditioning Engineers) has published 10 separate Advanced Energy Design Guides (AEDGs) for six different building types. The first group of guides, published in 2005 (and with nearly 600,000 downloads to date), targeted a 30 percent savings beyond ASHRAE Standard 90.1-1999 and covered small offices, small retail, K-12 schools, small warehouses, highway lodging, and small hospitals and healthcare facilities.

The most recent group of guides, published in 2013, targets a 50 percent energy savings over ASHRAE Standard 90.1-2004 and covers small-to-medium offices, medium-to-big-box retail, K-12 schools, and large hospitals. A 50 percent savings AEDG for grocery stores is now in development.

“The AEDG is one of the few interdisciplinary resources that receives both equal input and significant use from multiple disciplines and professional organizations—engineers, architects, lighting designers, and green-building professionals,” says Dan Nall, FAIA, the AIA’s representative on the AEDG Steering Committee. “As such, AEDG is a widely recognized and respected brand across the industry that cuts through what can be challenging communication between team members and clients.”

The development committee for AEDGs, formed in 2003, is comprised of representatives from the AIA, ASHRAE, the Illuminating Engineering Society of North America, the U.S. Green Building

Council, and the U.S. Department of Energy. As new benchmarks and best practices have evolved in different sectors of the AEC industry, the AEDG development team members have integrated those changes into the planning for successive guides.

Other changes have addressed cultural concerns within architecture centered on design autonomy. The most recent series of guides, for instance, recognizes that not all architects will want to (or be able to) use such a prescriptive design solution as the AEDGs outline. To that end, the guides also provide performance standards to direct teams toward an integrated methodology for their building. Decisions made during the design phase can be critical to achieving advanced energy savings.

“Anything like the AEDG series that can help architects understand the value of energy modeling—to use it up front as a design tool, which can aid collaboration—is most welcome,” says Helen J. Kessler, FAIA, LEED Fellow, founder of Chicago-based HJKessler Associates and a pioneer in energy modeling. “Architects don’t need to ‘do’ energy modeling per se, but they need to care about it deeply, and engage their engineering consultants in using models starting in the earliest phases of design.”

Nall sees the AEDG series as a starting point for that upstream conversation. “Many architects try to drive energy-efficiency conversations on their projects, but often lack the technical understanding to push engineers in that direction,” he says. “The AEDGs help to empower architects to move the conversation forward. They can serve as a conversation starter on teams that might not otherwise know how to think about energy issues as well as highly experienced teams who rely on high-level guidance to vet all possible solutions.” —Jodi Scott **AIA**



Heat Gains

Thermal performance 2.0

IN LOWER MANHATTAN, AN OLD MASONRY BUILDING (WHICH shall remain nameless) has such high thermal loads from its mechanical systems and human occupants that the air conditioning kicks on all year long—even in winter. It's a not-uncommon phenomenon in New York and other places where masonry and early curtainwall buildings have new uses and mechanical loads but not new building envelopes. Maybe preventing heat loss in the winter is not always such a good thing?

Up to this point, conventional wisdom has dictated that achieving high thermal performance was mostly about preventing heat transfer. But, to a growing number of researchers, it may have more to do with harnessing the power of that thermal energy and

ensuring that it can adapt to current and changing conditions. “You don’t want to prevent the transfer of energy,” says Jason Oliver Vollen, who is a principal in high-performance business engineering at AECOM as well as a research scientist at CASE, the Center for Architecture, Science, and Ecology at Rensselaer Polytechnic Institute in Troy, N.Y. “But,” he continues, “you want to manage it and use it to your advantage.”

Vollen is now in the third phase of an ongoing research project examining how high-performance materials can help buildings leverage the thermal energy that the sun broadcasts, instead of seeking protection from it the way most buildings do. It is one of three current projects advancing thermal performance recently funded by the AIA’s Upjohn Research Initiative grant program.

It is common knowledge that certain building materials can contribute greatly to heat transfer and overall thermal performance,



ILLUSTRATION: MICHAEL GLENWOOD

AIA FEATURE



N.Y., on a system of modular ceramic masonry curtainwalls that absorb the sun's heat and then redistribute it to the rest of the building, effectively turning the structure into an energy transfer station. While plants and animals have adapted to take advantage of local climatic conditions, architects have created a building environment that often seeks to protect against climatic conditions in what Vollen calls an "antagonistic way."

To a growing number of researchers, it may have more to do with harnessing the power of that thermal energy and ensuring that it can adapt to current and changing conditions.

Vollen calls his project Climate Camouflage. "Just as an animal would blend into its surroundings to hide from a predator," he says, "we're going to make our building as invisible as possible to the climate." The project's masonry system uses color, texture, and morphology to balance thermal energy across a façade by taking advantage of temperature differentials, material properties, and fabrication processes that vary depending on localized environmental conditions. Using ceramic is beneficial, he adds, because it's abundant, recyclable, and formable, and can be used in diverse applications without degradation. The system may soon be put to a real-world test: Tegula Tile and CASE are now working with the Schodack Central School District in upstate New York to do a possible pilot run of the masonry system as soon as next year.

Picking up on the idea of making buildings "invisible" or "transparent" to their environments, Kyoung-Hee Kim, an assistant professor of architecture at the University of North Carolina at Charlotte and a senior consultant at Front, received an Upjohn grant in 2013 for her project "Sustainable Transparency: Kinetic Building Façades." The project's goals are to establish design guidelines for mechanized façades using life cycle assessment techniques to create a commercially viable prototype of such a system using these guidelines.

The project recognizes that a major issue with mechanized façades is balancing aesthetics, functionality, cost, and energy efficiency, according to Kim. As part of her research, Kim studied buildings that have kinetic façades, including the Arab World Institute in Paris; Q1 headquarters in Essen, Germany; and the Al Bahr Towers in Abu Dhabi. Each of these employs a combination of sensors, mechanized components (actuators), a control board, and a building-management system. Building upon this, Kim has designed four kinetic façade typologies that are now being evaluated using prototyping and simulation techniques.

"I envision that the role of building façades will increase, not only providing a boundary layer between outdoor and indoor environments but also fulfilling adaptive roles in responding to dynamic environments and user needs [in existing buildings]," Kim says. She adds that she hopes that green-building checklists will continue to evolve to take into account qualitative performance issues such as user comfort, absenteeism, productivity, and well-being, all of which can be positively affected by thermal dynamics.

affecting a building's energy efficiency and the comfort of its occupants. What is less certain is the extent to which this kind of heat transfer impacts energy efficiency and undermines other efforts to create optimal conditions. In one example, considerable industry attention has been paid to the R-value of windows and protecting against solar gain, but relatively little information has been gathered about building-envelope performance. These three Upjohn grant research projects seek to advance that discussion in meaningful new ways.

In addition to Vollen's project, the other two projects deal with mechanized, or "kinetic," façades and the mitigation of heat loss through thermal bridging (which refers to the pathways of heat transfer and loss in poorly insulated buildings, such as those with concrete or metal). "It's incredibly important that the AIA is supporting advances in these subjects," says Drake Wauters, AIA, 2014 chair of the AIA's Knowledge Community on Technical Design and Building Performance, and the technical director and an associate principal at Perkins+Will. "Issues of thermal performance are very important, especially in a high-performance building—because small things can make a huge difference as building performance is elevated."

In his project, which won an Upjohn grant in 2010, Vollen is working with a ceramic tile manufacturer, Tegula Tile, in Rensselaer,



Yet quantitative information is also still essential to seeing and understanding thermal performance. The third Upjohn grant project—sponsored by Payette Associates in Boston and led by principal investigators Andrea Love, AIA, and Charlie Klee, AIA—is focused on determining which materials and envelope systems best mitigate thermal bridging. Building on a first-phase investigation of seven buildings designed by Payette (which meant the researchers had easy access to all the project histories and construction documents), this new project, awarded an Upjohn grant in 2012, adds eight more buildings to the portfolio. The investigators studied each building using thermal imaging, giving special attention to common transitional problem areas such as soffits and window openings as well as envelope systems such as curtainwalls, metal panels, rainscreens, and masonry. Because they could not physically alter the existing conditions of these buildings, the researchers performed computer simulations using the Lawrence Berkeley National Laboratory’s THERM program to study potential improvements.

“Just as an animal would blend into its surroundings to hide from a predator, we’re going to make our building as invisible to the climate.” —Jason Oliver Vollen, AECOM principal.

So far, the project has shown that thermal bridges can reduce R-values by approximately 40 to 60 percent over intended levels, which is significantly more than previously available estimates. “A lot of these buildings were designed to exceed code requirements, and we found that the thermal bridging was undermining those efforts significantly,” Love says.

“The quantification was the eye-opener,” Klee adds. “We also have seen that thermal bridging becomes increasingly a factor as we do other things better and better [to achieve energy efficiency].” There is little point, for instance, in specifying state-of-the-art insulation in a building if the thermal bridges are not adequately identified and mitigated. The researchers found that continuity is key when it comes to thermal performance. The more continuous a thermal barrier, and the lower the thermal conductance of the materials selected, the better the performance.

Similarly, to mitigate thermal bridging, continuous conductive elements such as Z-girts or masonry shelf angles must be pulled out of the thermal barrier or used discontinuously to mitigate heat transfer. While many products on the market claim to be thermally broken, the analysis showed mixed results, which demonstrates the importance of rigorous quantitative evaluation of proposed façade details.

All of the researchers hope to share the results of their projects at upcoming conferences and in industry publications, and it’s likely that the industry will see more research of this kind. “People are trying to get to a higher level of discussion and clarity and, hopefully, truthfulness in understanding the complete picture of sustainability,” Wauters says. “The architecture, engineering, construction, and ownership industries are trying to connect all the dots. That’s always a work in progress.” —Kim A. O’Connell **AIA**

AIAPERSPECTIVE

MATERIALS MATTER

THE FUTURE AND PAST OF IMPORTANT CHOICES



PHOTO: WILLIAM STEWART

ARCHITECTS CONFRONT A DIZZYING ARRAY OF NEW MATERIALS (and performance claims) any time they go to an expo, browse a design magazine, open their email inboxes, or thumb through the day’s mail at the office. How are we to distinguish hype from fact? Who has time to do the research, as mass customization and global manufacturing are working together to expand (exponentially) the available options when it’s time to specify a project?

After 1945—with new knowledge about materials that we derived from experience in World War II, combined with a flood of research dollars flowing from the government to the private sector—new products and technologies revolutionized the design and construction industry. Indeed, a quick glance at industry magazines published in the late-1940s and 1950s suggests a dizzying effect caused by so many new options, with similarities to what we are experiencing today.

Plastic became a mass-market success, being inexpensive, lightweight, and easy to shape into any form. There were also new, durable, fireproof, and easy-to-install floor tiles that contained asbestos, the newest “miracle” material.

Although architecture and design publications of the era provided extensive coverage and discussion of new materials, information came from the manufacturers themselves. Architects were certainly not derelict in their duties to protect the public health and welfare, but they just weren’t equipped to ask the right questions about the products they specified.

Fast-forward to today and, happily, there are solid and reliable sources for architects to consult as they address health, safety, and welfare by way of their material choices. The AIA website’s Materials Matter page (aia.org/practicing/materials) offers the most up-to-date information about the performance of materials in such critical areas as sustainability and public health. While that resource does not constitute endorsements of the products listed, the AIA Board of Directors is currently considering a strong position statement that may guide performance targets and life-cycle impact assessment as they relate to material choices.

And don’t forget: Last year the AIA joined the National Institute of Building Sciences to launch our digital Building Research Information Knowledgebase—BRiK (brikbase.org)—another resource for architects to find vetted research in several areas. Because architects specify the materials that literally touch people’s lives, we need all the help we can get to make the most informed decisions. **AIA**

Helene Combs Dreiling, FAIA, 2014 President

➔ Learn more about material matters at aia.org/practicing/materials.



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SPOT COOLING

PERFORMANCE ATTRIBUTES & APPLICATIONS

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Spot coolers are used in a wide variety of applications to maintain a certain temperature or remove humidity in an enclosed space.
 Photo Credit: MovinCool

By Richard Sharpe

Learning Objective One—Define spot cooling and identify its appropriate uses and benefits.

SPOT COOLING DEFINED

Techopedia defines spot cooling as, “Portable air conditioning that is used in overheated areas in a large space such as in a major data center. Spot coolers can be placed in the areas that require consistent temperatures.”

ASHRAE defines spot cooling as, “Cooling the air of a limited portion of an enclosed space without the use of walls or partitions.”

Spot coolers are used in a wide variety of applications to maintain a certain temperature or control humidity in an enclosed space, such as

data centers housing servers and IT equipment that generate a lot of heat. Spot coolers are also used in open spaces to spot cool work stations and heat-intensive manufacturing processes.

Spot cooling is an energy-saving alternative to central air conditioning when compared to the equipment cost and energy consumption of cooling an entire plant or warehouse. Portable air conditioning focuses cold air on specific work stations so that energy is not wasted to cool open space. Supplemental cooling of one area can reduce the energy costs of the cooling load over the entire building. Also, spot cooling can improve indoor environmental quality by focusing cool air exactly where and when it is

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Define spot cooling and identify its appropriate uses and benefits.
2. List types of spot cooling systems and explain how they function, as well as the pros and cons of each.
3. Compare the different types of portable spot air conditioning units in terms of their function, flexibility, installation, and applications.
4. Discuss key selection considerations for spot cooling units and how they were applied in one case study.

CONTINUING EDUCATION

CREDIT: 1 LU

COURSE NUMBER: ARsept2014.1

Use the learning objectives above to focus your study as you read this article.

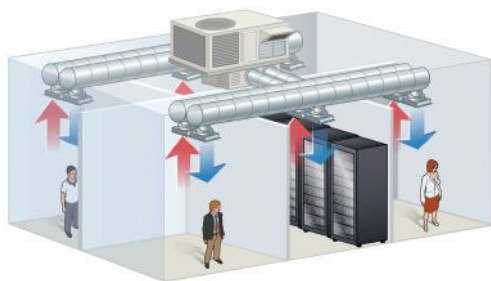
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needed, reducing humidity levels and keeping occupants comfortable.

HOW CENTRAL AC SYSTEMS COMPARE TO SPOT COOLING

Let's briefly compare a central air conditioning system to spot cooling. A central air conditioning system is composed of four parts that must be installed by a qualified HVAC technician: ducts, evaporator, outdoor condenser, and line sets. Line sets and permits are required and the installation is permanent. On the other hand, portable spot cooling is a compact, all-in-one unit that can be easily installed. There are no line sets required, permits aren't typically required, and the unit is easily relocated.



A central air conditioning system must be installed by a qualified HVAC technician, line sets and permits are required, and the installation is permanent. Photo Credit: MovinCool

There are numerous uses and benefits for spot cooling including people cooling, equipment cooling, and process cooling. The applications for these types of systems include server/telecom, offices and schools, healthcare, industrial, outdoors/events, and moisture removal.

SPOT COOLING IMPROVES OCCUPANT COMFORT AND SAFETY

Even when a manufacturing plant or other industrial facility has an efficient, large-capacity central air conditioning system, some areas or hot spots may still be subject to high ambient temperatures. Employee productivity in these hot spots can drop substantially, errors and accidents may increase, and OSHA violations may occur.

Portable spot cooling helps meet OSHA standards and improves occupant comfort by helping to reduce the risk of heat exhaustion and other related health issues due to heat exposure. Optimal occupant comfort increases employee morale, leading to improved manufacturing quality and productivity.

The Occupational Safety and Health Act (OSHA) of 1970 states, "Employers are required to provide their employees with a place of employment that is free from recognizable hazards that are causing or likely to cause death or serious harm to employees." This includes heat-related hazards that are likely to cause death or serious bodily harm.

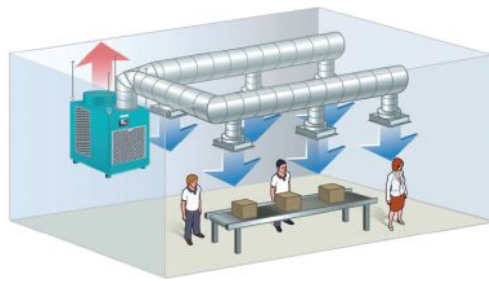


Work-related injuries and illnesses can be very costly to both employees and employers. Photo Credit: MovinCool

HEALTH PROBLEMS CAUSED BY HOT WORK ENVIRONMENTS

The OSHA Act of 1970 identifies the following health problems that can be caused by hot work environments:

- Heat stroke is an acute illness caused



Portable spot cooling is a compact unit that can be easily installed and relocated. Photo Credit: MovinCool

by overexposure to heat. Symptoms are dry, hot skin, high body temperature (usually over 105°F), and mental dysfunction.

- Heat exhaustion symptoms include weakness, lassitude, dizziness, visual disturbance, feeling of intense thirst and heat, nausea, vomiting, palpitations, tingling, and numbness of extremities.
- Heat cramps are painful and often incapacitating cramps in muscles.
- Heat rash is an itchy rash of small raised red spots on the face, neck, back, chest, and thighs.

The OSHA Act of 1970 recommends engineering controls to prevent heat-related health effects in the work environment. Specifically, indoor workplaces may be cooled by using air conditioning, increased ventilation (assuming that cooler air is available from the outside), or fans.

There are issues associated with using windows for cross-ventilation or using fans for air movement. They can encourage dust, concrete, metal, wood, and other particles to be blown around the work environment, potentially causing eye injuries. Workplace eye injuries are very prevalent: "The Bureau of Labor Statistics reports that eye injuries in the workplace cost over \$467 million annually. With indirect costs such as legal fees, judgments, and training new workers, the estimated total is more than \$934 million each year."

Another significant consequence to consider is lost productivity. In 2012 the Bureau of Labor Statistics reported that 23,830 eye injuries occurred that resulted in reported days away from work. A number of these were due to airborne debris. The use of spot cooling will keep employees comfortable and will not generate or promote flying debris that can be a potential hazard.

COST TO EMPLOYEES

Work-related injuries and illnesses can be very costly to both employees and employers. The International Labour Organization identifies some of these costs.

Some of the direct costs to a sick or injured employee include pain and suffering of the injury or illness, loss of income, possible loss of employment, and health-care costs such as rehabilitation, nursing home care/home health care, medical equipment, and medical claims costs.

Indirect costs for an employee can be several times more than the direct costs and are often difficult to measure. For example, the suffering of the employee's family may be extensive but may not be compensated for monetarily.

COST TO EMPLOYERS

The costs associated with workplace injuries or illnesses can be quite extensive for an employer as well. Even one incident can lead to financial disaster for a small company. Direct costs include payment for work not performed, medical and compensation payments, reduction or a temporary halt in production, increased training expenses and administration costs, as well as a possible reduction in the quality of work. Indirect costs to the employer may include replacement of the injured/ill worker, training of a replacement employee, reduced productivity during training, and negative influences on labor relations. The employer will also have to conduct an investigation, file reports, and fill out forms.

In fact, the U.S. Department of Labor—OSHA has developed an online tool that employers can use to assess the impact of occupational injuries and illnesses on their profitability: www.osha.gov/dcsp/smallbusiness/safetypays/index.html. The OSHA Safety Pays Program uses factors such as a company's profit margin, the average costs of an injury or illness, and an indirect cost multiplier to project the amount of sales a company would need to generate to cover those costs. The indirect costs are paid by the employer. The direct costs paid depends on the nature of the employer's workers' compensation insurance policy.

Portable spot cooling improves occupant comfort by reducing the risk of heat exhaustion and other related health issues due to heat exposure.



Spot coolers provide a convenient and cost-effective way to cool server rooms where equipment must be kept at a certain temperature. Photo Credit: MovinCool

USE SPOT COOLING TO PROTECT ELECTRONIC EQUIPMENT

There are numerous applications and benefits for spot cooling beyond people cooling. Electronic equipment can suffer both short-term and long-term effects from overheating. If an air conditioning system does not keep the temperature low enough the equipment in a data center may continue to function and show no signs of overheating, but its life cycle may be considerably shortened, adding to investment costs. The same applies to industrial environments where heat-sensitive electronics or motors may be subject to overheating.

In situations where the cooling capacity of the air conditioning system is inadequate, severe overheating can quickly occur, especially if there are several racks of equipment generating a large amount of heat. As the temperature rises to the danger level, servers containing a company's critical data will usually shut themselves down to prevent possible damage or data loss. Network routers, which handle a company's internal and external data transmissions such as e-mail and telephone communications, are even more heat sensitive. Overheating can permanently damage them, requiring costly replacement.

However, potentially even more costly than equipment replacement is system downtime. If downtime occurs, all business activities and transactions supported by the electronics equipment comes to a halt, sometimes with devastating results.

A building's central air conditioning system can sometimes provide the necessary cooling but it is usually expensive, as well as a wasteful use of energy. This is especially true because most IT equipment must operate continuously,

including periods when the building is unoccupied and does not otherwise require cooling such as nights, weekends, and holidays. Also, unless air conditioning can be delivered separately to the server room, other parts of the office can become uncomfortably cold for employees working there.

Spot coolers provide a convenient and cost effective way to cool server rooms where equipment must be kept at a certain temperature and it isn't practical to include permanent increased cooling at that location. The units safeguard servers and other temperature-sensitive, heat-generating hardware, achieving cooling that is as efficient as it is effective.

In terms of function, there are two basic types of portable spot air conditioners available: air-cooled and water-cooled. Air-cooled is the preferred method to spot cool within server rooms. We will discuss different types of portable spot air conditioners later.



Spot cooling of a small area or process can reduce cycle time, handling damage, reject rates, and increase profits. Photo Credit: MovinCool

USING SPOT COOLING IN MANUFACTURING PROCESSES

Manufacturing processes that require heat can contribute to higher cycle times as well as heat-related quality issues, resulting in lower output. Employing spot cooling for directed cooling of a small area or process can reduce cycle time, handling damage, and reject rates, and can increase profits. Spot cooling can be used to cool inventory to prevent product damage and needless waste, as well as to

protect valuable inventory from the harmful effects of high temperatures. For example, products such as food or plastics can be cooled down faster after they leave a heat-related process, substantially reducing cycle times. This would be used when it isn't cost effective to cool the entire processing plant for the benefit of cooling a particular area.

Spot cooling, which simultaneously removes moisture from the air, can also prevent product defects caused by warping and condensation due to excess heat and humidity.

OTHER USES FOR SPOT COOLING

Adding spot cooling as supplemental cooling to the existing system where a system upgrade would be cost prohibitive provides additional cooling for new rooms, areas, equipment, processes, or people.

Emergency back-up cooling provides insurance in the event that the main system goes down or if it is overloaded and there is a risk of equipment being damaged. This is a common practice for health care and educational organizations, as the elderly and children are highly susceptible to heat stroke.

Spot cooling can be used as primary cooling and is well suited for older buildings with no prior air conditioning. This is especially useful when making tenant improvements that change the floor plan, or when adding a heat load such as an IT closet that requires specific cooling. Spot cooling may also be used in new construction where air conditioning was an afterthought.

Using spot cooling for after-hours cooling will save on energy costs as it allows the main system to be shut down on weekends and after hours. There is no need to cool the whole facility when only small areas require cooling, especially server rooms.

Adding spot cooling as supplemental cooling to the existing system where a system upgrade would be cost prohibitive provides additional cooling for new rooms, areas, equipment, processes or people.

APPLICATIONS FOR SPOT COOLING

Server/Telecom

As discussed, spot cooling is commonly used in server and telecom industries to protect computers, networks, servers, telecom equipment and closets, and rack rooms. The trend is towards smaller, more "heat dense" servers, and equipment shutdowns may be more likely to occur as existing server room air conditioning systems become inadequate. Spot coolers provide supplemental or instant emergency backup cooling to protect critical equipment during a heat-related crisis.

