ARCHITECT

AIA Awards Issue

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The Journal of the American
Institute of Architects

Denise Scott Brown and Robert Venturi

"To Question How We Look at Things"

Ready for the Close-Up

Reducing Office Noise Receives Star Billing on Lifetime® Television

Collaboration and focused work take place in the bullpen area adjacent to private offices at BrandStar, Lifetime® Television's educational programming unit.

It's challenging enough to transition 135 busy professionals from a 20,000-square-foot space into an 11,000-square-foot space and then hope for a far more collaborative, productive work environment.

But that challenge gets really interesting when you broadcast every interior design decision and all the related construction activity that goes with it on Lifetime® Television.

Three different views of the bullpen area featuring white Calla™ ceiling panels and Formations™ Acoustical Clouds with Calla panels and Axiom® trim in Stone.

Welcome to the world of Kalyn Rothaus, interior designer, project manager, and on-air host of "Office Spaces," a reality TV series airing on Lifetime and in national syndication. Rothaus has the task of moving Lifetime's entire educational programming unit, called BrandStar, into a new, though considerably cozier, headquarters. The entire workplace transformation process is the subject of the hit TV show's first season.

"Our goal with the new space is to cut down on the owner's costs, create a workspace that's much more efficient, take maximum advantage of technology, and empower the BrandStar team with a more collaborative workspace that also supports focused work," explains Rothaus.

These requirements and their delivery led to a lively, dramatic series.

Take an area of central concern to Rothaus, namely noise reduction. What could she specify that would support the space compression with minimally-disruptive sound, especially conversations?

"One of my biggest challenges was designing a bullpen area for about 54 employees that still supports focused work," the TV host says. "Employees are on the phone. They're chatting with each other. They're expected to work as a team. I needed to manage all that noise."

"I did research about the ceiling panels with best-in-class sound absorption (noise reduction coefficient, or NRC), and sound blocking (ceiling attenuation class, or CAC) ratings. My investigation pointed me to Armstrong® Ceiling Solutions and their panels with Total Acoustics™ performance."

With a vast audience, including her peers in the architect and design community, following every move on TV, social media, and digital platforms, Rothaus was not about to risk the final outcome on anything less than a proven, must-perform solution.

Enter Armstrong Ceilings.

She worked with Armstrong Ceilings to identify a look, a performance expectation, and a budget that satisfied the building owner. Rothaus specified Calla™ ceiling panels with Total Acoustics™ performance knowing it would be ideal for private offices where sound blocking is important, as well as wall-to-wall ceilings in open spaces where noise reduction is crucial.

"I knew Armstrong Ceilings had good products, but I didn't want the typical visual of a two-foot by two-foot ceiling. I wanted to install linear light features. Because the open area ceiling is so expansive, I wanted to break it up with a decorative component," Rothaus observes.

She specified Formations™ Acoustical Clouds with Calla panels in Stone and crisp aluminum Axiom® trim to add the desired decorative visual. To further ensure the staff's acoustic comfort, she authorized a Dynasound sound-masking system to suppress the distractions of unwanted sounds.

What were the final results? An acoustical consultant measured the performance of the space and confirmed the success of Rothaus' efforts. The closed offices achieved a reverberation time of 0.4 seconds and Privacy Index of 100 percent. These ratings ensure optimized speech intelligibility within the space and confidential speech privacy between adjacent spaces. In the much larger open plan bullpen area the reverberation time remained 0.4 seconds, thanks to the added absorption of the Formations clouds. Normal speech privacy was achieved with the Privacy Index between adjacent workstations measuring from 80 percent–94 percent.

The result is documented in episode six of "Office Spaces," devoted to noise reduction. As Rothaus describes, the staff reaction made for a perfect TV ending.

"I took as many steps as I could to make sure noise wasn't an issue. The BrandStar team is now in the new space and is able to work and be very focused in a group area. It's very impressive. It's pretty incredible how it all works together to create a high-performance work setting."

The audience has declared it a winner, too: Rothaus is now in production on season two of "Office Spaces."