Offices/Schools

The systems may be used in offices and schools for supplemental cooling or maintenance needs after hours or on the weekends, in temporary classrooms, or as emergency backup cooling. They may reduce distractions in the classroom by keeping students and faculty cool during the hotter months. In addition, spot cooling can provide instant temporary cooling relief to critical areas when the existing air conditioning system shuts down, including after hours, on the weekend or when there is a risk of hot temperatures causing heat-sensitive servers or systems to fail, crippling daily operations.



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QUIZ

- Spot cooling:
 - Is an energy-efficient alternative to central air conditioning when compared to the equipment cost and energy consumption of cooling an entire plant or warehouse.
 - Can reduce the energy costs of the cooling load over the entire building.
 - Can improve indoor environmental quality by focusing cool air exactly where and when it is needed, reducing humidity levels and keeping occupants comfortable.
 - All of the above
- True or False: In addition to cooling, spot air conditioners are extremely efficient at simultaneously removing excess moisture from the air.
 - True
 - False
- Direct costs to employers associated with workplace injuries or illness include:
 - Medical and compensation payments
 - Reduction or a temporary halt in productions
 - Possible reduction in the quality of work
 - Negative effect on morale in other workers
 - All of the above
- A spot air conditioner is a self-contained system that is comprised of _____.
 - a compressor
 - a condenser coil
 - an evaporator coil
 - All of the above
 - A and B only
- True or False: Water-cooled portable models are suitable for applications where there is no available space for the warm exhaust air.
 - True
 - False
- Which of the following statements is/are TRUE of mini-split cooling units?
 - They consist of two separate units, an inside evaporator and outside condenser.
 - Installation often requires damage to walls and structure as well as incurred costs involved with brazing, charging refrigerant, electrical, and other labor costs.
 - They can be installed virtually anywhere.
 - All of the above
 - A and B only
- Which of the following statements is FALSE?
 - Potential disadvantages of water-cooled units include the size of the unit and required floor space, as well as the need to manage the warm air condenser exhaust.
 - Portable spot-cooling air-cooled units supply cool air and reject warm air through ductwork.
 - Portable spot-cooling water-cooled units are connected to a water source and supply cool air and use water to reject condenser heat.
 - None of the above are FALSE
- Ceiling-mount spot air conditioners consist of a single, pre-charged unit, eliminating the cost of installing and maintaining an external condensing unit.
 - True
 - False
- _____ is a measure of how efficiently a cooling system will operate when the outdoor temperature is at a specific level.
 - SEER
 - EER
 - IEER
 - None of the above
- Variables to consider when calculating heat loads include:
 - Square footage of the space to be cooled
 - Heat generated by occupants
 - Heat generated by each item of machinery
 - All of the above
 - A and C only

DESIGNING FOR HEALING AND INFECTION CONTROL

TWO CASE STUDIES EXAMINE THE INNOVATIVE USE OF SURFACE MATERIALS IN HEALTHCARE

Presented by:



Designers maximized the tight, steep site by creating a tall and relatively narrow building, with dramatic natural views of the surrounding hill country. Photo Courtesy of Casey Dunn.

By Paige Lozier

Learning Objective One—Identify how nature can connect a project's site and fabricated open space to provide a healing environment.

LAKEWAY REGIONAL MEDICAL CENTER

The newly constructed Lakeway Regional Medical Center is located in Lakeway, Texas, a resort community situated on Lake Travis 25 miles west of downtown Austin in the Texas Hill Country. The full-service hospital, opened in April 2012, combines state-of-the-art medical technology and the plush comforts of home, while serving as the primary acute care hospital for this community. In designing the facility and programs, administrators and designers took cues from the hospitality industry to make this hospital a far more comforting environment than typically found in standard hospitals.

This case study explores hospital design and how color, design, structure, and open space can significantly impact healing and recuperation of hospital patients. The design firm Page provided planning, architecture, MEP and civil engineering, and LEED consulting for the 270,500 square foot hospital, which was built by Hoar Construction. All solid surface and laminate surfaces were fabricated by R.J. Wherry & Associates.

Before the construction of Lakeway Regional, the closest hospital to the community was approximately 20 miles away. The steady growth the Lakeway community has experienced for over a decade is expected to continue, so the key to the building program was allowing for future facility expansion. Currently the facility includes 108 licensed beds with shell space to accommodate an additional 40 beds and 40,000 patient visits per year. The hospital has been designed to permit

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Identify how nature can connect a project's site and fabricated open space to provide a healing environment.
2. Discuss how an innovative new solid surface material may combat the spread of pathogens through a 99.9% reduction in bacteria* within two hours of exposure, even after recontamination.
3. Describe the world's largest known clinical trial of biocidal surfaces in which this biocidal, copper oxide-infused material has been applied within a 129-bed healthcare setting.
4. Examine how color and surface materials can be used in a healthcare setting to create a welcoming ambience.

CONTINUING EDUCATION

CREDIT: 1 LU/HSW

COURSE NUMBER: ARsept2014.2

Use the learning objectives above to focus your study as you read this article.

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lateral expansion at each level as well as vertical expansion for additional inpatient beds.

When beginning the design of the hospital there was a tremendous amount of community involvement to achieve what the owners, staff and community desired in a regional hospital. There were frequent meetings with the primary users—doctors, nurses and owners—but there were also several meetings held with the community at large to bring together everyone's ideas. Not only did the city council members and mayor have the opportunity to attend meetings, but Lakeway citizens could also participate to see how the project design was progressing and to provide input.

WORKING WITHIN A CHALLENGING SITE

Lakeway Regional Medical Center is located within a larger medical and mixed-use

development that is slated for future growth. Since the hospital's opening, part of the site has already been expanded to include a long-term care facility. The area is a greenfield, meaning nothing had previously existed on the site. The very steep sloping site is spectacular and affords patients, staff and visitors exceptional views to the central Texas landscape. But, the site also created one of the biggest design challenges of the project with contours that drop over 80 feet on an 8.6-acre hillside site; a facility of this size would normally require 25 acres. Therefore, the building was designed to have a compact footprint while providing a high level of flexibility for future expansion.

Early in the design process, the Page design team determined that the only way to fit all of the hospital programs onto the site was to build vertically. They maximized the tight, steep site by creating a tall and relatively narrow building, with dramatic natural views of the surrounding hill country and an abundance of natural daylight. As opposed to typical sprawling hospital complexes, the taller building combined with an adjacent parking structure had the added benefit of retaining a great amount of green space.

A vertically oriented hospital presents challenges because certain departments such as the emergency room need immediate access to patients. In addition, the loading dock and other utilitarian spaces necessary for a hospital's function also require immediate access to grade. The resulting building takes advantage of the sloping site by providing separate access points on different levels for the main entry, emergency center, outpatient surgery, service dock and staff entry, creating intuitive wayfinding for the facility. Each of the lower levels has access to landscaped courtyards and views to a man-made water feature within the healing garden/courtyard.

When approaching the site there is a circular road that moves through the 120-acres, with the hospital sitting on one corner. The hospital is flanked on the left by the parking garage and on the right by numerous plantings welcoming visitors through the front door. The front of the building is used as the main entry; the emergency room is on the same level but is accessed via an elevated concrete ramp. Sitting two levels below the ER is the loading dock. Therefore, incoming patients and visitors can access the building through the front, whereas services enter through the rear on the lower side of the building.



A sunken garden brings a large amount of daylight to lower levels, creates natural views from multiple floors, and aids in wayfinding. Photo Courtesy of Casey Dunn.

USING NATURE TO CREATE A HEALING ENVIRONMENT

The medical center serves a large population because it is the only major hospital in the area, so it was important to be open to the community as an inviting and encouraging environment. The Page design team really wanted to highlight this openness and create a hospitable feeling in their design. They also believed deeply in the healing effect of outdoor spaces and access to natural light, so they ensured that patient rooms had an abundance of natural light and that landscaping around the building was configured to optimize daylighting inside the hospital. Patient rooms have views of the surrounding hill country and there are shaded gardens and water features throughout the facility for patients and visitors to convene with nature. Garden spaces provide an escape from the stresses of being in a hospital and also enhance the welcoming ambiance the client was seeking.

The main landscaping feature is a sunken garden on the uphill entry side that brings a large amount of daylight to lower levels, creates natural views from multiple floors, and aids in wayfinding. The garden is tiered on four different levels and is planted with a variety of local vegetation, several trees, and ivy that spills over the terrace walls. Large stones salvaged from the site are set amongst the plantings, and a waterfall cascades through the sunken garden.

These landscaped areas were intended both as a respite for hospital visitors to step away from the hospital environment, but also as space for

recovering patients to receive daylight and fresh air for therapeutic reasons. Creating accessibility to these areas was a major part of the hospital's overall concept and design, which was inspired by local landscape and advanced sustainable technologies. It should be noted that 57% of the site was restored using native and adapted landscaping, maintaining important natural habitat and reducing water consumption associated with irrigation by an estimated 75%.



The exterior of the building is a combination of limestone veneer and precast concrete panels, which visually anchor the building to the site. Photo Courtesy of Casey Dunn.

NATURAL MATERIALS MIMIC THE LANDSCAPE

Lakeway Regional Medical Center's distinctive palette of materials and colors was derived from the owner's desire for a facility which felt more like a hotel than a hospital and which would embody the latest in sustainable design concepts. Introducing color to hospitals has been a major industry trend over the last several years in the attempt to avoid the clinical nature of older hospitals and create a warm, inviting environment.

Page designers intentionally avoided the cold, clinical feel of typical hospitals by using materials throughout the building that are very natural, warm, and inviting such as wood and limestone. Inspiration was taken from the natural beauty and features of the area by utilizing local stone and precast stone in colors seen across the sedimentation of the Central Texas Hill Country. These materials created a strong sense of regionalism and were balanced with materials containing high recycled content that helped to create a healthy, healing environment.

The exterior of the building is a combination of limestone veneer and precast concrete panels, which visually anchor the building to the site. At the front entrance, beautiful porcelain tiles were used with a color palette very similar to Texas limestone. This theme was carried inside with porcelain tiles in the same color family.

When you finish this article online you will be able read more about the Lakeway Regional Medical Center project and how color and surface materials can be used in a healthcare setting. Now let's explore another case study at Sentara Leigh Hospital where an innovative new solid surface material is being used in a clinical trial.



Over 8,000 square feet of interventional, biocidal surfaces were installed at Sentara Leigh Hospital, along with its use in all over-bed tables and patient bed rails. Photo Courtesy of EOS Surfaces and Charlie Gunter Photography.

Learning Objective Two—Discuss how an innovative new solid surface material may combat the spread of pathogens through a 99.9% reduction in bacteria* within two hours of exposure, even after recontamination.

USE OF BIOCIDAL, COPPER OXIDE-INFUSED SOLID SURFACES AT SENTARA LEIGH HOSPITAL, NORFOLK, VA

Hospital acquired infections (HAIs) such as MRSA, staph, ventilator associated pneumonia, central line-associated blood stream infections and urinary tract infections are on the rise throughout healthcare facilities nationwide. In a recently launched clinical trial, a groundbreaking new solid surface material is being applied and tested for its efficacy in combatting the spread of pathogens known to contribute to such HAIs. The clinical setting is a brand new, 129-bed tower at Sentara Leigh Hospital in Norfolk, VA, part of a family of 11 not-for-profit Sentara hospitals located throughout Virginia and North Carolina. The innovative products being tested are the first synthetic hard surfaces with EPA Registered Public Health Claims—copper oxide-infused solid surfaces that have been proven to kill bacteria* within two hours of exposure. Over 8,000 square feet of these interventional, biocidal surfaces were installed in the tower, along with its use in all of the over-bed tables and patient bed rails.

This comprehensive program is believed to be the world's largest hospital evaluation to date of biocidal materials, with the goal of assessing the

magnitude of their impact against pathogens that are known to contribute to healthcare associated infections. The biocidal copper oxide-infused surfaces (as well as copper-infused textiles, including all patient gowns, sheets, towels, and pillow cases) will be evaluated to assess the potential improvement of patient outcomes and the reduction of healthcare costs.

HOSPITAL ACQUIRED INFECTIONS PRESENT AN IMMINENT NEED

Despite aggressive monitoring, hand-washing campaigns and other infection control measures, HAI rates, especially those caused by antibiotic-resistant pathogens, are unacceptably high not only in the United States, but worldwide. The drug-resistant Gram-negative bacteria threatens hospitalized patients whose immune systems are weak; the bacteria can survive for a long time on surfaces in the hospital and enter the body through wounds, catheters, and ventilators. Hospital acquired infections caused by this bacteria, such as Methicillin-resistant *Staphylococcus aureus* (staph), Methicillin resistant *Staphylococcus aureus* (MRSA), or *Escherichia coli* (E. coli), are a significant global issue.

The Centers for Disease Control and Prevention (CDC) estimates that in the United States, HAIs account for nearly 1.7 million infections and 100,000 deaths each year. A 2009 CDC study estimates the annual direct costs of HAIs to be between \$35.7 billion and \$45 billion. Killing bacteria on frequently touched surfaces can play an important role in managing risks associated with microbial control. It is anticipated that the use of biocidal, copper oxide-infused surfaces will make a significant difference in reducing the bioburden in healthcare facilities and could become a standard of care for the industry.



The platform technology infused into this surface is a proprietary copper oxide technology originally developed by Israeli scientists focused on integrating copper into linens to harness the benefits of copper's natural, biocidal properties. Photo Courtesy of EOS Surfaces and Charlie Gunter Photography.

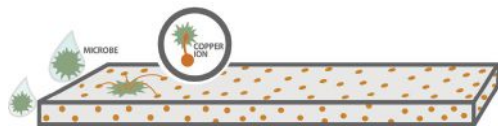
THE BENEFITS OF COPPER

Copper is an essential nutrient in the human body and has been used for health, wellness, and biocidal purposes for thousands of years, dating back to the ancient Egyptians, Romans, and Aztecs. Copper plays an important role in the healthy function of many systems and organs within the body, including the nervous and immune systems, and the heart, brain, and skin. In the medical arena, researchers have also documented copper's value in stimulating the production of hemoglobin (red blood cells), collagen and other key proteins that help stabilize skin layers, promoting wound healing.

Copper is biocidal and effectively kills a broad spectrum of microbes through their exposure to copper ions. The copper ions use a multi-targeted mode of attack to deactivate microbes; they damage the microbe membrane cell wall, damage microbe genetic material (RNA & DNA), and damage microbe proteins. This multi-targeted attack results in rapid cell death in a matter of minutes. In addition, copper alloy surfaces contain an almost unlimited source of high concentration copper and are not selective in their kill, making biocidal resistance highly unlikely. This is opposed to antibiotics, which are typically designed to be selective and to inhibit the growth of targeted bacteria, but not the cells in the body.

The platform technology infused into the surface is a proprietary copper oxide technology owned by Cupron, Inc. that was originally developed by Israeli scientists who were focused on integrating copper into linens to harness the benefits of copper's natural, biocidal properties. They found that copper, and particularly in its oxidized state (referred to as cuprous oxide), provided the best combination of effectiveness and durability that they were seeking. They also discovered a new method for embedding the copper oxide-infused polymers into a wide variety of materials during manufacturing. This transforms the material into a biocidal product that protects against a broad range of microorganisms such as bacteria and fungi. In textiles, for example, the microscopic oxide particles are polymerized into nylon and polyester fibers so that they are woven throughout the matrix of the material, rather than just acting as a surface coating.

Copper is biocidal and effectively kills a broad spectrum of microbes through their exposure to copper ions.



Each sheet of the material is infused all the way throughout the product with the proprietary technology, making the power and effectiveness of the copper indefinite; it cannot be worn off or become less effective over time. Image courtesy of EOS Surfaces.

MODIFYING CUPRON TECHNOLOGY FOR SOLID SURFACE PRODUCTS

A solid surface manufacturer in the U.S. learned of this cuprous oxide derivative technology and felt it could be altered and chemically modified to work in hard surfaces and other hard plastics. The scientists allowed the manufacturer to dive straight into research and development to determine if the product could be polymerized into a hard surface and still work mechanically without sacrificing the efficacy of the technology. Through extensive R&D, the partnership determined that the technology was in fact a viable biocidal technology for touch surfaces and advanced product protection through active reduction of bioburden.

Thus was born the solid surface industry's first EPA-registered, copper oxide-infused hard surface that is approved to make public health claims regarding its biocidal capabilities. The scientists and manufacturer are now working together to address significant healthcare issues by integrating the proven biocidal protection of copper into a wide range of healthcare and consumer applications. They are working within the medical marketplace on projects designed to help reduce HAIs and their related costs in healthcare facilities and improve the healing and quality of life for patients.

Biocidal, copper oxide-infused solid surfaces are a non-porous, fully tested surfacing material with all the inherent benefits of solid surface such as integral bowls and backsplashes and virtually seamless applications, all with the added biocidal benefits of copper. Each sheet of the material is infused all the way throughout the product with the proprietary technology—visible on all exposed surfaces. Hence, no matter where the sheet is cut, or what part of the sheet is exposed, the technology is present in equal concentration and dispersion to continuously kill bacteria on the surface, reducing the bioburden of the environment.

The technology is not a film or liquid chemical application. In fact, the particulate within the solid surface slabs can actually be seen by the human eye. The mixture of the copper oxide technology into the solid surface makes the power and effectiveness of the copper indefinite; it cannot be worn off or become less effective over time.

QUIZ

- What was the biggest design challenge at Lakeway Regional Medical Center?
 - Hospital administration
 - Budget
 - Site
- What is a benefit of the sunken garden used at Lakeway Regional Medical Center?
 - Brings daylight to lower levels
 - Creates natural views
 - Aids in wayfinding
 - All of the above
- Warm, hospitable colors were employed throughout Lakeway Regional through a mixture of what surfaces? Choose all that apply:
 - Stone
 - Glass
 - Solid surface
 - Wood veneer
 - Laminate
- True or False: Laminate was typically specified in areas with constant activity and interaction such as nurse stations and patient rooms.
 - True
 - False
- True or False: Laminates are more durable and less expensive than veneers.
 - True
 - False
- What is the primary element used in biocidal solid surface products?
 - Mercury
 - Lead
 - Copper
 - Silver
- The CDC estimates that in the United States, HAIs account for nearly _____ infections and 100,000 deaths each year.
 - 2 million
 - 1.7 million
 - 5 billion
 - 2,000
- EPA testing determined that the registered biocidal solid surface material kills greater than _____ of Gram-negative and Gram-positive bacteria within two hours of exposure even after recontamination.
 - 50%
 - 100%
 - 75%
 - 99.9%
- Biocidal solid surface can be used in which of the following surfaces?
 - Countertops
 - Bed rails
 - Sinks
 - Nurse stations
 - All of the above
- True or False: The biocidal solid surface has copper imbedded throughout the material so it can be manipulated (sanded, cut, etc.) without losing its efficacy.
 - True
 - False



Visit <http://go.hw.net/AR914Course2> to read more and complete the quiz for credit.

SPONSOR INFORMATION



Wilsonart is one of the world's leading manufacturers and distributors of high pressure laminates and other engineered surfaces used in furniture, office and retail space, countertops, worktops, and other applications. The company has achieved success through a combination of outstanding service, high-quality products, and a focus on continuously redefining the laminate surface through improved performance and aesthetics.



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CENTER



Business **The Architect 50: Which Firms Rose to the Top?** 70

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A worktable in the Oakland, Calif., studio of Rael San Fratello, a firm that is deeply invested in materials research.

THE ARCHITECT



Text by **Eric Wills** and **Elizabeth Evitts Dickinson**

EVERY YEAR, we approach the ARCHITECT 50 with the same premise. It may be impossible to capture every way in which a firm can excel, have a significant impact on its community, mentor a younger generation of designers, and help save the planet with its energy-efficient buildings. But we nevertheless strive to compile a list that recognizes firms small and large, who are making their mark beyond just their ability to run a financially lucrative business. This year, we added a few new data points, capturing information on how firms are helping their interns gain licensure, both through financial incentives and culture. And we asked

firms to submit a portfolio with an energy-efficient project that best exemplified their commitment to sustainability (ARCHITECT editors judged those submissions). When we ran the numbers (check out our methodology on page 84), some familiar firms rose to the top (Westlake Reed Leskosky), some newcomers rocketed into the top 10 (Studio Gang Architects), and some unexpected interlopers crashed the proceedings (Jones Studio). In the end, the exact positions may not capture the full extent of how firms are excelling. But we hope that the list inspires architects to review their own best practices and embrace even higher ambitions.

OVERALL

“YOU CAN’T GET TO TECHNICALLY EXCELLENT SOLUTIONS WITHOUT A PHENOMENAL AMOUNT OF RESEARCH.” —PAUL E. WESTLAKE JR.

01 WESTLAKE REED LESKOSKY

Cleveland, Ohio | ••• | \$\$\$
OVERALL SCORE: 300.00



1ST
4TH
5TH

Few firms have the distinction of reaching the century mark, but Westlake Reed Leskosky, founded in 1905, has not only survived, it has thrived. The key to that success, says managing principal Paul E. Westlake Jr., FAIA, was a decision to focus the firm’s portfolio while diversifying its services. “For the first 92 years, we were a Cleveland-based, architecture-only firm with a diverse practice,” says Westlake. “We would respond to any opportunity.”

In 1997, that changed. First, the firm assessed its portfolio to determine “where we might be differentiated, in terms of our talents and our profitability,” Westlake says. It decided to focus on performing and cultural arts centers, historic preservation, healthcare, and workplace environments.

Then, the firm diversified its geography by opening new offices in cities like Phoenix, while also expanding in-house expertise to include things like engineering and building modeling services. Today, the firm provides an integrated design approach within its core areas of expertise. “Our philosophy was to get away from the patriarchy of architecture and to embrace the idea that all disciplines

are important,” Westlake says. “When we do a performing arts project now, we do the architecture, plumbing, IP data, lighting, acoustics, engineering ... we do everything.”

This expertise is bolstered by a strong commitment to research. Sixty percent of profits went back into research in 2013, helping to support highly technical projects like the \$15 million Wayne N. Aspinall Federal Building and U.S. Courthouse modernization project in Grand Junction, Colo., which became the General Services Administration’s first net-zero energy facility on the National Register of Historic Places and achieved LEED-NC Platinum. “You can’t get to technically excellent solutions without a phenomenal amount of research,” Westlake says.

Equally important to the sustainability of its portfolio is the sustainability of its workforce. Associates get an automatic 10 percent salary bump upon licensure, and every employee has a clear, five-year growth plan. “They love that they can look ahead and it’s not a mystery how they are going to grow in the firm,” Westlake says. “The most important assets of any firm are the people.” E.E.D.

LEGEND

EMPLOYEES

- 1–10
- 11–99
- 100–499
- 500–999
- 1,000+

GROSS REVENUE

- \$ Less than 999,999
- \$\$ 1–9.9 million
- \$\$\$ 10–99.9 million
- \$\$\$\$ 100–999.9 million
- \$\$\$\$\$ 1 billion+

RANK IN EACH CATEGORY

- Business
- Design
- Sustainability

TOP 10 BIGGEST MOVERS

FIRST TIME MAKING THE TOP 50

02

William Rawn Associates

Boston | •• | \$\$\$
OVERALL SCORE: 288.95



4TH
27TH
2ND

This year, 2009’s top firm had one of the highest net-revenue-per-employee numbers with a portfolio that included Tata Hall at the Harvard Business School. The firm designed 92% of its projects using energy modeling.

03

Gensler

San Francisco | ••••• | \$\$\$\$
OVERALL SCORE: 277.44



6TH
19TH
4TH

Gensler invested 13.2% of its profits in research and collected energy data for 92% of the gross square footage of its projects from 2012 and 2013. “The challenges of creating fresh, human-scaled forms and site responses for multiple hundred-thousand-square-foot projects is daunting,” said the design judges. “But this team seemed to stay on task in getting them right.”

04

20 PLACES

ZGF Architects

Portland, Ore. | ••• | \$\$\$\$
OVERALL SCORE: 262.28



9TH
23RD
9TH

ZGF bolstered its business rank by dedicating 3% of its billable hours to pro bono work, and shined in the sustainability category with its 44,607-square-foot J. Craig Venter Institute in La Jolla, Calif., designed to achieve net-zero energy.

05

EYP Architecture & Engineering

New Brunswick, N.J. | ••• | \$\$\$
OVERALL SCORE: 261.30



10TH
81ST
1ST

EYP was the top firm in the sustainability category (see page 76) and boasted a 20% increase in net revenue as well as a strong research portfolio, which helped it move up eight spots from last year.

06

Adrian Smith + Gordon Gill Architecture

Chicago | •• | \$\$\$

OVERALL SCORE: 257.96



Adrian Smith + Gordon Gill increased its net revenue by 27% and exhibited "design innovation in projects across the globe of varying scales and budgets," said the design judges. "Elegant and high-performance curtainwalls that have strong identity at the scale of the city, in the interior atmosphere of the building, and at the scale of the detail."

07 +

Brooks + Scarpa Architects

Los Angeles | •• | \$\$

OVERALL SCORE: 254.19



Just 14 employees large, Brooks + Scarpa debuted on the list with a strong performance in sustainability (95% of the firm's projects were designed using energy modeling and daylighting studies) as well as design. "Good use of kit-of-parts architectural elements to create new and surprising atmospheres," said the design judges.

08 +

Studio Gang Architects

Chicago | •• | \$\$\$

OVERALL SCORE: 246.55



A notable debut, Studio Gang scored high in sustainability with its Living Building Challenge—certified remodel of the Midwest Office for the Natural Resources Defense Council in Chicago. "Refreshing and innovative, combining new tools and technologies with fresh forms," said the design judges. "In every case, the problem that was refined by the design team to be solved was as interesting as the solution itself."

09

Payette

Boston | ••• | \$\$\$

OVERALL SCORE: 246.31



Sixty-six percent of Payette's 144 employees are LEED accredited professionals, but the firm really shined with its design portfolio. "Elegant handling of large-scale institutional buildings with structural innovation and distinguished curtainwall resolution," said the judges.

10

Mark Cavagnero Associates

San Francisco | •• | \$\$

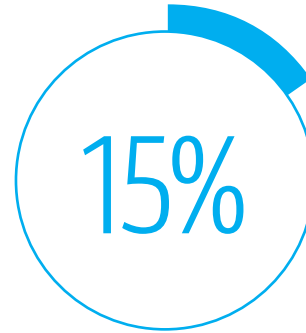
OVERALL SCORE: 244.59



Mark Cavagnero improved on its 29th place finish last year thanks to strong financials and its design portfolio. "Clear architectural elements distilled to elegant solutions that timelessly engage historic buildings and contemporary urban settings," said the judges. "The thoughtful syncopation structure envelope and interior construction contributed to an engaging rhythm—perhaps most evident in the San Francisco Jazz Center."

BUSINESS

01 WESTLAKE REED LESKOSKY 1ST OVERALL

BILLABLE HOURS
DEDICATED TO
PRO BONO WORK

11

Lake|Flato Architects

San Antonio | •• | \$\$\$

OVERALL SCORE: 242.01



Lake|Flato repeated its strong showing from last year (10th) with a design portfolio that exhibited "a mastery of light and shadow," the judges said. "The design team was thinking beyond material gesture to an expansive interplay of controlled form in many states: solid and negative, transparent and dynamic."

12

Skidmore, Owings & Merrill

New York | ••••• | \$\$\$\$

OVERALL SCORE: 241.56



SOM bolstered its business ranking with a healthy research portfolio, including its Timber Tower project. "Large-scale work with thoughtful attention to detail, which gives architectural identity that mediates between the urban scale and that of specific spaces in the city," said the design judges.

13 ↻ 55 PLACES

Ikon.5 Architects

Princeton, N.J. | •• | \$\$

OVERALL SCORE: 237.41



Ikon.5 Architects missed the cut last year but rocketed onto the list thanks mainly to the strength of its design portfolio. "Clear and elegant design solutions harnessing structure, material, and light towards singular timeless work, on relatively tight budgets," said the judges.

14

The Miller Hull Partnership

Seattle | •• | \$\$\$

OVERALL SCORE: 235.67



Miller Hull's commitment to sustainability is exemplified by its Bullitt Center in Seattle, which is using 75% less energy than a similar building constructed to Seattle's codes. Initial data suggest the center will be net-positive.

02 HDR 19TH OVERALL

AVERAGE SALARY INCREASE
UPON LICENSURE

03 SPECTOR GROUP 40TH OVERALL

NET REVENUE INCREASE
FROM 2012

04 WILLIAM RAWN ASSOCIATES 2ND OVERALL

NET REVENUE INCREASE
FROM 2012

05 GOOD FULTON & FARRELL 83ND OVERALL

AVERAGE SALARY INCREASE
UPON LICENSURE

15**HOK**

St. Louis | ••••• | \$\$\$\$

OVERALL SCORE: 233.75



HOK offers a 10% salary bump upon licensure. The firm's commitment to sustainability (60% of staff are LEED accredited professionals) was illustrated by its National Oceanic and Atmospheric Administration center in Pearl Harbor, Hawaii, which is expected to earn LEED Gold.

16**Eskew+Dumez+Ripple**

New Orleans | •• | \$\$

OVERALL SCORE: 233.47



A 2011–2014 Intern Development Program Outstanding Firm Award winner, Eskew+Dumez+Ripple impressed the design judges: "Every project seemed to be infused with a sense of effortlessness—forms and site responses that were inspired straightforward, and respectful of place while not being overly precious."

17**Leddy Maytum Stacy Architects**

San Francisco | •• | \$\$

OVERALL SCORE: 227.63



Leddy Maytum Stacy shined in sustainability: 57% of employees are LEED accredited professionals, and the firm collected energy data for all of its projects from 2012 and 2013. Its Rene Cazenave apartment building in San Francisco, designed for the formerly homeless, is expected to perform 29% better than California code.

18 ↻ 62 PLACES**HGA**

Minneapolis | •••• | \$\$\$\$

OVERALL SCORE: 226.12



After missing the list last year, HGA zipped into the Top 20 thanks to its strong financials and sustainable credentials, bolstered by the Los Angeles Harbor College Science Complex in Wilmington, Calif., which is expected to earn LEED Platinum.

19 ↻ 30 PLACES**HDR**

Omaha, Neb. | ••••• | \$\$\$\$

OVERALL SCORE: 222.03



Healthcare specialist HDR had a strong 2013, with a 20% increase in net revenue. The firm invested a healthy 10% of profits in research, investigating how new legislation is affecting the delivery of healthcare as well as pursuing evidence-based design.

20**Perkins+Will**

New York | ••••• | \$\$\$\$

OVERALL SCORE: 221.67



Perkins+Will invested 10% of its profits in research and demonstrated a solid commitment to sustainability: 53% of staff are LEED accredited professionals and the firm collected energy data for 38% of the gross square footage of its projects from 2012 and 2013.

DESIGN

01 NADAAA 25TH OVERALL

For the second year in a row, NADAAA has captured the top slot for design. Once again, the design jury noted the firm's command over a diverse range of typologies and geographies, regardless of whether it's a \$90 million school of architecture that just opened in Australia or an elegant private home sited amid olive groves in France. The judges hailed the firm's "strong handling of materials and structural form to shape light and connect to each site."

Research, says principal Dan Gallagher, AIA, underscores the firm's design ethos and allows for success within its breadth of projects. "At the base of all of our work, regardless of scale and location, is the rigorous analysis of place, of material, of program, of structure, of orientation," he says. "This makes us less of a conventional firm, perhaps, in that we don't specialize in one type of project. Rather, it is the rigor of our process that carries through. And that can manifest itself in different programs."

To support its iterative design process, NADAAA has added an in-house shop that allows for prototyping, modeling, and even fabricating custom elements for projects. This



allows the architects to test unusual forms and materials and to prove feasibility to clients and construction professionals, bridging the gulf that can exist between rendering and reality. "There are all of these other pieces that go into design: client management, execution,

the place between the beautiful rendering and actually getting something built," says principal Katherine Faulkner, AIA. "We consider that to be a part of the design process as well. We are quite muscular on the delivery end." E.E.D.

COURTESY NADAAA

21 +

Jones Studio

Phoenix | •• | \$\$\$

OVERALL SCORE: 220.95



With 13 employees, Jones Studio debuts on the list thanks to its green credentials. The firm's Mariposa Land Port of Entry in Nogales, Ariz., which features an extensive rainwater collection system, was designed to achieve LEED Platinum.

22

CO Architects

Los Angeles | •• | \$\$\$

OVERALL SCORE: 220.73



CO Architects' Collaborative Life Sciences Building and Skourtes Tower in Portland, Ore., is seeking to achieve LEED Platinum. All of the firm's projects in 2013 were designed using energy modeling.

23

NBBJ

Seattle | •••• | \$\$\$\$

OVERALL SCORE: 219.91



NBBJ had a 14% increase in net revenue from 2012 and offers a 5% salary increase upon licensure. The firm's design portfolio, which includes the Rupp Arena renovation in Lexington, Ky., and an Amazon office complex in Seattle, received high marks from the judges.

24

ELS Architecture and Urban Design

Berkeley, Calif. | •• | \$\$\$

OVERALL SCORE: 219.88



ELS makes a nice jump in the rankings from last year (42nd) thanks to a 20% increase in net revenue. The firm's emphasis on high-performance design is reflected by the numbers: 80% of its projects were designed using energy modeling, and the firm collected energy data on 80% of the gross square footage of its projects from 2012 and 2013.

25 + 50 PLACES

NADAAA

Boston | •• | \$\$\$

OVERALL SCORE: 219.84



Repeat design category-winner NADAAA was a big mover, making the overall Top 50 for the first time (see above).

26 +

Behnisch Architekten

New York | ••• | \$\$\$\$

OVERALL SCORE: 218.97



Behnisch debuts on the list thanks to its strong design portfolio. "A coherent body of work across a variety of scales that masters light, color, and movement to weave buildings into their site," said the judges. "The firm works globally but captures the local atmosphere of each place."

02 BEHNISCH ARCHITEKTEN 26TH OVERALLCity of Santa Monica
Parking Structure**03 PAYETTE 9TH OVERALL**Pennsylvania State University, Eva J. Pell
Laboratory for Advanced Biological Studies**04 WESTLAKE REED LESKOSKY 1ST OVERALL**

Visitor Research and Training Center

05 SKIDMORE, OWINGS & MERRILL 12TH OVERALL

Denver Union Station

CLOCKWISE FROM TOP LEFT: DAVID MATTHIESSEN FOR BEHNISCH ARCHITEKTEN; WARREN JACGER PHOTOGRAPHY; ROBERT POLIDORI, COURTESY WESTLAKE REED LESKOSKY

27 ↻ 21 PLACES**Ann Beha Architects**

Boston | •• | \$\$\$

OVERALL SCORE: 218.80



Ann Beha's shot up 21 spots thanks to marked improvement in its sustainability ranking: 54% of the staff are LEED accredited professionals and 80% of projects were designed using energy modeling. The firm was selected to renovate the Walter Gropius–designed U.S. embassy in Athens, Greece.

28**FXFowle Architects**

New York | ••• | \$\$\$

OVERALL SCORE: 217.19



FXFowle made a nice jump (16 spots) with a portfolio that had an "impressive and ambitious selection of projects," said the judges. "Not necessarily a consistent pursuit of a design agenda, but consistent in architectural ambition."

29 ↻ 57 PLACES**BNIM**

Kansas City, Mo. | •• | \$\$\$

OVERALL SCORE: 216.47



After missing the cut last year, BNIM had a strong year: 93% of the firm's projects were designed using energy modeling and daylighting studies, and its LEED Platinum Bancroft School Redevelopment project in Kansas City is bringing affordable housing to a revitalizing neighborhood.

30 +**Hastings Architecture Associates**

Nashville, Tenn. | •• | \$\$

OVERALL SCORE: 216.18



Smaller firm Hastings debuted on the list thanks to a 22% increase in net revenue and a portfolio that featured the LEED Platinum Bridge Building renovation/addition project in Nashville.

31 +**Sorg Architects**

Washington, D.C. | •• | \$\$\$

OVERALL SCORE: 215.04



Sorg debuted on the list with strong financials and sustainability credentials: 95% of the firm's projects were designed using energy modeling, including the LEED Silver Southern Regional Technology and Recreation Complex in Fort Washington, Md.

32**LPA**

Irvine, Calif. | ••• | \$\$\$

OVERALL SCORE: 214.50



LPA witnessed a 14.5% increase in net revenue and shined in sustainability: 80% of the firm's projects were designed using energy modeling and pursued a potable water-use reduction beyond what was mandated by code.

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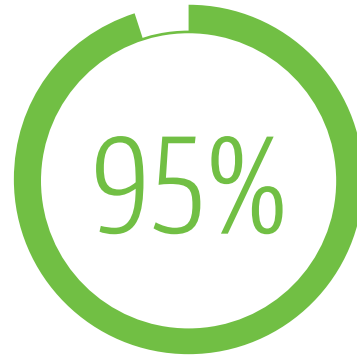
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CENTER

SUSTAINABILITY

01 EYP ARCHITECTURE & ENGINEERING 5TH OVERALL



GROSS SQUARE FOOTAGE DESIGNED USING ENERGY MODELING

Two years ago, EYP made a move to become a leader in high-performance buildings. The firm—founded in Albany, N.Y., in 1972, and now encompassing 375 employees in 12 offices—had a history of energy efficiency, both with its portfolio and in its own offices. But the firm wanted to make that commitment global. “We decided that our vision would be for every building to become a high-performance building from an energy perspective,” says president and CEO Tom Birdsey, AIA.

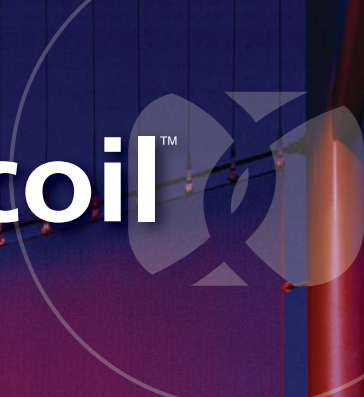
To that end, in 2012, EYP merged with The Weidt Group, a company offering analysis and energy modeling using proprietary software. Today, the company consults on every EYP project. “We begin with pre-design modeling,” says David Eijadi, FAIA, principal at The Weidt Group. “We can build accurate enough models so that we can do immediate comparisons and get a project to net zero or to meet the [AIA’s] 2030 challenge. Then, as the design team and

the client develop more real information, our models evolve and allow them to continue to make even more refined decisions. Going through this process helps designers and owners make improved decisions.”

And it helps to save clients money, such as the more than \$1.3 million in rebates that EYP’s client Trinity University, which is in San Antonio, received from its municipally owned energy utility.

EYP did daylighting studies for all of its projects in 2013, pursued a potable-water-use reduction for 95 percent of the gross square footage, and also collected energy data for 75 percent of its online projects for the last two years. “We now put into our specifications a requirement for metering devices and other technology in the building not just to reduce energy, but to make it easier for us to measure and have benchmarks for understanding that energy reduction,” Birdsey says. E.E.D.

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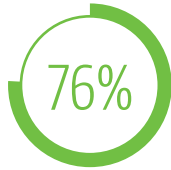
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02 WILLIAM RAWN ASSOCIATES
2ND OVERALL



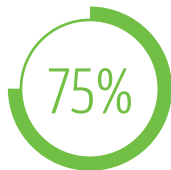
STAFF THAT ARE LEED ACCREDITED PROFESSIONALS

03 LEDDY MAYTUM STACY ARCHITECTS 17TH OVERALL



PROJECTS DESIGNED USING DAYLIGHTING STUDIES

04 GENSLER 3RD OVERALL

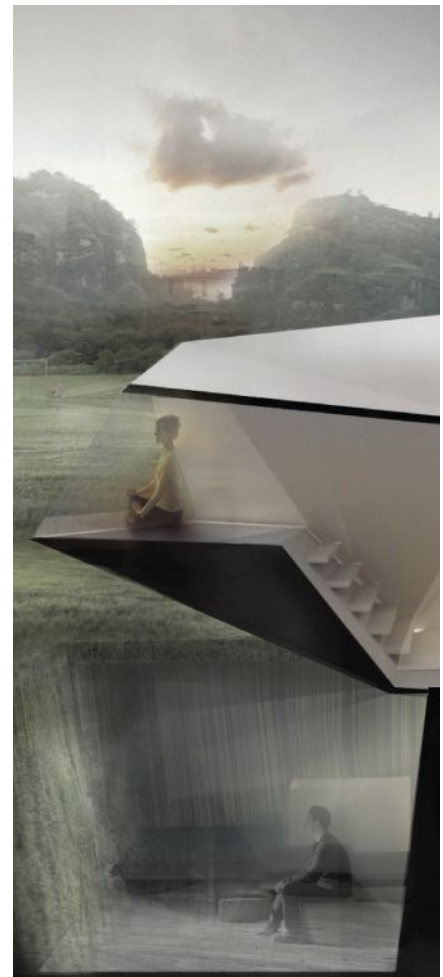


2012 AND 2013 PROJECTS FOR WHICH ENERGY DATA HAVE BEEN COLLECTED

05 WESTLAKE REED LESKOSKY 1ST OVERALL



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33 Meyer, Scherer & Rockcastle

Minneapolis | •• | \$\$\$
OVERALL SCORE: 213.66



Meyer, Scherer & Rockcastle moved up 10 spots from last year with its portfolio of libraries (Tulsa City–County Central in Oklahoma, Madison Central in Wisconsin) and adaptive use projects (Urban Outfitters Building 14 in Philadelphia, Riverfront Loft in Minneapolis).

34 Kohn Pedersen Fox

New York | •••• | \$\$\$\$
OVERALL SCORE: 211.53



KPF boasted an 11.7% increase in net revenue thanks to an international portfolio (the Abu Dhabi International Airport Midfield Complex, a master plan for Accra, Ghana) as well as a few projects closer to home, including the Hudson Yards Master Plan and the proposed One Vanderbilt tower in Midtown.

35 SmithGroupJJR

Dearborn, Mich. | ••••• | \$\$\$\$
OVERALL SCORE: 210.50



SmithGroupJJR's portfolio showed a solid commitment to sustainability: the U.S. Department of Energy's National Renewable Energy Laboratory's systems integration facility in Golden, Colo., achieved LEED Platinum, and the Lawrence Berkeley National Laboratory's Solar Energy Research Center in Berkeley, Calif., is expected to earn LEED Gold.

36 26 PLACES
Centerbrook Architects and Planners

Centerbrook, Conn. | •• | \$\$\$\$
OVERALL SCORE: 206.37



Centerbrook had a 10% increase in net revenue and featured a portfolio that included a biomass heating facility for the Hotchkiss School in Lakeville, Conn., part of the institution's effort to become a carbon-neutral campus.

37 +

Marlene Imirzian & Associates Architects

Phoenix | • | \$\$

OVERALL SCORE: 204.90



Eight-person firm Marlene Imirzian excelled with a portfolio of smaller-budget and sustainably minded projects, including a Girl Scouts Leadership Center in Phoenix.

38 +

Kirksey

Houston | ••• | \$\$\$

OVERALL SCORE: 204.72



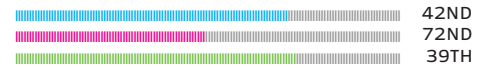
Kirksey debuts on the list after experiencing a 65% increase in net revenue. Its portfolio included a series of Houston office buildings expected to earn LEED Gold.

39

DLR Group

Overland Park, Kan. | •••• | \$\$\$\$

OVERALL SCORE: 203.89



2012 overall top firm DLR Group achieved net-zero energy, water, and waste with its MUSE school renovation project in Calabasas, Calif.

40

Spector Group

Woodbury, N.Y. | •• | \$\$\$

OVERALL SCORE: 203.63



The Spector Group boasted one of the top net-revenue-per-employee numbers, offers a 10% salary increase upon licensure, and impressed the design judges with a portfolio that showed a "wide range of skill and ambition."

41

LMN Architects

Seattle | ••• | \$\$\$

OVERALL SCORE: 202.40



LMN will conduct post-occupancy studies to ensure that its Stone34 office building in Seattle—designed to reduce energy and water consumption 75% from baseline, and expected to earn LEED Platinum—is meeting energy targets.

42

Clark Nexsen

Virginia Beach, Va. | ••• | \$\$\$

OVERALL SCORE: 201.52



Clark Nexsen used energy modeling to design 92% of its projects, which included the Terminal 1 renovation at the Raleigh-Durham International Airport.

43

CannonDesign

Buffalo, N.Y. | •••• | \$\$\$\$

OVERALL SCORE: 201.18



CannonDesign's portfolio of higher education, healthcare, and lab projects featured the LEED Platinum San Diego State University's Conrad Prebys Aztec Student Union and the LEED Gold Indiana University Health neuroscience center.

44

Ayers Saint Gross

Baltimore, Md. | ••• | \$\$\$

OVERALL SCORE: 200.66



Ayers Saint Gross invested 10% of its profits in research related to its higher education work, such as its Interdisciplinary Science and Engineering Lab at the University of Delaware.

The Cutting Edge

Constructed for the Salt Lake City Winter Games, the Weber County Ice Sheet and Sports Complex was an effective and attractive answer to the question of stadium space. The combination of an exposed fastening roof, wall panels and flat sheets achieves a sleek, industrial presentation — perfect for an athletic center of Olympic fame.