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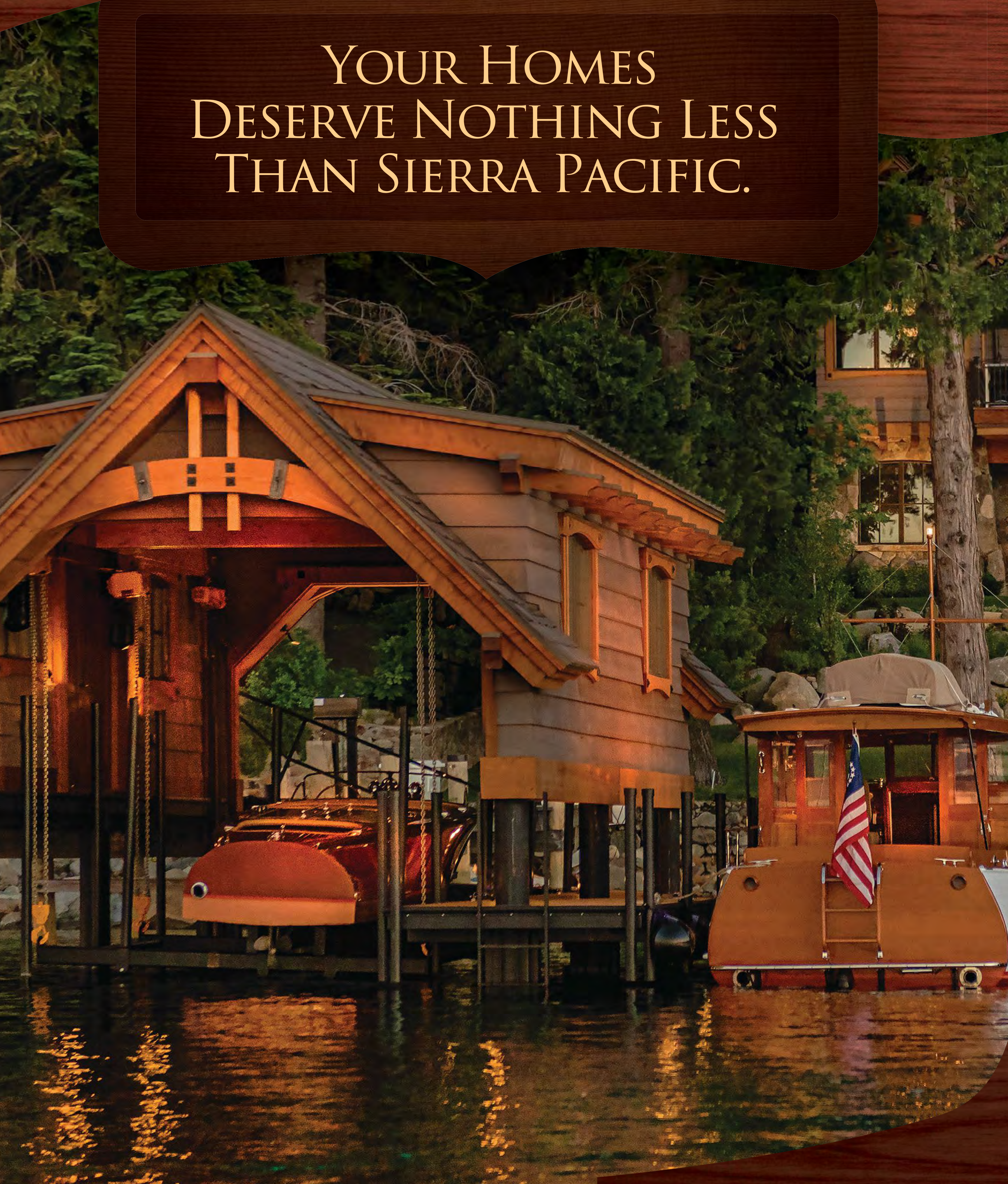

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LARA SWIMMER

Reading Is Fundamental

The AIA and the American Library Association (ALA) announced seven winning projects for their 2016 Library Building Awards, which recognize excellence in library architecture. This year's recipients reflect the changing role of libraries within communities that have come to expect technologically advanced spaces in lieu of traditional stacks of books. The Miller Hull Partnership's Renton Public Library (above), in Renton, Wash., for example, was praised by the jury for connecting "the downtown district to the City Park, bringing life and activity to the spaces within and around ... without disrupting the habitat and hydraulics of the river below." —DEANE MADSEN