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PROJECT: Weber County Sports Complex

LOCATION: Ogden, Utah

ARCHITECT: FFKR Architects

CONTRACTOR: All Metals Fabrication

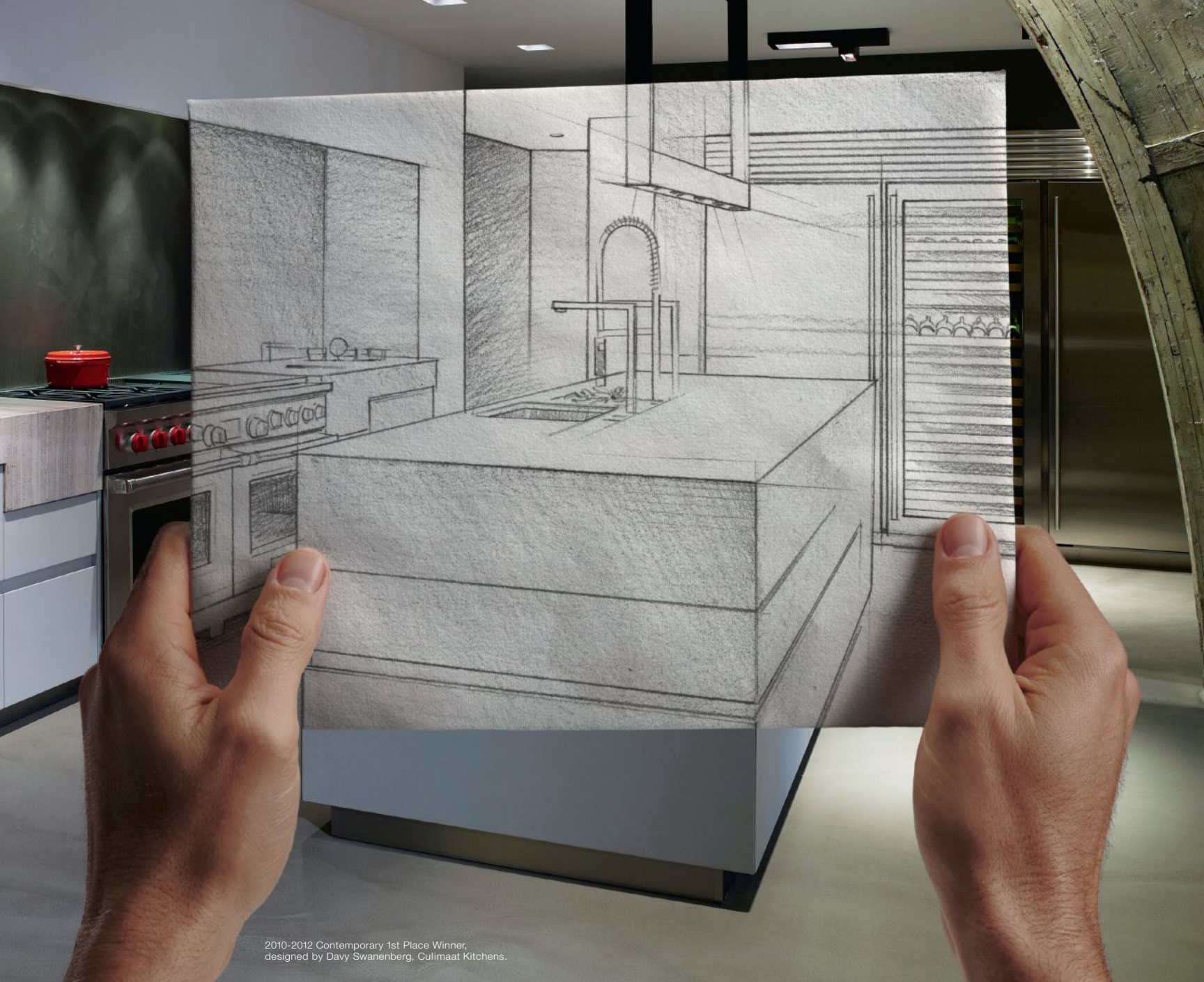
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45 +**Leers Weinzapfel Associates Architects**

Boston | •• | \$\$

OVERALL SCORE: 200.21



Leers Weinzapfel's higher education projects (including a University of North Carolina at Chapel Hill research building) demonstrated a solid commitment to sustainability.

46**Mithun**

Seattle | ••• | \$\$\$

OVERALL SCORE: 199.28

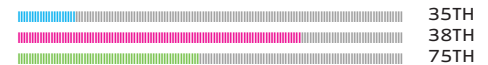


After missing the list last year, Mithun snuck on with what the judges called "an optimistic collection of can-do architecture, positive and proud."

47 +**Ziger/Snead**

Baltimore | •• | \$\$

OVERALL SCORE: 196.91



Ziger/Snead had a 16% increase in net revenue with a portfolio of local projects: the Baltimore Design School, the Under Armour Visitor Center, and the Baltimore Museum of Art renovation.

48**Ross Barney Architects**

Chicago | •• | \$\$

OVERALL SCORE: 196.55



Ross Barney offers a 10% salary increase upon licensure. Its Office Technical and Education Building at the Fermilab Illinois Accelerator Research Center is expected to achieve LEED Gold.

49 +**nArchitects**

New York | •• | \$\$

OVERALL SCORE: 195.60



nArchitects makes its debut with a portfolio that "displays clear control over new areas of practice in a fresh and innovative way, combining landscape elements, prefab, and technology," said the judges. "My Micro NY could establish a new paradigm for lower-cost housing in dense cities."

50**Ehrlich Architects**

Culver City, Calif. | •• | \$\$

OVERALL SCORE: 195.58



Ehrlich just made the cut after a strong financial year marked by a 56.8% increase in net revenue. The firm's John M. Roll U.S. Courthouse in Yuma, Ariz., was cited by the GSA Design Awards and is expected to earn LEED Gold.

DESIGN JUDGES

Florian Idenburg, Intl. Assoc. AIA, is founding partner of New York-based SO-IL. Prior to founding his office with Jing Liu, Idenburg was eight years at Pritzker laureates Kazuyo Sejima + Ryue Nishizawa/SANAA. Idenburg is an associate professor at the Harvard Graduate School of Design.

Dan Maginn, FAIA, is a principal with Kansas City, Mo.-based El Dorado. He has expertise in leading complex projects for public and private sector clients, and is adept at high-performance sustainable design. He has worked on a number of large-scale public art collaborations.

Sharon Johnston, AIA, is a founder and principal of the Los Angeles-based firm Johnston Marklee. She earned her architectural degree at the Harvard Graduate School of Design and serves on the board of the Los Angeles chapter of the American Institute of Architects.

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METHODOLOGY

ARCHITECT advertised the ARCHITECT 50 program in the magazine and on the website, and sent invitations to firms that either requested entries or that had been invited in previous years. In all, 146 firms qualified. Data was from the 2013 fiscal year and was self-reported. Projects completed or in progress during the calendar year were included. Data was checked for consistency, and outliers were fact-checked. Karlin Associates LLC, a third-party research firm based in New York City, compiled the ranking and assured the confidentiality of the data.

The ARCHITECT 50 ranking is based on scores in three separate categories:

BUSINESS

35% Net revenue per employee (counting only architecture and design-related revenue and staff)

14% The percentage of profits invested in research

19% A firm's benefits to help interns achieve licensure, including paid leave, reimbursement for test fees, and salary increase upon licensure



18% Profitability (positive change in net revenue from 2012)

14% A firm's pro bono work, measured by participation in Public Architecture's 1% program and the percentage of billable hours dedicated to pro bono

DESIGN EXCELLENCE

79% A score for a design portfolio. Three judges chosen by ARCHITECT individually and anonymously scored each portfolio to create an overall portfolio score

5% A discretionary score for the teaching positions that a firm's employees held at architecture schools



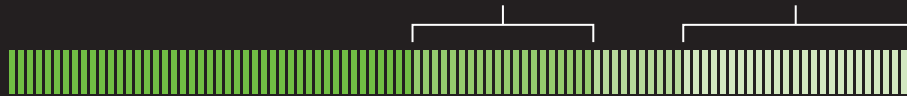
11% The category also measured design awards won, including awards granted by ARCHITECT, the AIA, ASLA, and other prominent institutions

5% The percentage of total employees who were licensed

SUSTAINABILITY

20% Participation in the AIA's 2030 Commitment program and percentage of the gross square footage of projects that were designed to 2030 standards and that were verified as meeting those standards

25% A score for a green portfolio with a project that best demonstrated a firm's commitment to sustainability (scoring by ARCHITECT magazine editors)



45% Energy and water metrics (the percentage of gross square footage of a firm's projects that pursued a potable water reduction beyond what was mandated by code or that incorporated energy modeling or daylighting studies, with additional credit given for the percentage of gross square footage for which energy data was collected in the last two years)

10% The percentage of a firm's employees with LEED AP or Green Associate credentials

Each data point in the three categories was assigned a weight, formulated after consulting with industry experts. After the scores were tabulated in each of the three categories, they were rescaled. The top ranking firm in the sustainability and the design category was assigned a score of 110, and the top firm in the business category was assigned a score of 80. The rest of the firms' scores in each of the three categories then were recalculated as a percentage of the top score. The sustainability and design categories were assigned more points than the business category to help reward firms that achieve all-around excellence beyond just profitability. Finally, a firm's scores in each of the three categories were added together to create the overall ranking. Those scores were also normalized, with the top firm given an overall total of 300, and all the other firms' scores calculated as a percentage of the top score. Each firm's performance was calculated relative to the performance of other firms. A firm with an overall score of 300, for example, did not necessarily top out on every indicator and category; it accumulated the highest composite score.



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BEST PRACTICES

FINDING SUCCESS IN SUCCESSION

AS THE BABY BOOMER GENERATION APPROACHES RETIREMENT, FIRMS SHOULD STRATEGIZE FOR SMOOTH LEADERSHIP TRANSITIONS.



Text by **Amanda Kolson Hurley**
Illustration by **Toby Neilan**



RAY KOGAN, AIA
PRESIDENT, KOGAN & COMPANY

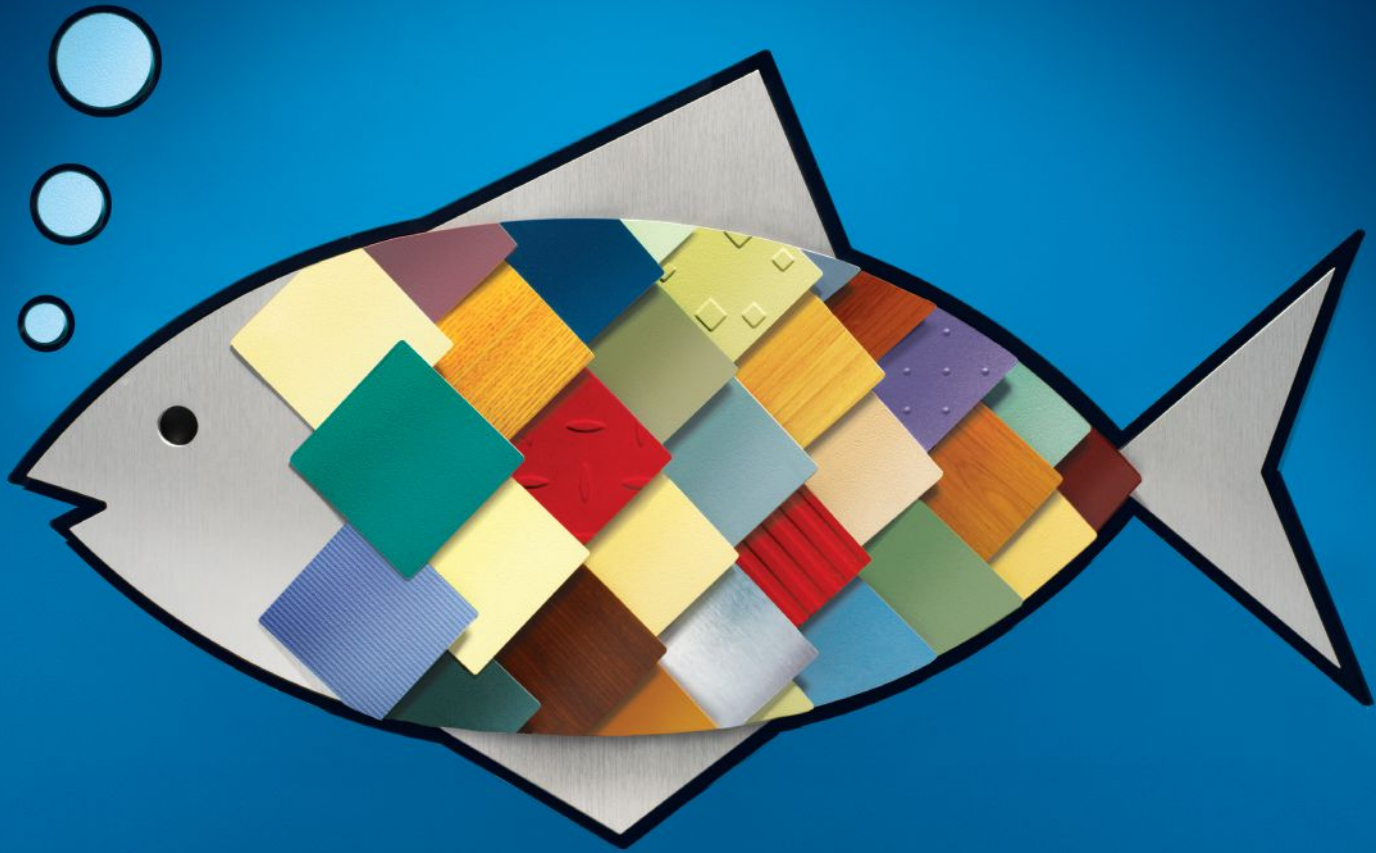
WHEN YOU OWN a design firm, “there are two exit strategies: death and quitting.” That’s what Rob Girling, co-founder of the design consultancy Artefact, recently wrote in a blog post for *Fast Company’s* Co.Design. But Girling omits the third, far more preferable strategy, which is a well-handled leadership succession.

Most firms don’t adequately prepare for succession, says Ray Kogan, AIA, president of Arlington, Va.-based consulting firm Kogan & Company. They’d better get started: In a wave of baby boomer retirements, more than a quarter-million Americans turn 65 every month. Many design industry leaders are also

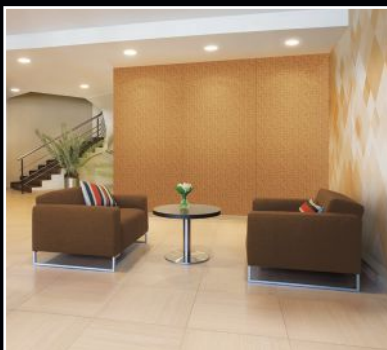
reaching that milestone (the average age of AIA members is 54). “It’s a huge, huge number of firms, and firm principals,” says Kogan, who adds that he’s been fielding more inquiries about succession from clients.

ARCHITECT talked to Kogan and three firm leaders about tips for confronting this challenging, and often delicate, process.

Start Early: “I honestly think four or five years before a key individual in the firm is planning on stepping out of their role” is the time to start talking about succession, Kogan says. Indeed, it takes years to identify and groom a potential successor, or ideally more than one. “Things happen—unpredictable things,” Kogan notes.



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ED JERDONEK, AIA
PRESIDENT,
LUCKETT & FARLEY

Mark Ripple, AIA, and his colleagues at New Orleans-based Eskew+Dumez+Ripple weathered the worst kind of unpredictable event last year, when founding partner Allen Eskew died suddenly. Ripple, a partner and the director of operations, credits Eskew's own foresightedness with enabling the firm's recovery from the loss. In 2000, Eskew expanded his sole ownership of the firm to six colleagues—including Ripple and Steve Dumez, FAIA. He worked with consultants on long-term planning and devolved many leadership duties to Dumez and Ripple. By the time of his death, "Allen was intimately involved [in the firm], but we had gone from this sole practitioner model to something much, much more diversified," Ripple says.

Groom the Next Generation to be Strategic Leaders, Not Project Managers: Firm owners, especially if they founded the business, tend not to delegate the most important or sensitive duties. They may assume no one else can maintain key client relationships or understand the finances as well as they do.

That has the effect of turning the firm's second tier of leadership into project managers, cutting them off from any strategic role. Do-it-all owners "hire managers rather than leaders," Ripple says. Instead, they should "bring in people that have contrasting skill sets that complement theirs."

Establish Good Governance: When an owner's personal identity is wrapped up with the firm, a good governance system can ensure that big decisions aren't made by a select few. Kogan says more firms are letting an involved board of directors steer them through transitions.

It's also wise to be prescriptive about the financial implications of as many scenarios as possible. A buy-sell agreement lays out all the terms for purchasing and selling shares in

the firm. Partners of Chicago-based Skidmore, Owings & Merrill (SOM), for example, agree that they will retire (and sell their shares) within the fiscal year that they turn 65. This clarifies the time frame and makes mentorship of the next generation not just desirable, but essential.

"You cannot stay. You have to leave. You can't sort of ... [run] your practice like you would if you were a sole provider," says SOM managing partner Richard F. Tomlinson II, FAIA. "Your responsibility is to mentor those you're working with."

Consider an Employee Stock Ownership Plan (ESOP): Broadening ownership is a common strategy for successions, and more firms are taking it a step further by becoming employee-owned. When Ed Jerdonek, AIA, was named president of Louisville, Ky.-based Lockett & Farley in 2005, it was partly employee-owned; the ESOP trust acquired the rest of the equity over time and now holds 100 percent of it.

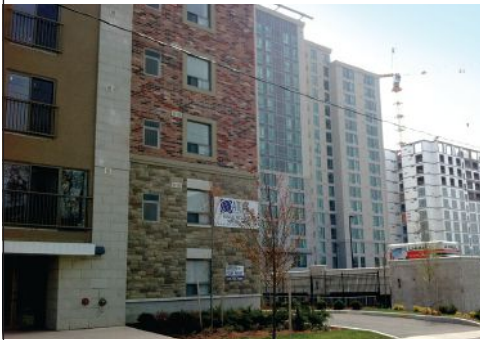
"There is no financial nut to have to crack," Jerdonek says. Any future transition will be "a pure leadership transition," since there is no ownership change. Separating leadership and ownership can avoid succession conflicts, and more holders of stock means more people have a vested interest in the firm's future.

The flip side? Unlike in a traditionally structured firm, leaders don't have to assume a lot of debt (by buying an ownership stake). Without that debt hanging over them, leaders can lose what is perhaps their greatest spur to success, Jerdonek believes.

Instead, their commitment to the firm's culture becomes key. "Culture trumps everything," Jerdonek says. "So what we need to do is to find individuals who ... can be stewards, and growers of our culture." With the next generation of leaders meeting that criterion, the future is bound to be bright.

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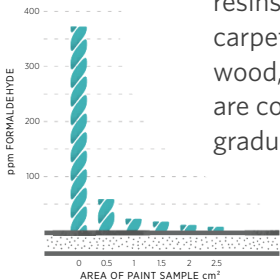
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Aldehydes are emitted from carpet and other products over time.[†]

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*Formaldehyde Reducing Technology is currently available in flat and egg-shell sheens. The length of time Harmony actively reduces odors and formaldehyde depends on the concentration, the frequency of exposure and the amount of painted surface area.

[†]Based on methods: ISO 17226 Determination of formaldehyde content in leather by High Performance Liquid Chromatography ISO 16000-3 Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air

NEXT PROGRESSIVES

MATERIAL FOCUS

OAKLAND, CALIF.—BASED RAE SAN FRATELLO BUILDS WITH POLYMERS DEVELOPED BY ITS MATERIALS COLLABORATIVE, EMERGING OBJECTS.

Text by **Alex Hoyt**

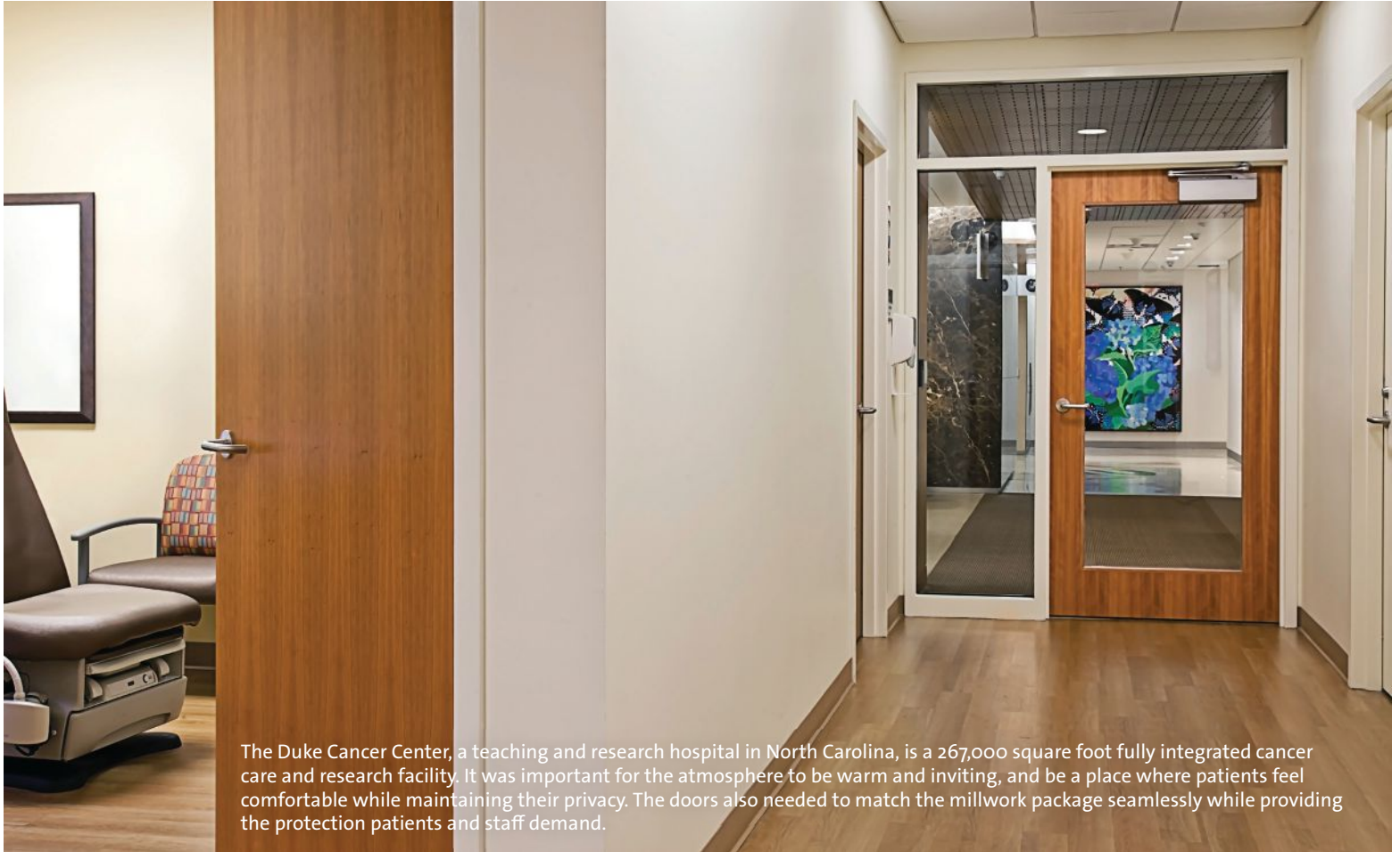
Portrait by **Andy J. Scott**

IN 1995, Virginia San Fratello and Ronald Rael were alphabetically seated next to each other in an M.Arch. class at Columbia University's Graduate School of Architecture, Planning and Preservation. Since then, they've gotten married and taught together at Clemson University's Charles E. Daniel Center for Building Research and Urban Studies in Genoa, Italy. In 2002, they also co-founded the Oakland, Calif.—based atelier Rael San Fratello, a workshop where models are often the finished product and the goal, posted on the firm's website, is "to disrupt the conventions



Partners Ronald Rael and Virginia San Fratello carry out research on 3D printing through their Emerging Objects subsidiary.

THOUGHTFUL DESIGN



The Duke Cancer Center, a teaching and research hospital in North Carolina, is a 267,000 square foot fully integrated cancer care and research facility. It was important for the atmosphere to be warm and inviting, and be a place where patients feel comfortable while maintaining their privacy. The doors also needed to match the millwork package seamlessly while providing the protection patients and staff demand.

“VT Doors were the right product for the New Duke Cancer Center. The durability, sustainability, acoustics and value aspects made the doors a top pick. In addition, VT’s commitment to service and custom solutions accommodated a variety of spaces within the design.”

Jennifer Mango, IIDA, ASID
Senior Interior Designer
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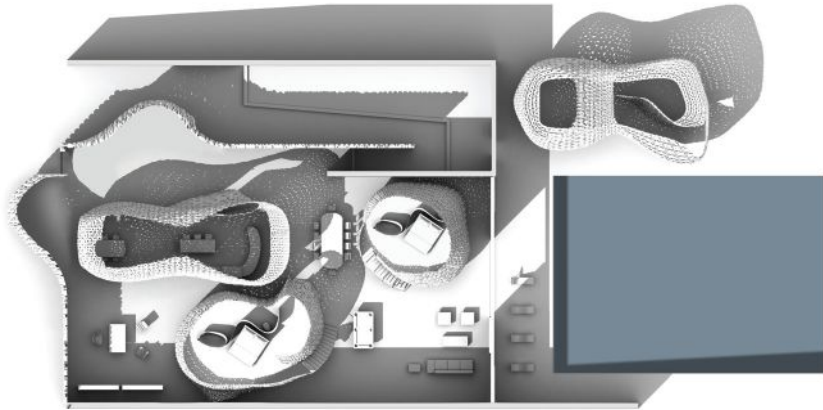
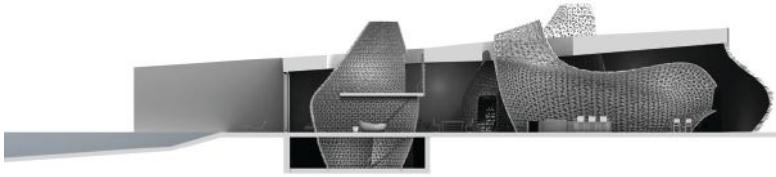
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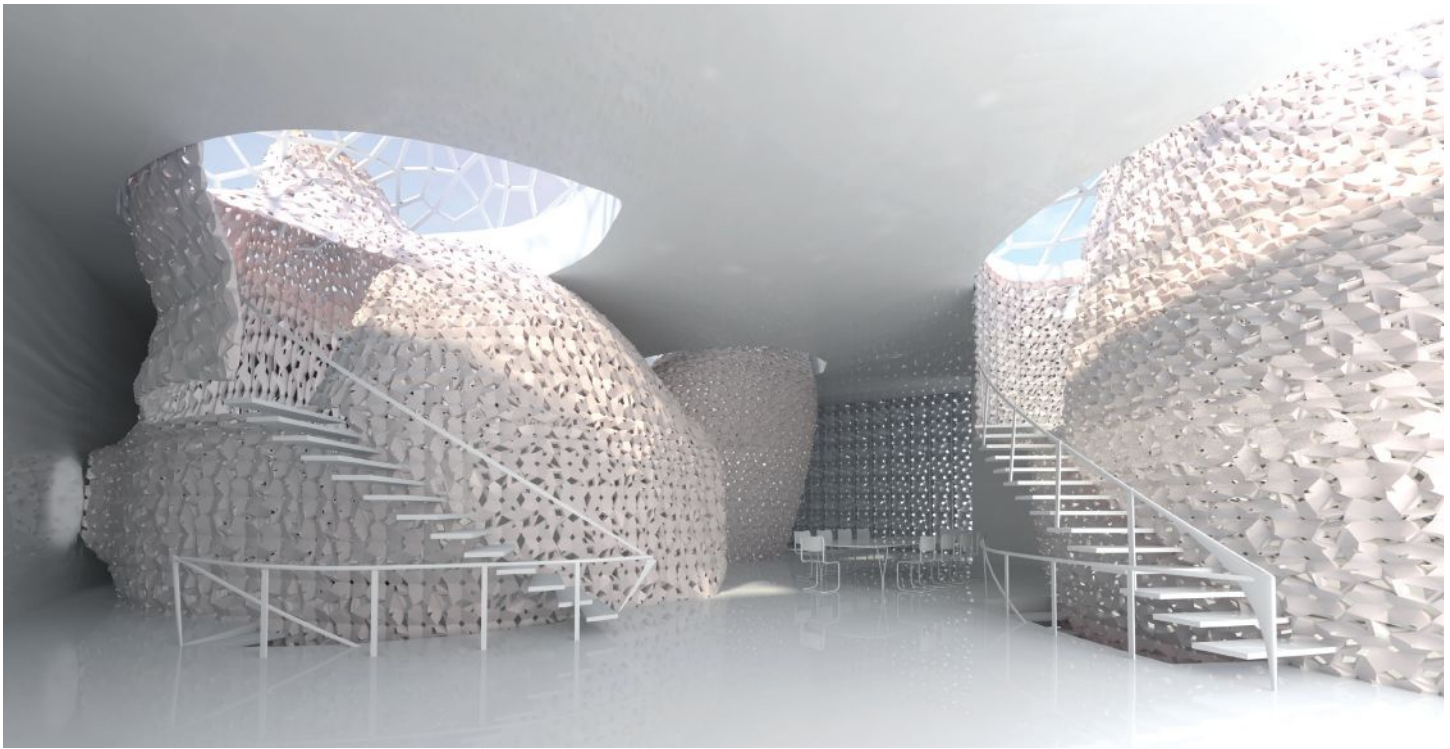
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of architecture by tackling projects not often of interest to architects.” Rael, 42, an associate professor of architecture at the University of California, Berkeley, and San Fratello, 43, an assistant professor at San José University’s Department of Design, don’t have licenses or more than a handful of completed projects between them; instead, they’re guided by a spirit of political activism and an interest in expanding the boundaries of material technology. Here, they discuss the intersection of immigration and design, the limits of architecture, and an experimental approach to 3D printing—which they explore with their materials research arm Emerging Objects—that they hope will revolutionize our environment.

On being a post-9/11 firm: We were living in New York on Sept. 11, 2001, but it wasn’t until a few years later, when we were designing a house in Texas near the U.S.–Mexico border, that we truly realized how the political landscape could affect our work. In 2006, the Secure Fence Act was passed, financing an 800-mile wall along the border. Many of the laborers in the region had crossed the border from Mexico, and 9/11 was the beginning of the end for that. On the design level, the house had



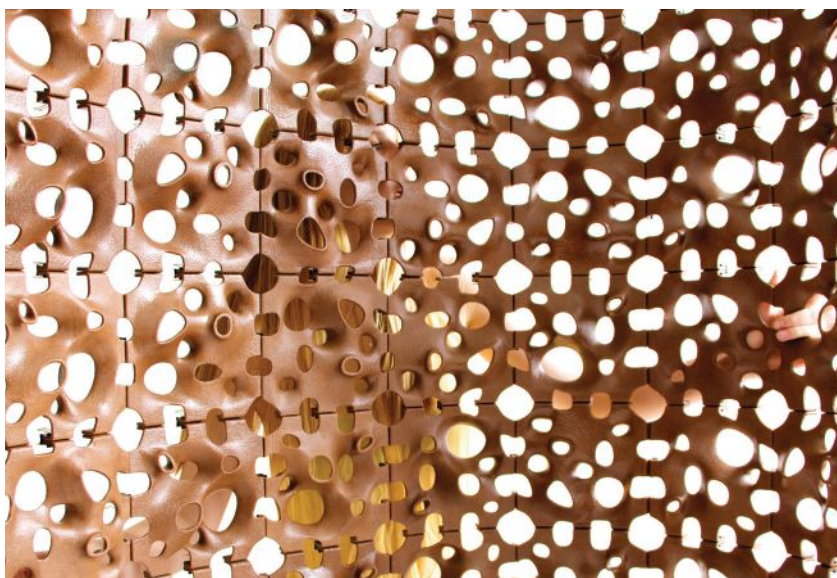
This page: The 3D Printed House 1.0 for Jin Hai Lake Resort in Beijing—section (top), plan (middle), and interior rendering (above)—is a case study in integrating traditional building components and volumes produced with 3D-printed salt polymers and fiber-reinforced cement polymers developed by Emerging Objects. **Opposite page:** Emerging Objects demonstrates the structural potential of these polymers with its installation saltYgloo—336 panels made from San Francisco Bay salt assembled into a semi-structural shell (top and middle). Rael San Fratello created the SOL Grotto installation (bottom) in 2012 at the Berkeley Botanical Garden using 1,368 light tubes from now-defunct Solyndra to illuminate a small contemplation space on the garden grounds.

a very affordable steel roof, but, because of the war in Iraq, the price of steel had skyrocketed, and this simple structure, designed to be affordable, no longer was. We didn't think that 9/11 would intersect with a small house in Texas, but it did.

On place and politics: We lived in one of the few apartments in New York's Chelsea district that opened onto what became the High Line. Before it was the High Line, it was our backyard—we would plant flowers and take walks. When we moved to San Francisco and learned that the Bay Bridge was going to be dismantled, we decided that it should be converted to a park, and entered a sketch in a competition, WPA 2.0, that sought to rethink U.S. infrastructure. We didn't win, and the Bay Bridge is being demolished, but the project was part of our continuing line of thought.

On 3D printing: We've been teaching in architecture schools for 15 years, and have always been exposed to 3D printing and used it in our classes, but we didn't often use it in our practice because of the expense and lack of durability. Recently, our research on printing with other, more durable materials has taken off. We've printed structures out of sawdust, cement, and ceramic. We've even attempted using rubber from recycled tires, glass from broken windshields, and salt from the San Francisco Bay. Now we've been commissioned by a developer to design houses for a plot north of Beijing that would be among the first 3D-printed houses. The concept typically suggests using one large house-sized printer with a single material. But we see the process as more complex and rich—the walls, for instance, should be a different material from the floor and the ceiling. We want to build a house that does not suggest that architectural traditions should be usurped by new 3D printing technologies.

On theory versus practice: We operate like all architects operate—90 percent of the projects that cross our desks don't get built. If we based the happiness of our careers on that statistic, we'd be far from happy. Like all designers, we take projects as far as we can, with the hope that a conclusion will present itself in reality. It could be repurposing the Bay Bridge, or bringing awareness to the border wall, or creating a 3D-printed house. The latter project remains conceptual, but we see a trajectory where we could radically change the construction industry. If we don't get there, we won't be unhappy. But we're pushing the idea as far as we can.



DETAIL

NATURALLY STRONG

FOR THE OPEN-AIR INDOCHINE CAFÉ IN KON TUM, VIETNAM, VO TRONG NGHIA ARCHITECTS TRANSFORMED THOUSANDS OF BAMBOO CANES INTO AN ORGANIC FAN VAULT.



For the restaurant's nontraditional support structure, Vo Trong Nghia Architects leveraged the mechanical properties of bamboo to create inverted conical columns, which were mocked up and load tested prior to the project's construction.

Text by **Logan Ward**
Photos by **Oki Hiroyuki**

BAMBOO MAY BE the ultimate sustainable building material. As one of the world's fastest-growing plants, it can sprout up to 4 inches per day depending on variety, soil, and climate.

Vo Trong Nghia Architects' design of the Indochine Café in Kon Tum, Vietnam, proves that the fast-growing grass can look sophisticated—even when it is left in its natural state.

Built in 2013 as part of a hotel complex on the Dak Bla River, the 6,000-square-foot open-air restaurant is elegant in its simplicity: 15 inverted cones made of bamboo canes rise 20 feet to create a fan vault of sorts that supports a butterfly roof, also made from bamboo.

The columns are arranged in a 3-by-5 grid in the café's 60-foot-by-100-foot plan. Each one is 20 feet in diameter at the top and tapers to 5 feet at the base, which is anchored into a concrete foundation with steel plates and bolts.

Traditional Vietnamese fish baskets served as the inspiration for the columns. Principal designer Vo Trong Nghia, founding partner of his eponymous firm in Ho Chi Minh City, Vietnam, first worked with the material as a child, helping his family make bamboo tableware.

The challenge in designing large structures with bamboo, he says, is respecting its mechanical qualities. Bamboo is dense and hard, but it can bend into strong, curved shapes. Pound for pound, it has three to four times the tensile strength of steel, but its behavior depends on whether it is used in whole, cut in cross-sections, or laminated.

Part of the strength of each column comes from the arched geometry of its approximately 400 bamboo canes bound by rope and three steel tension rings inside each cone at 5, 10, and 15 feet above finished floor. An internal central cane bundle and four to eight diagonal cross-braces provide additional support for the roof.

Fasteners and conventional construction methods would have ruined the round-cane

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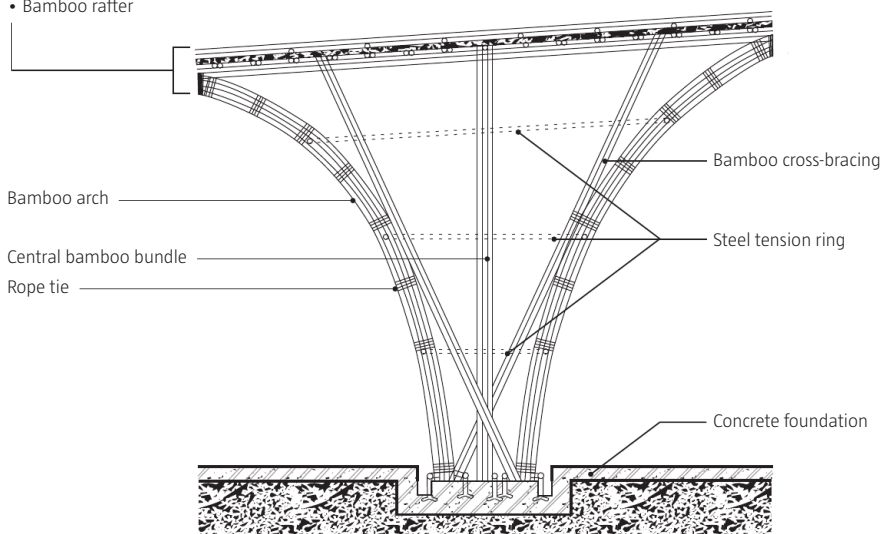


Surrounded by a man-made pond, the restaurant was built as part of a hotel complex along the Dak Bla River in Kon Tum.

Column Section

Roof

- 5mm PVC panel
- $\phi 35\text{mm}$ –55mm bamboo purlin
- 50mm thatch layer
- $\phi 35\text{mm}$ –55mm bamboo purlin
- Bamboo rafter



texture highlighted in Nghia's design. Steel-pin joints, for instance, would generate localized point loads that would split bamboo's hollow hardened cell walls and buckle its joints.

The 15 columns were thus prefabricated by means of low-tech joinery—mostly synthetic fiber and a few small nails. Finding structural engineers was difficult, Nghia says. “We based the design on traditional experience, but it follows logical rules of structure. And we always make a mock-up before construction, placing weights on top to test how much the bamboo bends.”

Likewise, it's almost impossible to find contractors experienced in traditional bamboo construction techniques, even in Vietnam. For example, to prevent insect infestation, Nghia knew to soak the bamboo in mud and smoke it dry. As his firm designs more bamboo structures, he has had to hire and train his own construction teams, which now work under a subsidiary company, Wind and Water House.

In total, the café contains more than 10,000 bamboo canes, each about 5 years old and costing roughly \$1 each. Harvested from Vietnam's many forests, the bamboo bends into strong, flowing shapes that Nghia loves.

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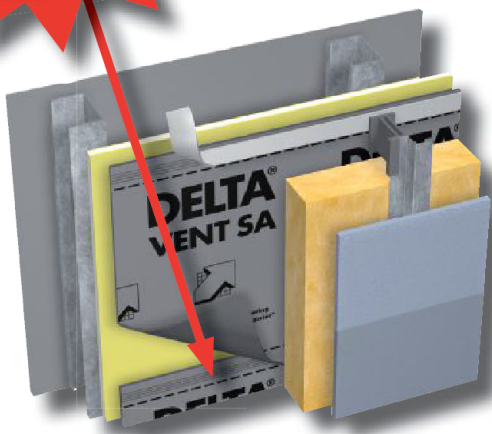
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Text by **Hallie Busta**

Photo by **Mike Basher**



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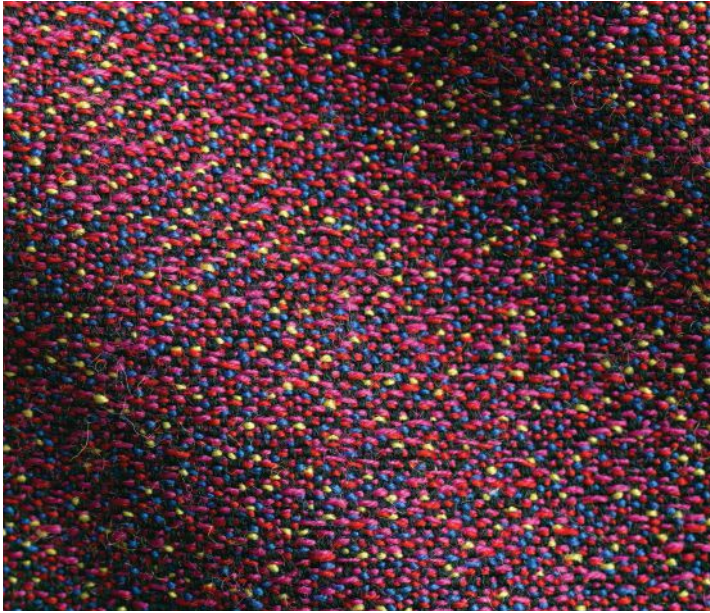
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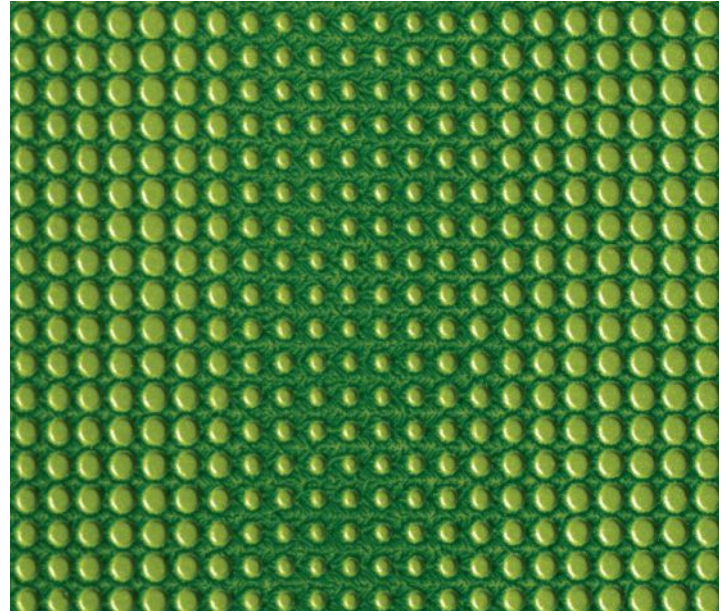
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MILLIONS OF COLORS, WOLF-GORDON

Danish textile designer Grethe Sørensen weaves colorful nylon and wool fibers into an array of pixels to create Millions of Colors, a trio of upholsteries for Wolf-Gordon. Fire (shown), Earth, and Milky Way offer warm, cool, and monochromatic colorways, respectively, that shift gradually on a 223.5" repeat. wolfgordon.com Circle 101



DRAPE, MAHARAM

An embossed, gradient surface adds interest to nonwoven vinyl textiles in Drape, designer Konstantin Grcic's upholstery and wallcovering line for Maharam. An antimicrobial, stain-resistant finish suits the material for high-use spaces in need of a durable covering. maharam.com Circle 102



BANANA FIBERS, 3FORM

Wild plants and corn husks are shredded and their fibers sandwiched between layers of 3form's Varia Ecoresin partitioning surface, which contains 40% post-consumer-recycled content and is Greenguard-certified for indoor air quality. Banana Fibers, one of the many organic-material interlayers offered by the company, features light and dark translucent strips that proffer a warm glow. 3-form.com Circle 103



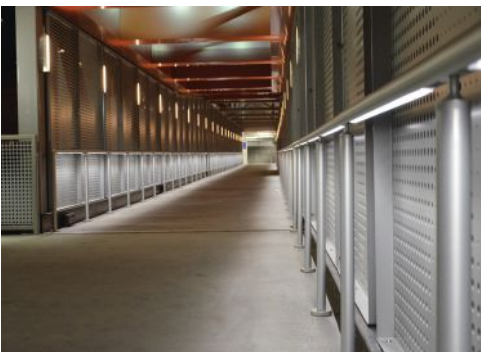
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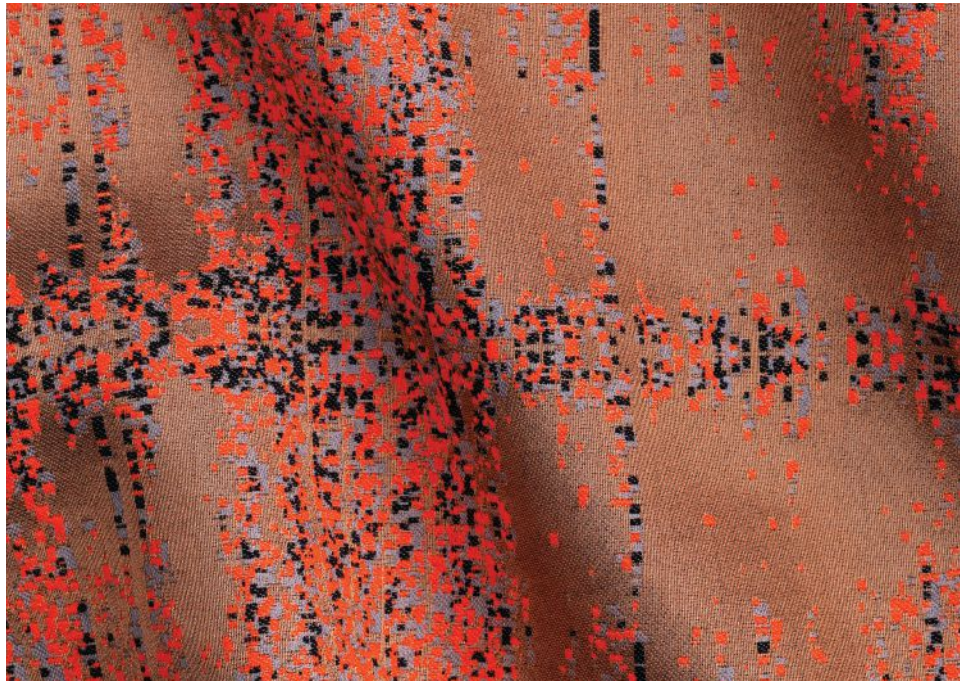


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MILZIG, JOHN BOYD TEXTILES

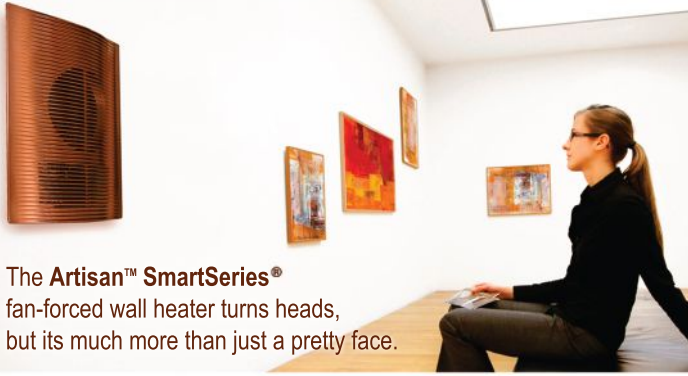
Working horses may have all but disappeared from the streets of Castle Cary, England, but the 177-year-old John Boyd Textiles remains in town as a producer of horsehair fabric for upholstery and wallcoverings. The fibers are wrapped with silk and cotton for consistency, and the textiles' widths are limited to the length of the cropped horsetail hair. The company still produces its legacy designs, but new variations, such as Milzig (shown), apply the traditional craft to contemporary design. johnboydtextiles.co.uk Circle 104



MY TRIBE, BEATWOVEN

U.K.-based designer Nadia-Anne Ricketts derives the patterns of her bespoke Beatwoven textiles from the digital vocabulary of sound. Her proprietary audio technology visualizes the work of artists from Rachmaninoff to DJ Demi, a music producer with whom she collaborated on My Tribe (shown). Its squares and rectangles replicate the drum beats of electronic dance music. beatwoven.co.uk Circle 105

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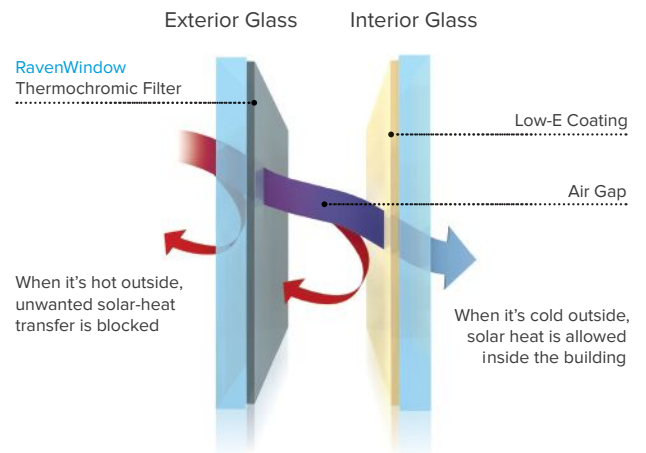


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QINGDAO WORLD HORTICULTURAL EXPO THEME PAVILION

BEN VAN BERKEL OF UNSTUDIO DESCRIBES HIS SERIES OF QUIETLY COLORFUL STRUCTURES DESIGNED FOR ONE OF CHINA'S LARGEST FLOWER SHOWS.