> *Learn more about all seven of the winning AIA/ALA Library Building Award winners at bit.ly/2016AIAALALibraryAwards.*


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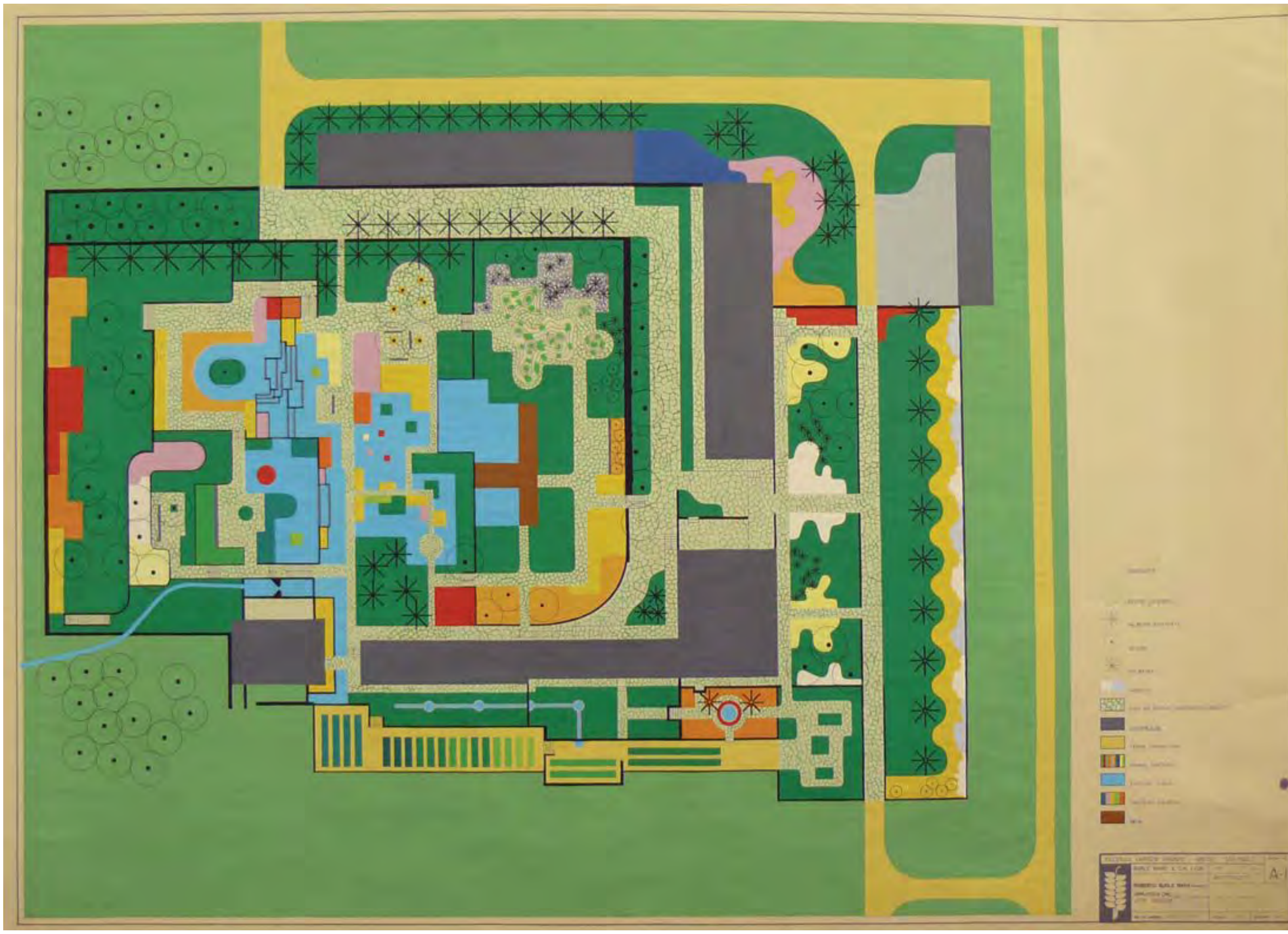

COURTESY THE JEWISH MUSEUM

The Constantly Modernist Gardener

Most people know Roberto Burle Marx as the designer of nearly 2,000 gardens worldwide that broke with the 19th century European tradition in favor of using native fauna and asymmetry. A monographic show at the Jewish Museum in New York City, *Roberto Burle Marx: Brazilian Modernist*, offers nearly 140 examples of the designer's work, celebrating both his landscapes as well as Burle Marx's talents in painting, sculpture, theater design, textiles, and jewelry. On display until Sept. 18, the exhibition will then travel to Berlin before ending, appropriately, in Rio de Janeiro.