Interview by **Aaron Betsky**
Photos by **Edmon Leong**

There is a tradition of garden expos in Northern Europe that seems to have spread to Asia. What are these expos about?

Ben van Berkel, Hon. FAIA: These expos present new horticultural accomplishments and get the public interested in this topic. Now you are seeing these kinds of exhibitions about new flowering plants, and the culture and technology around growing them, appearing in Asia. It was an interesting topic to work with when it came to designing a full experience—not only the exhibition halls, but also walking around the buildings. How could we innovate by integrating the buildings with the landscape and flowers?

Why did you decide to use a rose as your starting diagram or metaphor?

We started with “What is so fascinating about a rose?,” but also looked at the geometrical pattern of it and the symbolic way that flowers have been used in painting. I was interested in still lifes of flowers; the most beautiful abstract versions can be found in the work of Andy Warhol. So I see the rose here not as a geometrical model alone, but also as a symbol and an element that has such a beautiful history in the way it has been represented.

The landscape draws you in along a series of ramps to the center, where you choose between the four pavilions that make up the Theme Pavilion.

Yes. What is quite nice is that the buildings actually all have an angled plane, so they have a kind of dynamic relationship with their surroundings and the mountains in the landscape beyond. Because of the planar organization of the façades, and how you walk around and ramp into the buildings, you are able to discover the color that we put into the slats of the panels that will give you orientation in the site.





Previous spread: The four structures that make up the larger Theme Pavilion of the horticultural expo are low-slung shells connected by a series of landscaped plazas.
This image: The buildings' metal fins create a texture akin to paper parasols and conceal on their undersides a bright spectrum of color that unfolds around each structure.





How did you develop the skin, with its series of metal panels that twist and turn as they go around the roughly square contours of the buildings? This idea of texturizing the façade—we do that so often now in architecture. But I wanted to give it a particular kind of gradient that would have a moiré effect. Inside, these structures contain totally artificial worlds, so the building needed to be closed. Maybe because of the earlier closed buildings, like the electricity stations that we did in the early '90s, I very much like to do buildings where you have almost no windows; then you have to try very hard to create a kind of window into the façade.

And you have a color scheme that runs the full chromatic spread as it wraps around the building. What does it achieve for you?

In horticulture today, they can introduce almost every color by engineering these flowers, so all of these colors on the building can be found in flowers as well. And we thought: Could that spectrum also guide you a little bit? It became a wayfinding system that deals with memorizing where, and from which angle, the building has which color, because if you go another 5 or 10 meters, you can't see that color anymore.

You achieved this by putting colored slats into the fold of these metal panels, the folding of which is what creates this continual rise and fall of the façade. Are the panels also structural?

Yes. This whole aspect of the façade also plays with the history of Chinese umbrellas. Those have a structure of folds, they can unfold, and although

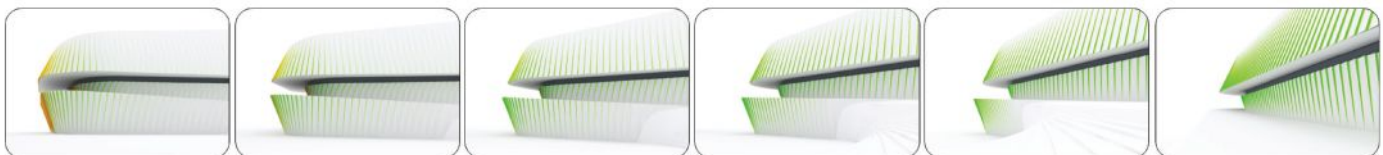
I didn't want to mimic the dynamic aspect literally here, I wanted to play with that texture. So it is a skin structure with a very light structural element behind it.

In terms of your work and UNStudio's work in general, you've explored this interest in chromatic shifts on the exterior of buildings as early as the La Defense Offices in Almere, the Netherlands, and inside some of your department stores in South Korea.

In the Almere project, where we played with color, it's almost as if you can paint with your own eye as you walk through the site. So here, we played with the idea of the dynamics of movement and color at the same time in order to orient, but also to give the building, as an object, a totally different read. Is the building somewhat disappearing? Or is it opening up? Or is it really hiding something behind the building that we don't know? I like always to play with these ideas but you have to deal with a structure that is quite closed.

You made the building out of metal in very abstract shapes, and its logic is derived from the computer programs that you were among the pioneers in developing. So here you've proposed a kind of building development that does not come from the existing landscape and is really part of a much more global and standardized method of architectural production. I still like the paradox between that which is contextual and that which is autonomous in architecture. I call it a form of light

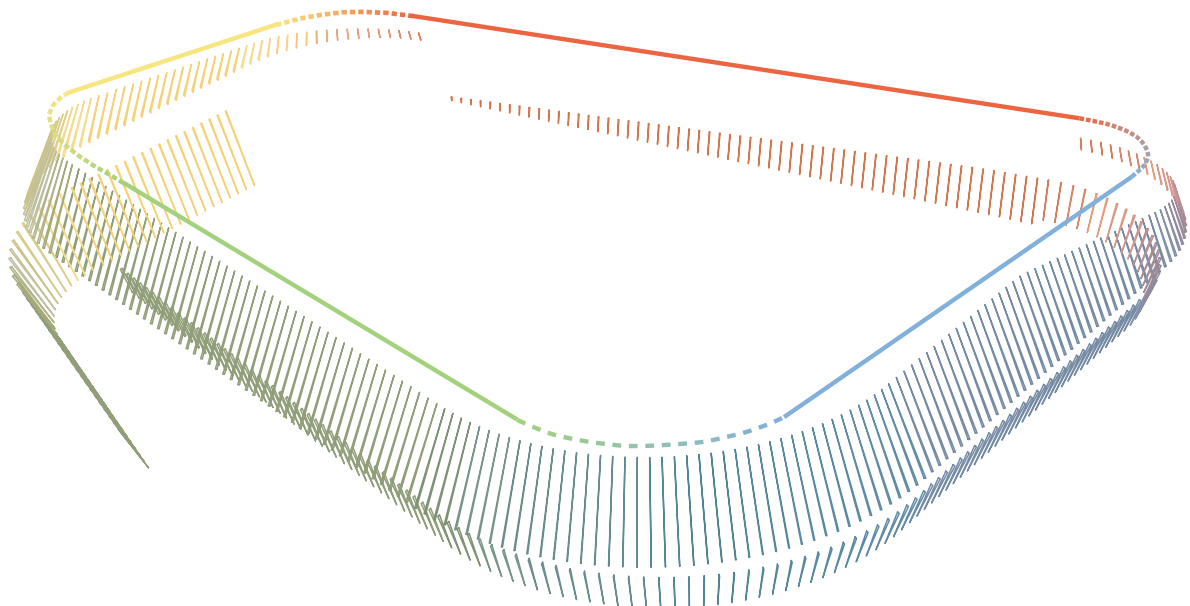
Design Directionality Diagram



UNStudio was responsible for the exterior of the structures, not the interiors or the surrounding landscape. So to manage and curate circulation, the team developed a series of ramps that move around, up, and into each building. Movement along these ramps is what allows the colorful character of the skin to unfold.

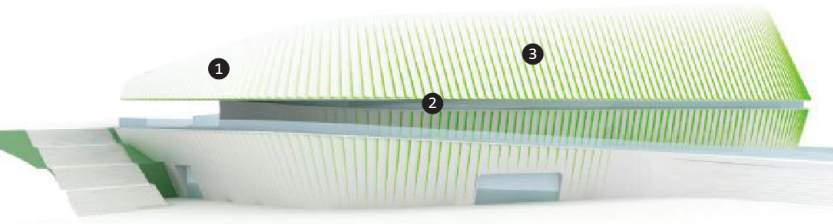


Façade Coloration Diagram



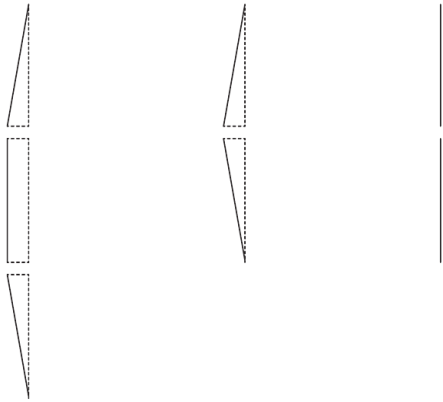


Façade Elevation Diagram

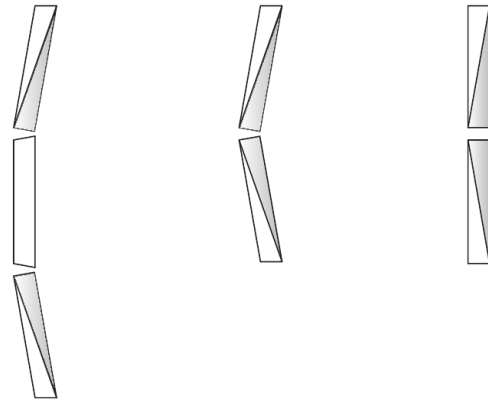


- 1. Trimmed Cones
- 2. Cylinders
- 3. Standard Cones

Façade Fin Sections



Façade Fin Axonometrics



Opposite: A path leading past a yellow-accented section of one of the structures, with exterior planting displays on either side. **Above:** The building skins are assemblies of standardized metal components cut and bent into cylindrical, conical, and flat panels.



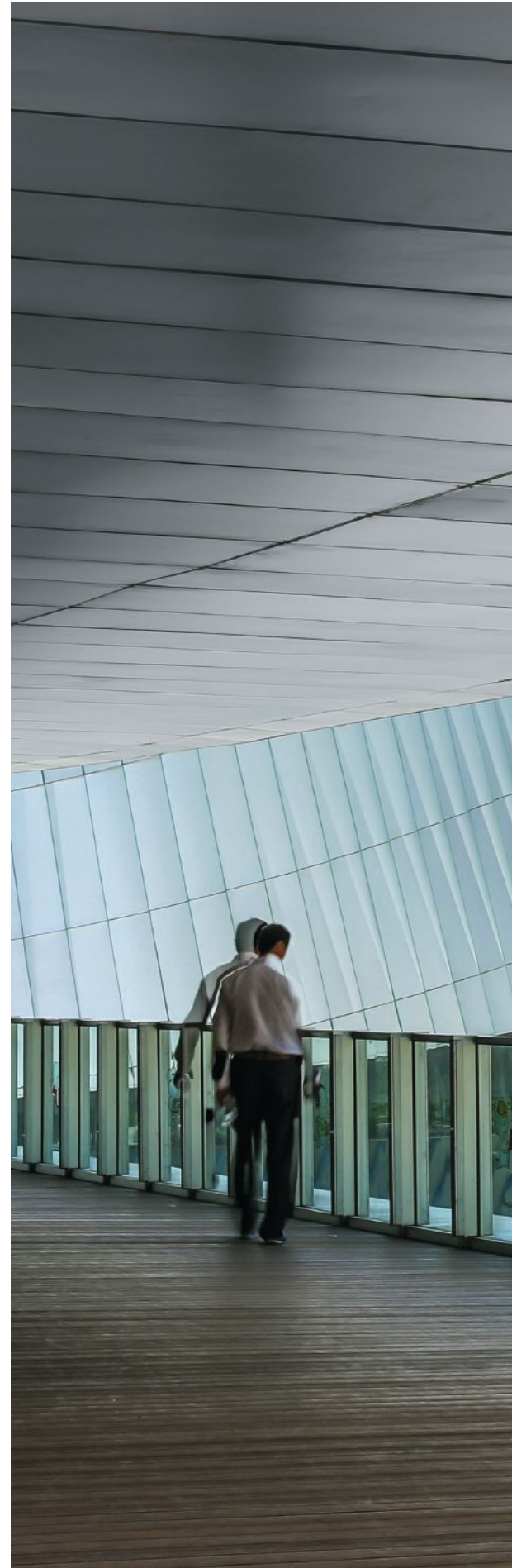
autonomy. I think back to when I saw iPods for the first time. I thought it was a phone, it looked so alien to me, so different than any other object that I had seen. There are a lot of people who don't believe in the new or the unexpected, but I think that you can sometimes give a bit of surprise with a technological effect, or a cultural effect that is not local. I find it fascinating to play with. But it needs to be mixed. I've always been interested in this idea of rethinking the way that one organizes a site. I like to rethink the infrastructure, the way that one sees and discovers things and the way one experiences the site.

What do you hope that people will take away from this building? When people go to these kinds of expos, they usually take away pictures and memories of the flowers, but it seems as if you also wanted to make something iconic that would remain in their memory.

I'm fascinated by the fact that you can create an afterimage like you might have after seeing an interesting film—something that you'd like to come back to it. I tend to give multiple experiences to the visitor, and the coming back experience is very important.

So you want people to be haunted by the colors as they move around, and you want them to be haunted by the building after they leave?

Yes, but haunted also about the thoughts behind the building that they maybe don't fully grasp, but that they'd like to understand. And to give them an opportunity to rethink the experience. I think architecture can do this, especially with a place that is kind of a dialog of autonomy and context, and in this case a very daunting context. So haunted, yes, but also at the same time, I hope that it creates unexpected readings that keep on fascinating you.





Opposite: A pathway wraps each building, shaded by the overhanging roof structure.
This image: The inset walkways' metal ceiling and wood floor frame views of the surroundings.

SOUTH AUSTRALIAN HEALTH AND MEDICAL RESEARCH INSTITUTE

THIS NEW FACILITY, DESIGNED BY WOODS BAGOT, IS MEANT TO JUMPSTART THE STATE'S INTERNATIONAL MEDICAL SCIENCE EFFORTS AND PROVIDE THE CITY OF ADELAIDE WITH ITS OWN ARCHITECTURAL ICON.





Text by Clay Risen

IS IT ANY WONDER that research centers, as design challenges, tend to bring out the best in architects? From Louis Kahn's sublime Salk Institute in La Jolla, Calif., to Frank Gehry, FAIA's ecstatic (if leaky) Stata Center at MIT in Cambridge, Mass., they have to meet complex functional requirements—biomedical labs, say, or supercomputing facilities—and at the same time catalyze collaboration, innovation, and that ineffable but utterly vital element in any research endeavor: genius.

Such was the task given to the firm Woods Bagot by the South Australian Health and Medical Research Institute (SAHMRI), a publicly funded, independent science facility in Adelaide that anchors the western edge of the city's North Terrace neighborhood. The institute originated in 2008, when the government of South Australia, of which Adelaide is the capital, committed \$200 million Australian (\$186 million U.S.) to developing a world-class health and medical laboratory that would not only attract globally renowned researchers, but also act as an aesthetic touchstone for the city, helping to put Adelaide on the map alongside Sydney and Melbourne. To complicate things further, the building had to be on the cutting-edge of environmental sustainability and to connect with the public as an urban icon.

Built between downtown Adelaide and the River Torrens, SAHMRI's neighbors include a new hospital, convention center, and university campus—but also a rail yard that interrupted the passage between the urban core and a riverside greenbelt. "It wasn't just 'maximize a lab and put it on a site,'" says Jeffrey Holmes, AIA, a director in the firm's New York office and a leader on the SAHMRI project. "We needed a way to give back space."

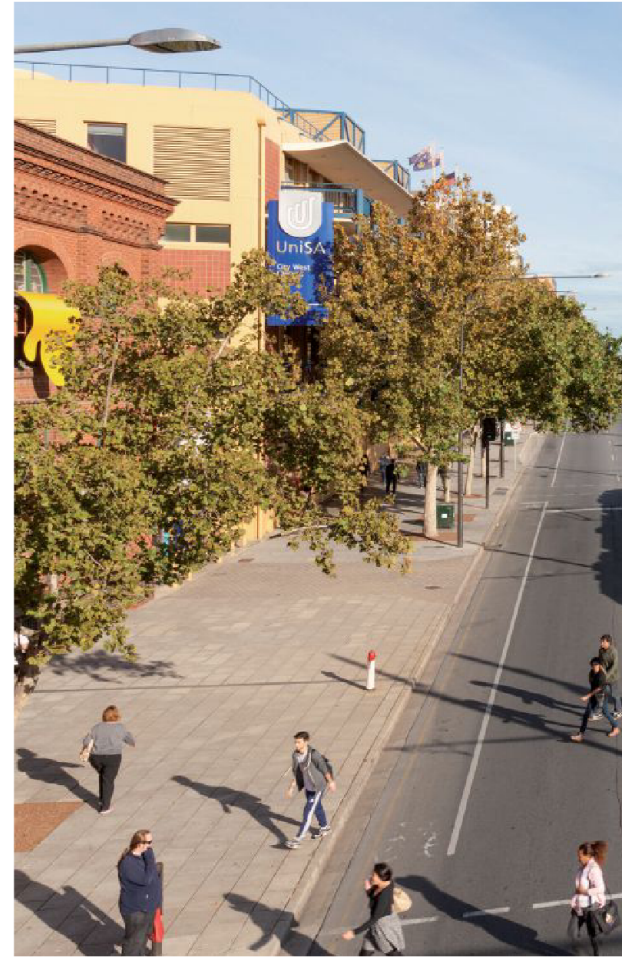
The firm's first move was to lift the building off the ground, so that it seems to hover above the park space below and around it, offering a gateway between downtown and the river. SAHMRI's 36 interior columns, spaced at 33-foot-by-45-foot intervals, channel the building's load to just six points—what the design team calls "flower columns"—at the plaza level. Then the designers split and pivoted the northern and southern halves of the building, creating an eastern and western atrium in between—"like a bowtie," Holmes explains. The pivot also created a publicly accessible forecourt on the south side of the structure.

The core of the building is, of course, its laboratory facilities, which accommodate up to 675 scientists and have preinstalled water and waste-disposal hookups to accommodate both "wet" and "dry" programs. Most laboratories are arranged in three parts: the workspace itself, the support functions (equipment closets, freezers, flues) and the "write-up" space, for meetings and analysis. Usually, the support space is in the middle, so that the work and write-up spaces are closer to the windows. At SAHMRI, Woods Bagot placed the support space on the western side of the building, with the lab in the middle and the write-up space to its east.

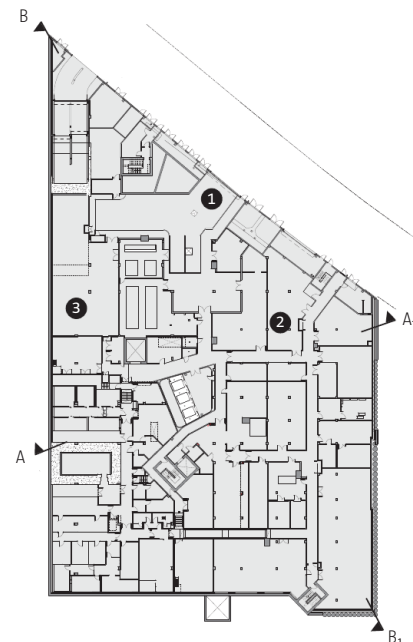
That simple shuffling achieves several things at once. The solid support spaces on the western side, which has the heaviest solar load, provide passive protection against South Australia's harsh afternoon sunlight. And placing the glass-walled lab facilities adjacent to the open-plan write-up spaces not only allows light to filter into both, but it increases opportunities for collaboration and chance encounters.

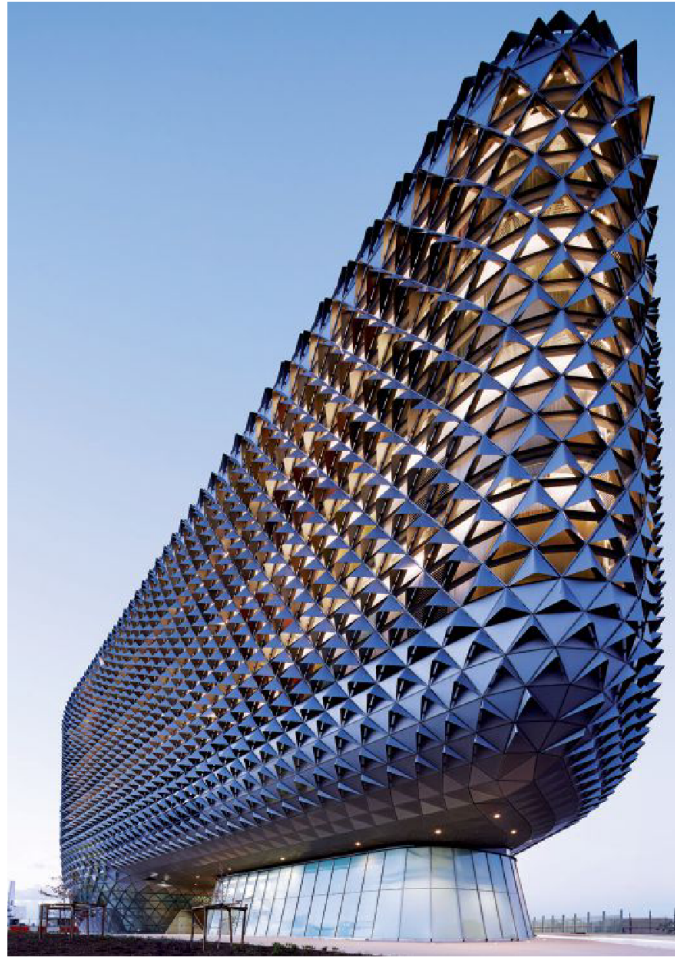
Fronting the eastern atrium, which runs from floor to ceiling along much of the building, is a free-hanging steel, aluminum-and-glass diagrid. Spanning 131 feet wide and 131 feet tall, it allows an abundance of light to flow into the building and through to the lab spaces. To moderate the light, Woods Bagot devised aluminum sunshades for each glass piece, with every shade designed site-specifically to modulate the amount of light needed inside the building, as determined by computer modeling.

The diagrid form wraps around the entire building, a single skin that makes it appear like a unified object; from the outside, it looks like a giant



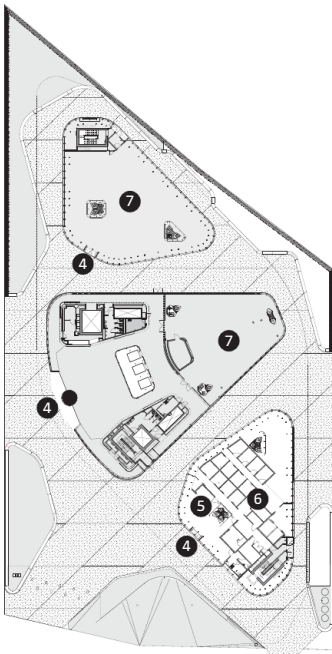
Ground-Level Plan



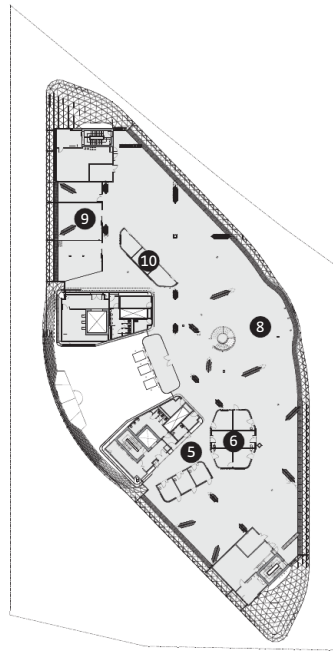


Previous spread: Behind the metal-and-glass west face of the new SAHMRI complex in Adelaide, Australia, brightly painted and enclosed support spaces add visual punch and reduce heat gain. **Far left:** SAHMRI sits in a developing area of town, near a new convention center, hospital, and rail line. **Left:** The building's distinctive form was determined in part by site constraints, including the desire to create plaza-level connections between urban fabric on one side and a riverwalk on the other.

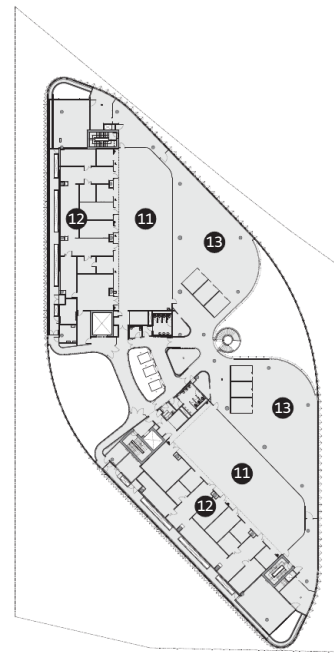
Third-/Plaza-Level Plan



Fourth-Level Plan



Typical Lab-Level Plan



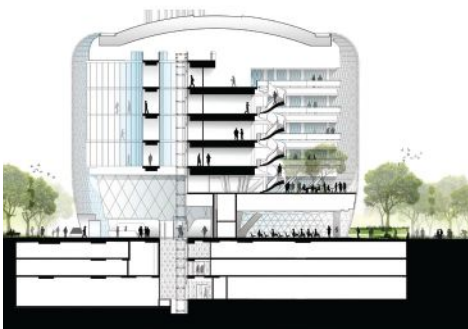
1. Loading dock
2. Storage
3. Mechanical
4. Entrance
5. Waiting Room
6. Consultation rooms
7. Multipurpose space
8. Café
9. Meeting room
10. Offices
11. Laboratory
12. Laboratory support
13. Write-up space





This image: The entrance plaza on the western side of the building. **Opposite:** Aluminum shades of different depths regulate interior temperatures in the east and west atriums. (The west atrium is shown here.)

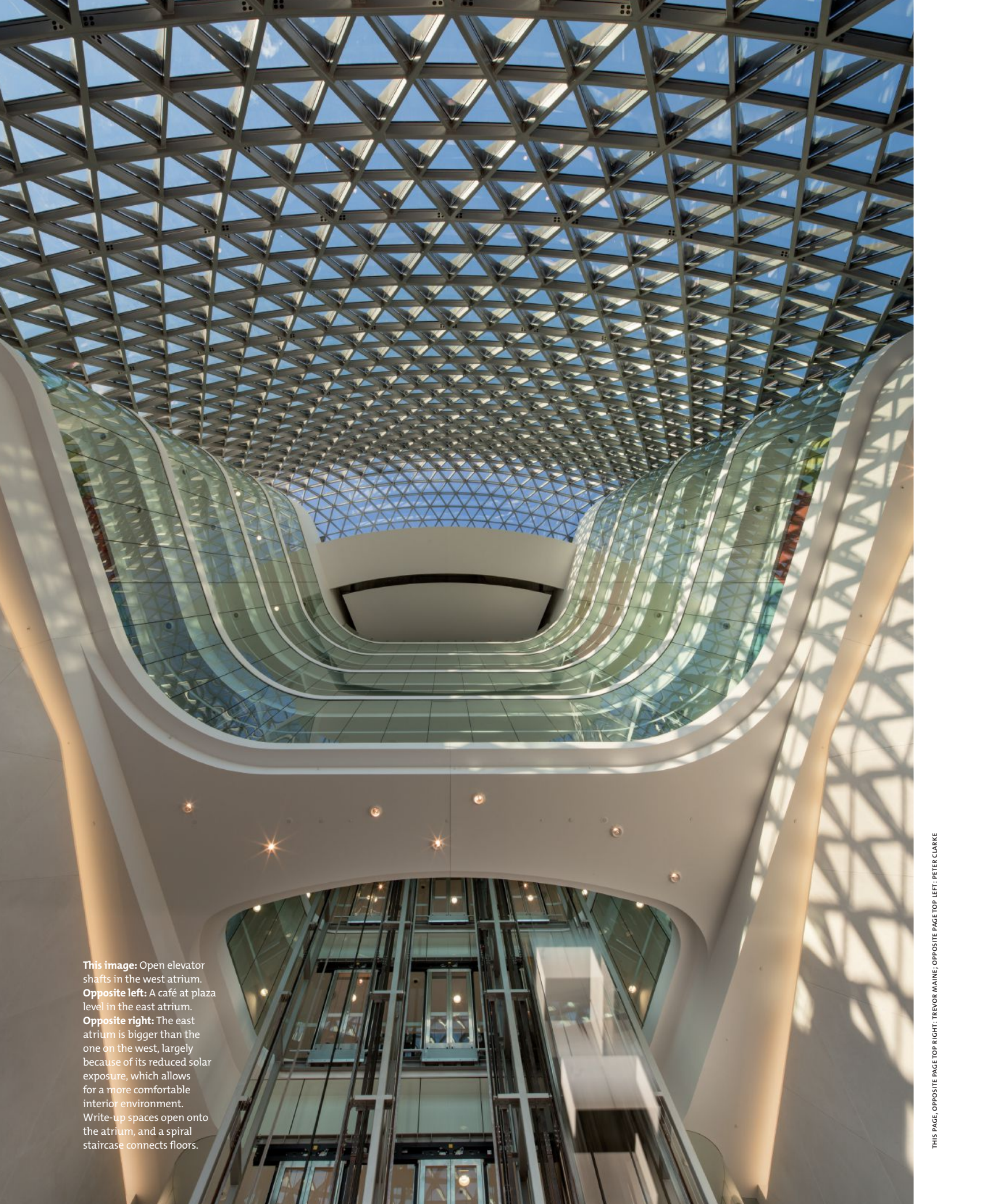
Section A-A1



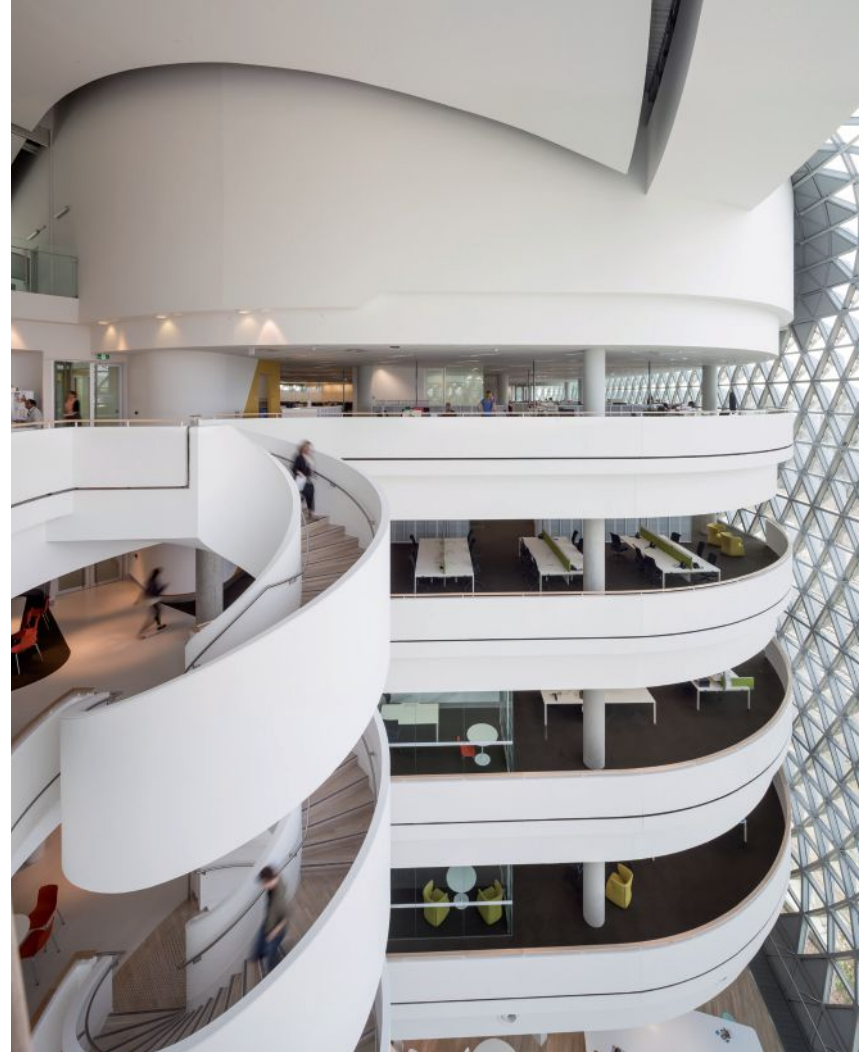
Section B-B1



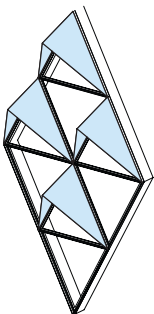




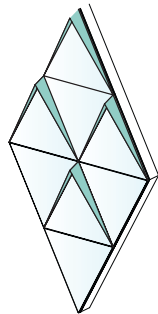
This image: Open elevator shafts in the west atrium.
Opposite left: A café at plaza level in the east atrium.
Opposite right: The east atrium is bigger than the one on the west, largely because of its reduced solar exposure, which allows for a more comfortable interior environment. Write-up spaces open onto the atrium, and a spiral staircase connects floors.



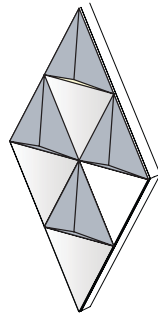
Façade Shading



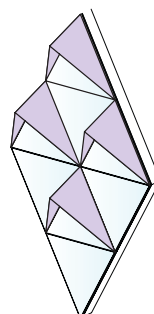
West Façade
Shade with no glass



East-West Façade
Shallow shade with glass



North and South Corners
Closed shade with metal panel



East Façade
Shade with glass

pine cone—indeed, that’s one of SAHMRI’s local nicknames.

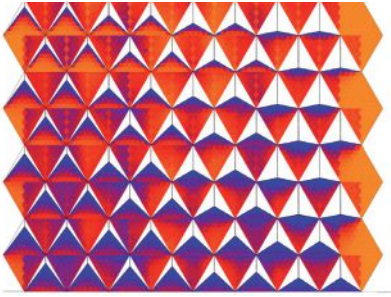
Another environmentally friendly aspect of SAHMRI is its air conditioning system: Taking advantage of the open space below the building, the system pulls in cool air from below and vents warmer air out the top, creating a low-energy chimney effect. That, combined with an energy-conscious water and waste-removal system, helped SAHMRI achieve a LEED Gold rating, the first medical-research building in Australia to do so.

To make all of this work while keeping vibration to an absolute minimum, something that is a critical requirement for any world-class research facility, Woods Bagot, along with the engineering firm Aurecon, parsed hundreds of computer models to devise a structural system that vibrated at a typical amplitude of just 50 microns (the human threshold

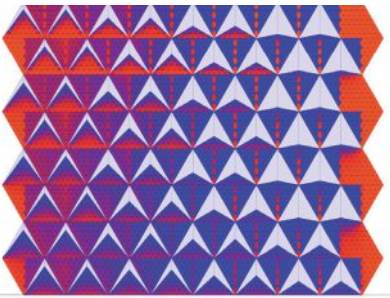
for sensing vibration is 200 microns). That’s low enough to render additional isolation for sensitive equipment, standard in many laboratories, unnecessary. To keep vibrations even lower, Aurecon added isolation bearings on the lower floors, which allow for load transfers but keep the upper floors from vibrating, even when the lower levels shake. “Effectively we created a totally isolated building within a building,” says Paul Koehne, a senior structural engineer at Aurecon.

Projects like SAHMRI are obviously neither easy nor intuitive. “How researchers work is very different from how people in a bank work,” Holmes says. In a sense, the research institute became a research project all its own. “Everyone involved, from the client to the engineer, took it on as a sort of science project,” he adds. “It was, for all of us, a process of discovery.”

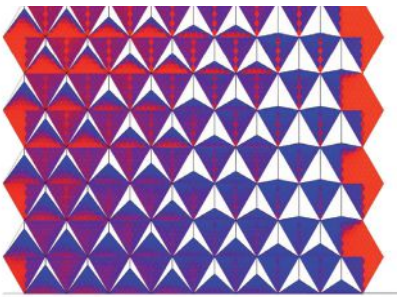
Northeast Façade Heat Diagram



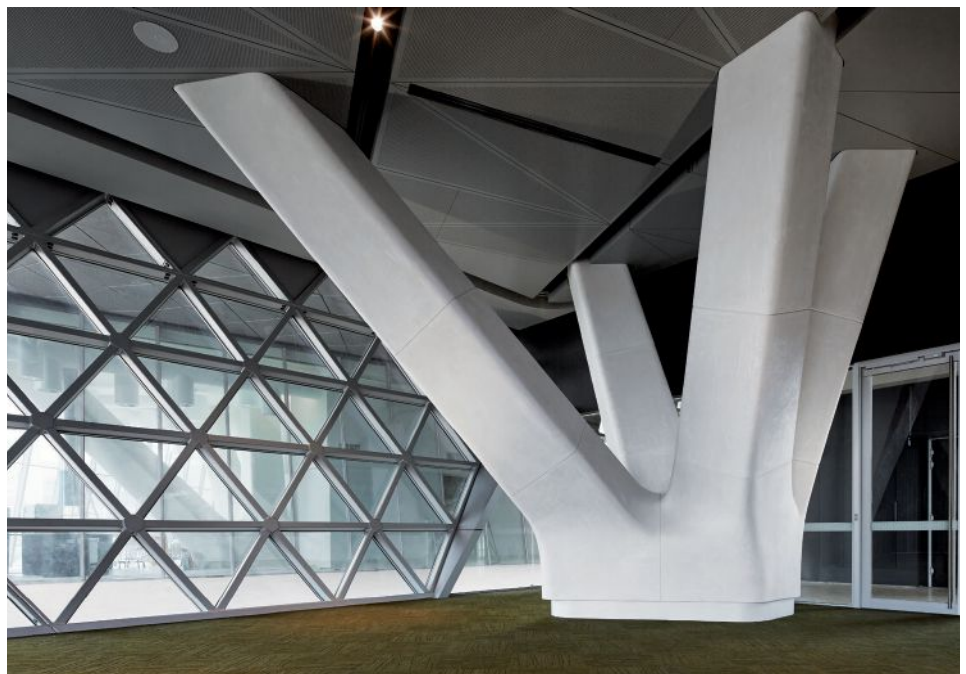
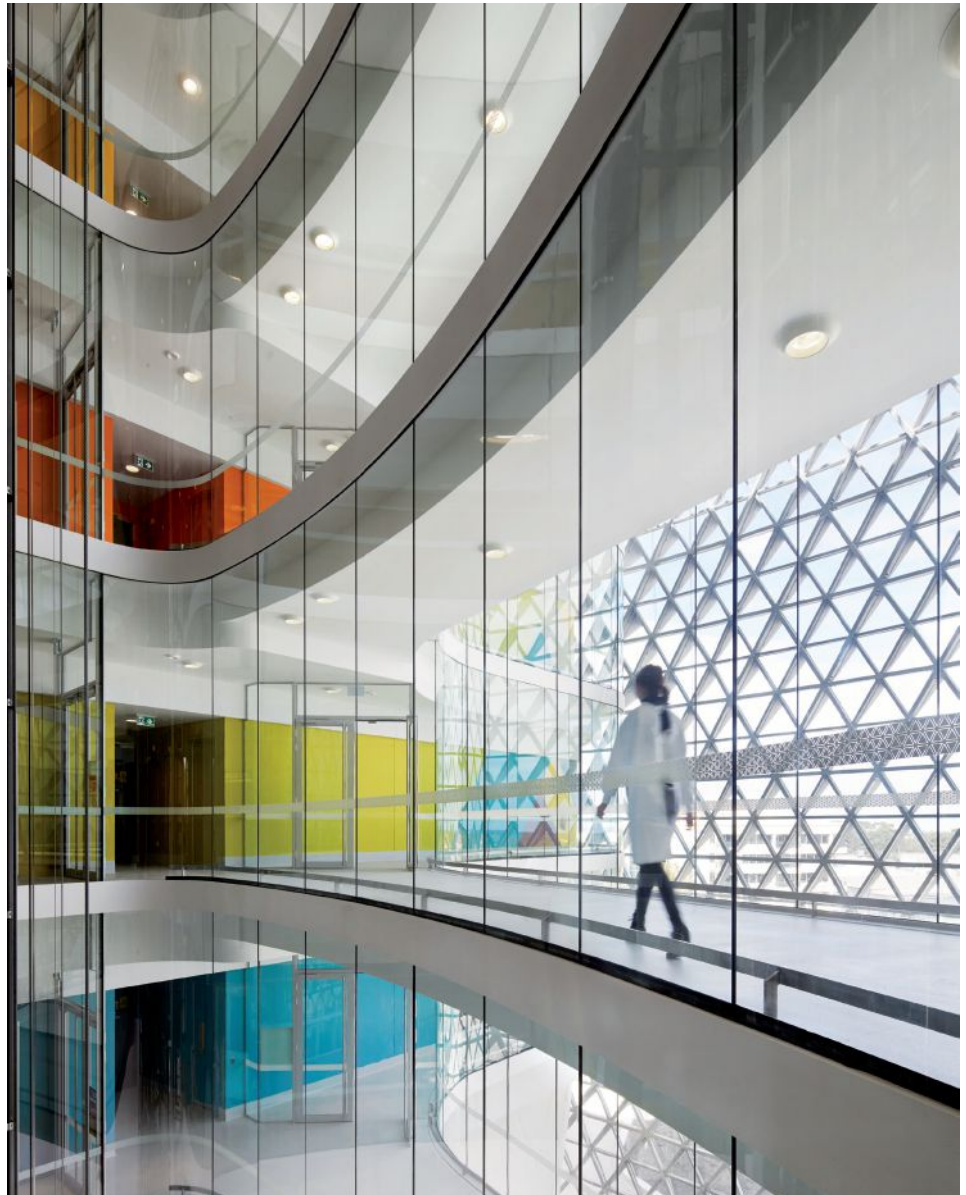
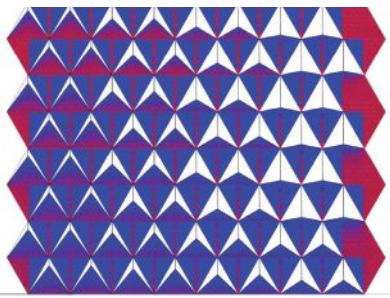
Northwest Façade Heat Diagram



Southeast Façade Heat Diagram



Southwest Façade Heat Diagram





Opposite top: Glass-enclosed bridges connect upper-level labs on the north and south sides of the building.

Opposite bottom: The so-called flower columns at the plaza level transfer column loads from the upper levels to centralized points. **This page:** A narrow, open-air atrium on the west side of the building helps to regulate temperature and reduce heat gain in adjacent conditioned spaces.





LA BREA HOUSING

THIS 32-UNIT AFFORDABLE HOUSING COMPLEX IN WEST HOLLYWOOD, CALIF., DESIGNED BY PATRICK TIGHE ARCHITECTURE WITH JOHN V. MUTLOW ARCHITECTS, PACKS A LOT OF DESIGN BANG FOR THE BUCK.

Text by **Nate Berg**

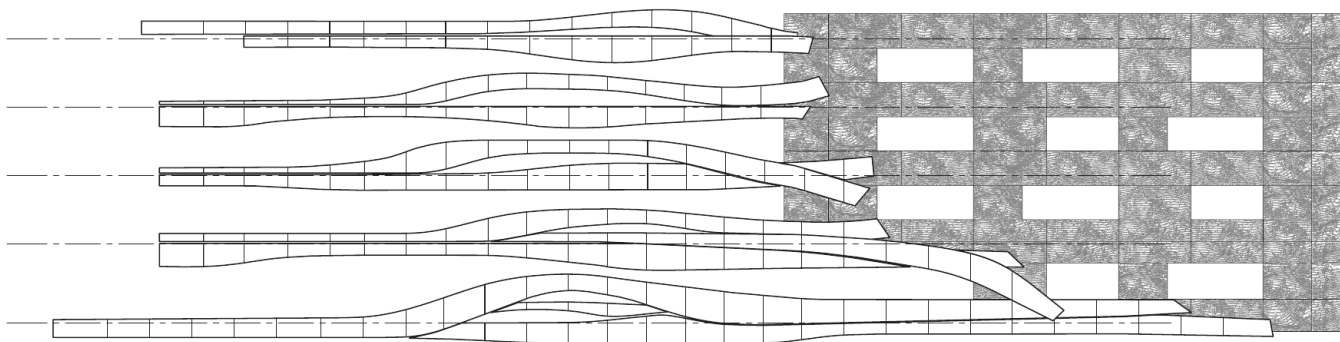
AT THE INTERSECTION of Santa Monica Boulevard and La Brea Avenue, just across the abrupt aesthetic jumpcut of a municipal border with Los Angeles, West Hollywood's unique architectural and urban design standards are on full display. From the hectic plaza of a vertical shopping mall on the corner, to the turquoise street lights, to the colorful, sometimes garish, palettes of new 100-unit condo buildings, the appearance of the public realm is carefully considered—if a bit overwhelming.

Standing out from the noise is a new mixed-use affordable housing complex designed by local firms Patrick Tighe Architecture, based in Santa Monica, and John V. Mutlow Architects, from Los Angeles. The parti is relatively simple: a 32-unit courtyard-style apartment building with ground-floor commercial space. Each of the studio, one-, and two-bedroom apartments has its own balcony and courtyard-facing terrace. The streetside façade is clad with a shield of laser-cut aluminum panels overlaying the recessed aquamarine balconies, and its entry corner is wrapped with a series of striking, large white bands that recall the imperfectly lain bandages of a cartoon mummy.

Sited next to a fast food parking lot, the corner has the airspace to burst into notice on the avenue, creating the “big move,” according to principal Patrick Tighe, FAIA. “We wanted to celebrate that corner and treat



Un-Rolled Elevation

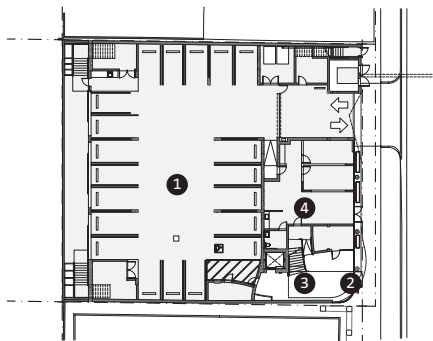




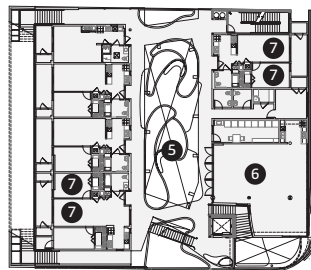
Previous spread: White ribbons of panelized metal wrap the building's southeast corner. **Opposite top:** The ribbons extend across the aluminum screen of the east façade, fabricated by Gardena, Calif.-based Machineous. **Opposite middle:** The walls of the recessed balconies are painted aquamarine. **This image:** The pattern of the perforations affords privacy, while still allowing for the passage of light and air.



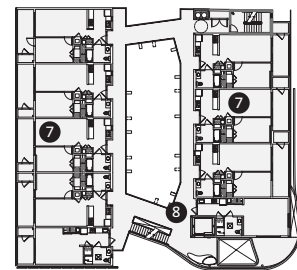
Ground-Floor Plan



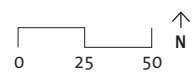
Second-Floor Plan



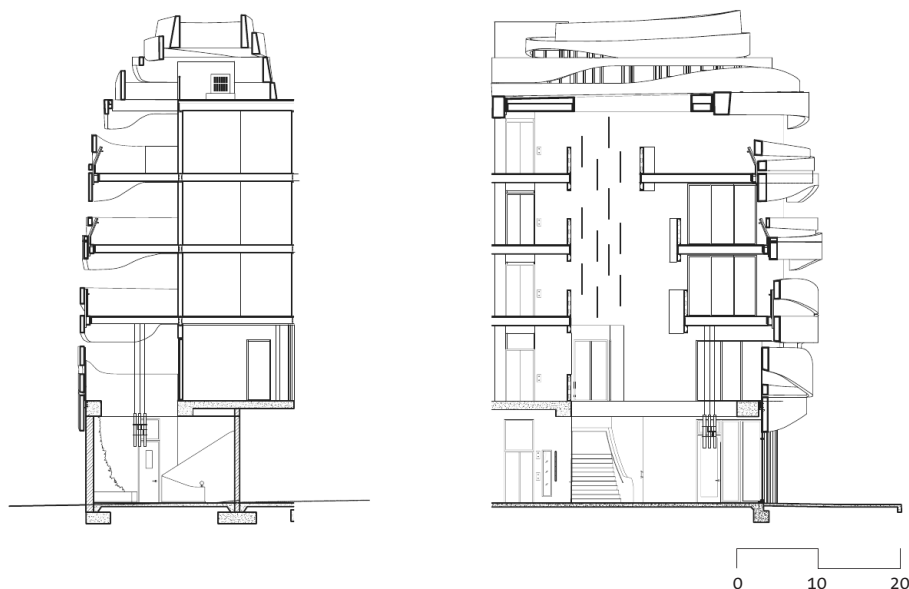
Third- to Fifth-Floor Plan



- | | |
|-----------------|------------------------|
| 1. Parking | 5. Courtyard |
| 2. Entrance | 6. Public space |
| 3. Lobby atrium | 7. Residential unit |
| 4. Commercial | 8. Outdoor circulation |



Lobby Atrium Sections



Opposite left: Concrete, metal, and industrial fixtures carry the exterior aesthetic through to the public spaces, such as this lobby that leads to the residential units on the floors above. **Opposite right:** Much of the circulation in the building is accommodated by open-air pathways, with railings of perforated aluminum that nod to the building's skin.

it almost like a fifth elevation," he says. "The corner really becomes an important element. It's almost like a beacon of activity."

In an example of unabashed computer-modeled architecture, the bands demand notice on a street where every other building seems to be either recently completed or under construction. "There isn't much context there. It's all being developed," Tighe says. And given that much of the surrounding residential fabric is market rate, he says, "we were really more interested in the building from the inside out and from the perspective of the user."

The facility opened earlier this year and houses formerly homeless LGBT youth, people with disabilities, and people living with HIV/AIDS. The nonprofit AIDS Project Los Angeles occupies the ground-floor commercial space. Because Tighe wanted the building to function as a welcoming environment, the design emphasizes the apartments' private-but-open terraces and balconies as well as common spaces, especially in the courtyard.

Not just an L.A. archetype, the courtyard also serves an environmentally functional role, mostly due to its north-south alignment. "The fact that we can get air and light into the middle of the building allows for

each unit to have cross ventilation, creating a microclimate within the building," Tighe says.

The rooftop incorporates photovoltaics and a solar hot water system that provides free, passively heated water to residents. The temperature-regulating courtyard also helped the project meet West Hollywood's municipal green building standards. While they didn't pursue certification, Tighe says it would meet the equivalent of LEED Silver.

Developed by the nonprofit West Hollywood Community Housing Corp., the \$8.3 million project was funded by the City of West Hollywood and the County of Los Angeles, and also through low-income housing tax credits. "These are low-cost projects, and we try to get as much design out of them as we can," Tighe says.

What helped was the cooperation between the architects and the city, Tighe says. He and his team worked closely with West Hollywood's urban designers and planners, as well as its architectural review board and other community groups to refine the project. "It was almost a community-driven design," he says. And the structure holds its own in the visual static of a city with more than its share of things to see.

This image: The entry directs residents to a planted central courtyard on the second level, around which all of the residential units are arranged. Poured-concrete planters and benches provide gathering areas for the residents. **Opposite:** Concealed behind the building's beribboned corner is the open-air main lobby atrium.





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S-HOUSE

TOKYO-BASED YUUSUKE KARASAWA ARCHITECTS DESIGNED A GLAZED, SPLIT-LEVEL HOUSE IN JAPAN'S SAITAMA PREFECTURE THAT EXPLORES THE OWNER'S INTEREST IN THE NETWORKS FORMED BY SPACE AND NATURE.

Text by **Katie Gerfen**

Photos by **Sergio Pirrone**

PHILOSOPHY AND ARCHITECTURE are certainly no strangers, but rarely does a scenario play out where a client finds an architect who can fully express the client's life's work through the design for a single-family home. Such is the case with the S-House in Ōmiya, in the Saitama Prefecture of Japan. The client is a professor of what he terms "network philosophy." An acolyte of French philosopher Michel Serres, he studies the interconnections between humans and nature.

Tokyo-based architect Yuusuke Karasawa—who worked at MVRDV and Shigeru Ban Architects before starting his eponymous firm in 2006—is interested in what he terms "complicated network space," wherein, he says, "walls, ceilings, and floors are intricately entwined together." So when Karasawa got the commission to design this 1,117-square-foot house, it was a match made in ... well, complex interior volumes and viewlines.

The result is a split-level, two-story structure with ribbons of glazing so expansive that the views of the dense suburban neighborhood are all-encompassing and inhabitants' every action is on display. (Mirrored polyester privacy curtains appear opaque outside but still allow views out.)

Working with British engineer Alan Burden, Karasawa developed a structural system that allowed him to "recognize a network space purely," he says. Steel plates, 6 millimeters thick, were welded together to form box beams that mark each half-level on the façade. The void inside the beams allows for electrical and mechanical systems and equipment. To minimize seams, the beams and glazing were fabricated at maximum lengths. Thin steel columns are positioned at the corners to deal with the stressors of Japan's earthquake-prone environment.

Karasawa's system of scissoring central staircases would make M.C. Escher proud. The split levels and lack of interior partitions make for complex spatial relationships between the two bedrooms and baths, living room, dining room, kitchen, and study. Each functionally discrete area visually bleeds into others. The house is capped by two white-ceramic-tiled terraces, reminiscent of those favored by Le Corbusier.

After the client moved in, Karasawa says, "he thought the house succeeded in realizing network philosophy as his lifelong theme of study, and was also quite a comfortable space for daily living." Proof, perhaps, that architecture can not only be driven by, but also imitate, philosophy.

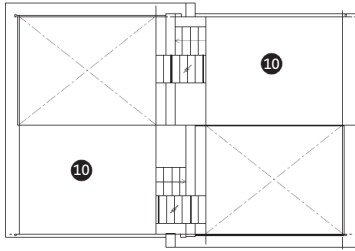




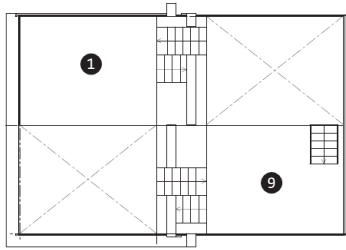
Previous page: The thin, fluoropolymer-painted steel plate that forms the primary structure of the S-House extends beyond the glazed perimeter. Privacy curtains allow for views out but not in.

This image: Scissoring staircases connect the split-level interiors, offering glimpses into the bedrooms, dining room, kitchen, and other spaces.

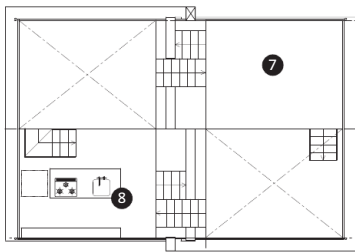
2.5-Level Plan



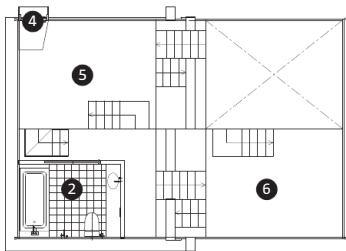
2.0-Level Plan



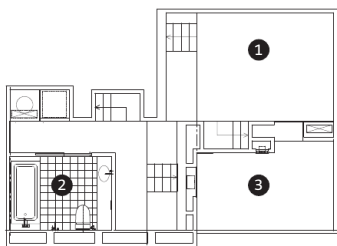
1.5-Level Plan



1.0-Level Plan



-0.5-Level Plan



- 1. Bedroom
- 2. Bathroom
- 3. Storage
- 4. Entrance
- 5. Foyer
- 6. Dining room
- 7. Living room
- 8. Kitchen
- 9. Study
- 10. Terrace





Opposite top: White-painted plaster board covers most of the M.C. Escher-like interior. Hard surfaces are countered by the perimeter curtains and in some spaces by hemp carpet. **Opposite bottom:** Two ceramic-tiled roof terraces provide outdoor space in the dense urban neighborhood. **This image:** Wood bookcases define the study.



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Qingdao World Horticultural Expo Theme Pavilion, PAGE 108

Project Qingdao World Horticultural Expo 2014 Theme Pavilion, Qingdao, China

Client Office of 2014 Qingdao World Horticultural Expo Executive Committee

Architect UNStudio, Amsterdam—Ben van Berkel, Hon. FAIA, Hannes Pfau, Gerard Loozekoot, Markus van

Aalderen, Joerg Petri, Milena Stopic, Yu-Chen Liu, Cong Ye, Irina Bogdan, Xing Xiong, Maud van Hees, ShuoJiong Zhang, Philipp Mecke, Maya Alam, Junjie Yan, Gilles Greis, Subhajt Das, Erwin Horstmanshof, Faiz Zohri, Andrew Brown, Patrik Noomé, Amanda Chan, Nanang Santoso

Competition Stage:

Landscape Architect !melk urban design

Theater Adviser Theateradvies

Structural and M/E/P Engineer Arup

Construction Stage:

Local Architect and Structural and M/E/P Engineer Qingdao Architectural Design Institute

Façade Engineering Shenyang Yuanda Aluminum Industry Engineering

Lighting Tsinghua Tongfang

Size 35,000 square meters (376,736 square feet)

South Australian Health and Medical Research Institute, PAGE 118

Project South Australian Health and Medical Research Institute (SAHMRI), Adelaide, Australia

Client South Australian Government; SAHMRI

Architect Woods Bagot Global Studio Collaboration between the Adelaide, Melbourne, and New York studios

Interior Designer Woods Bagot

Mechanical and Hydraulic/Plumbing Engineer

Norman Disney & Young

Structural, Civil, Electrical, and Geotechnical Engineer Aurecon

Managing Contractor John Hindmarsh

Landscape Architect Oxigen

Lighting Designer Norman Disney & Young; Aurecon

Laboratory Specialist Research Facilities Design

Project Risk Management Department of Transport, Energy and Infrastructure

Cost Manager Rider Levett Bucknall

Environmental Consultant Cundall

Building Surveyor BuildSurv Building Surveyors & Certifiers

Building Certifier Katnich Dodd

Disability Consultant Disability Consultancy Services

Dangerous Goods Consultant CETEC

Wayfinding and Signage Consultant ID/Lab

Radiation Shielding Design Consultant Radiation Services Group

Size 30,000 square meters (322,917 square feet)

Cost \$186 million

Material and Sources

Building Management Systems and Services

Schneider Electric schneider-electric.com

Carpet Interface interface.com.au

Ceilings AMF amfceilings.co.uk; Rockfon rockfon.com

Concrete Piotto Bros.

Electrical Services Nilsen nilsen.com.au

Façade Yuanada yuanda-europe.com

Fire Services Trojan Fire

Flooring Riga Floor Coverings (timber)

rigafloors.com.au; Arrunga Surface Solutions (concrete) mirafloor.com.au

Furniture Aura (system furniture) auradesignerfurniture.co.uk; Wunda (joinery) wunda.com.au

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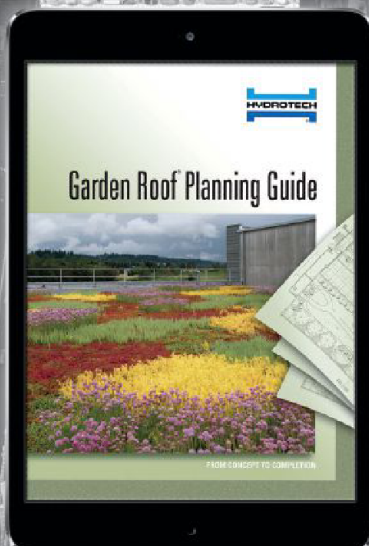


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La Brea Housing, PAGE 128

Project La Brea Housing, West Hollywood, Calif.

Client West Hollywood Community Housing Corp.—Robin Conerly (executive director), Jesse Slansky (director of real estate development)

Architect Patrick Tighe Architecture, Santa Monica, Calif., and John V. Mutlow Architects, Los Angeles—Patrick Tighe, FAIA, John V. Mutlow, FAIA (principals); Evelina Sausina, Assoc. AIA, Alan Dana, Assoc. AIA

(project architects); Chia-Min Wang, Andrea Urmanita, Michael Ho, Assoc. AIA, Albert Chavez, Kervin Lau, Assoc. AIA, Ted Digiralomo, Gelareh Arbab, Grant Nunnelee, Pepe Sanchez, Monica Mader, Barkev Daron (team)

Structural Engineer Ming Yang Yeh + Associates

M/E/P Engineer IBE Consulting Engineers—John Gautrey, Alan Locke

Environmental Consultant Green Dinosaur—Jason Lorcher

Civil Engineer P.A. Arca Engineering

Construction Manager Castle & Gray International—Freddy Pinero, Tim Conrey

General Contractor Alpha Construction—Irvin Laxineta, Gerald Pedrow, Phil Logan

Landscape Architect Mark Tessier Landscape Architecture

Fabricator Machineous

Solar PermaCity

Size 52,000 square feet

Cost \$8.3 million

S-House, PAGE 137

Project S-House, Ōmiya, Saitama, Japan

Architect Yuusuke Karasawa Architects, Tokyo—Yuusuke Karasawa (principal in charge)

General Contractor O'Hara Architectural and Construction—Akira O'Hara, Satoshi Kikuch

Size 103.76 square meters (1,117 square feet)

Material and Sources

Structure Steel frame; Fluoropolymer-painted steel plate

Flooring Ceramic tiles; Oak flooring; Hemp carpet

Walls Emulsion-painted plaster board

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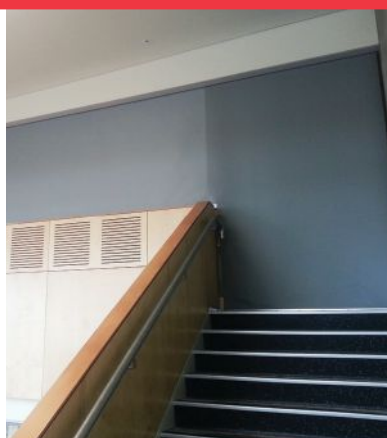
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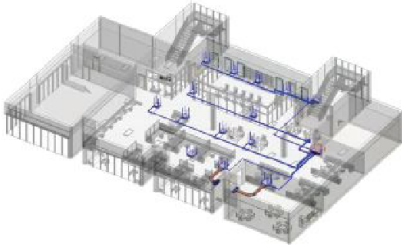
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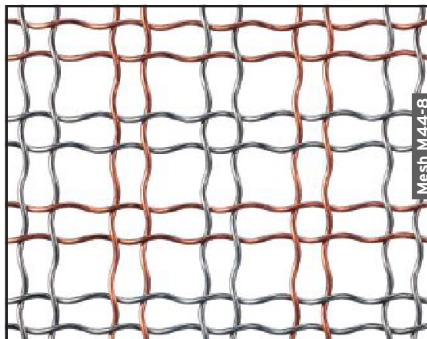
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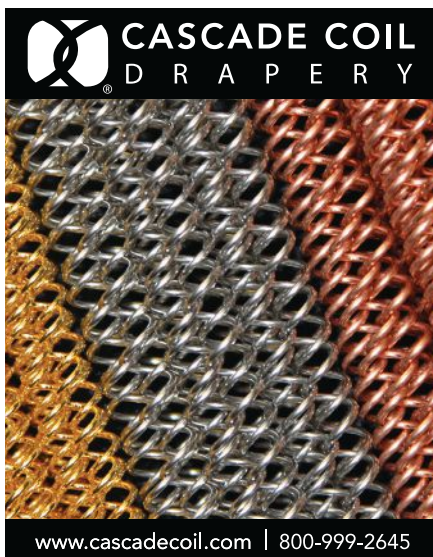


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1999 P/A Awards Jury

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 Eva Jiricna, Hon. FAIA
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 Billie Tsien, AIA
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Text by **John Morris Dixon, FAIA**

WHEN PRATT INSTITUTE, the venerable art and design school in New York's Brooklyn borough, decided to build new student housing in the 1990s, it held an invited design competition. The winner was New York-based Pasanella + Klein Stolzman + Berg, now known as PKSB.

The dorm was to be situated in one corner of the school's urban campus, near some well-preserved townhouses and low-rise apartment buildings. The PKSB scheme divided the program's 128 two-student rooms among several volumes that reflected the neighborhood's scale—a long bar on the campus side and three almost cubic wings facing the community. Interior amenities that helped the architects to win the commission—and the P/A citation—were the exceptional shared spaces they were able to add to the program, within the budget: several double-height project studios and a large,

equally high entrance lobby that was intended to double as a gallery or a theater.

Some proposed exterior features were revised on the way to construction. While much of the building is clad with brick, which is in harmony with its older neighbors, all-glass cladding was specified for the upper floors of the campus-facing long bar and on the recessed areas of the wing walls. Between concept and completion, this glass was replaced variously by panels of factory-painted steel and translucent Kalwall, preserving the design's concept, if not its material.

As often happens, the Progressive Architecture Awards jury's decision reflects some recorded differences. While juror Eva Jiricna, Hon. FAIA, professed that "it doesn't make me feel 'Wow,'" juror Billie Tsien, AIA, praised the design for handling potentially mundane program elements with "elegance."

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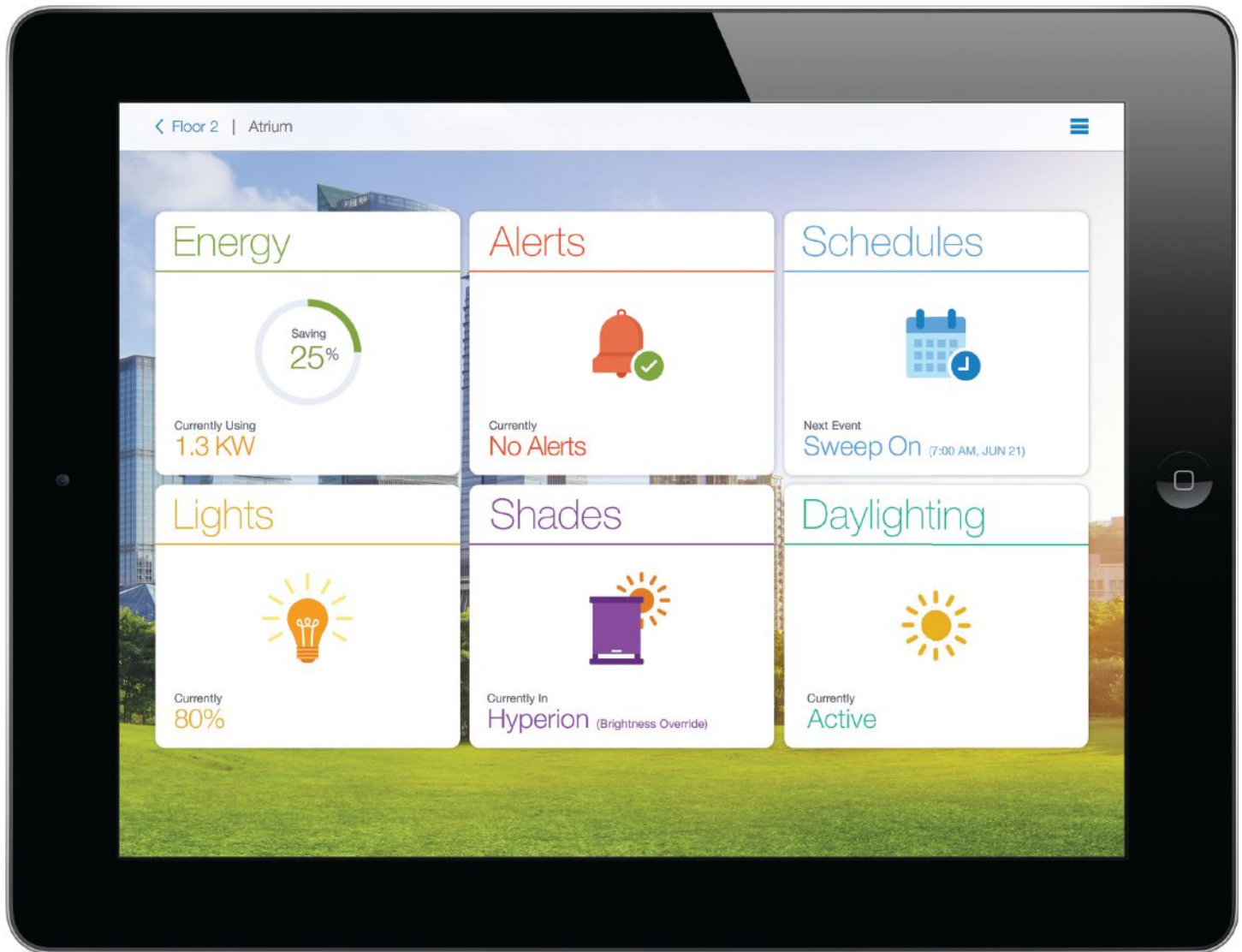
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