> *See more images from the Roberto Burle Marx exhibition and monograph at bit.ly/BurleMarxModernist.*


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LUIS GALLARDO

The Triangle in the Square

In March, Pavilion on the Zócalo, a temporary installation by the Mexico City firm Productora, won the 2016 Mies Crown Hall Americas Prize MCHAP.emerge Award. Built two years ago for the Mexican capital's annual Culture Fair on a plaza that dates back to the Aztecs, the three-piece wooden pavilion highlights how influential migration has been to the city and houses an exhibition by Mexican architect Alberto Odériz. The biennial award, established by Illinois Institute of Technology architecture dean Wiel Arets, ASSOC. AIA, promotes the work of innovative young practices throughout the Americas. —CHELSEA BLAHUT

> *Read more about Productora's winning project at bit.ly/2016MCHAPprize.*

COURTESY HERZOG & DE MEURON

Ancient City, Modern Library

While working on its proposal for the National Library of Israel, Herzog & de Meuron had to reconcile challenges to both typology and site. For typology, the firm had to envision a new library for the digital age; for site, designing for Jerusalem, even in the more modern neighborhoods, is a balancing act between honoring history and exploring possibilities. The firm's solution, it says, "is open and transparent but grounded in the traditions of great libraries and the city itself. As in the past, books will remain at the center. They form a foundation and necessary balance against constant technological change … and are visible to all in a central void."

> *See more renderings of Herzog & de Meuron's design for the National Library of Israel at bit.ly/NationalLibraryIsrael.*

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Ghost Story

How do you walk inside a building that has been gone for nearly a millennium? For Italian artist Edoardo Tresoldi, the solution was to rebuild it. A sculptor, Tresoldi reconstructed the basilica of Siponto, on the Adriatic coast of Italy, a church destroyed by an earthquake in the 13th century along with the surrounding town, which itself dated back to the second century B.C. But Tresoldi built the new version of the church as a ghost of its former self, using 4,500 square meters of wire mesh weighing 7 tons. The spectral structure has been drawing crowds to the archaeological site since it was erected in early March.

BLIND EYE FACTORY

> See more photos of Edoardo Tresoldi's unnerving ghost of the Siponto cathedral at bit.ly/SipontoGhostChurch.

COURTESY ADRIAN SMITH + GORDON GILL ARCHITECTURE

All the Waterfront's a Stage

A couple of summers from now, if you head to Chicago's Navy Pier to catch the Lake Michigan breezes and take in a few acts from the Bard, you might be seated underneath this new, configurable tent. Local superstar firm Adrian Smith + Gordon Gill Architecture has designed the Yard at Chicago Shakespeare Theater, which will provide the company with its third stage. Mobile towers support the tent, allowing the venue to be reconfigured from an intimate space for 150 to a much larger space for 850. Construction is expected to begin soon, with completion scheduled for fall 2017.

> *See more renderings of Adrian Smith + Gordon Gill Architecture's design for the Yard at Chicago Shakespeare Theater at bit.ly/ChicagoShakespeareYard.*

RYANN FORD

Pit Stop Preservation

Inspired by a move from Southern California to Austin, Texas, much of it along Route 66, photographer Ryann Ford started documenting a once-ubiquitous animal now nearing extinction: the midcentury rest stop, built as the U.S. was ramping up its infrastructure capacity with President Eisenhower's Interstate Highway System. After a few years, Ford had shot more than 150 stops around the country and crowdfunded the idea into a book, *The Last Stop: Vanishing Rest Stops of the American Roadside* (Powerhouse Books, 2016). The stops, she wrote in her pitch, gave drivers a way to "reconnect people to the places they were traveling through."

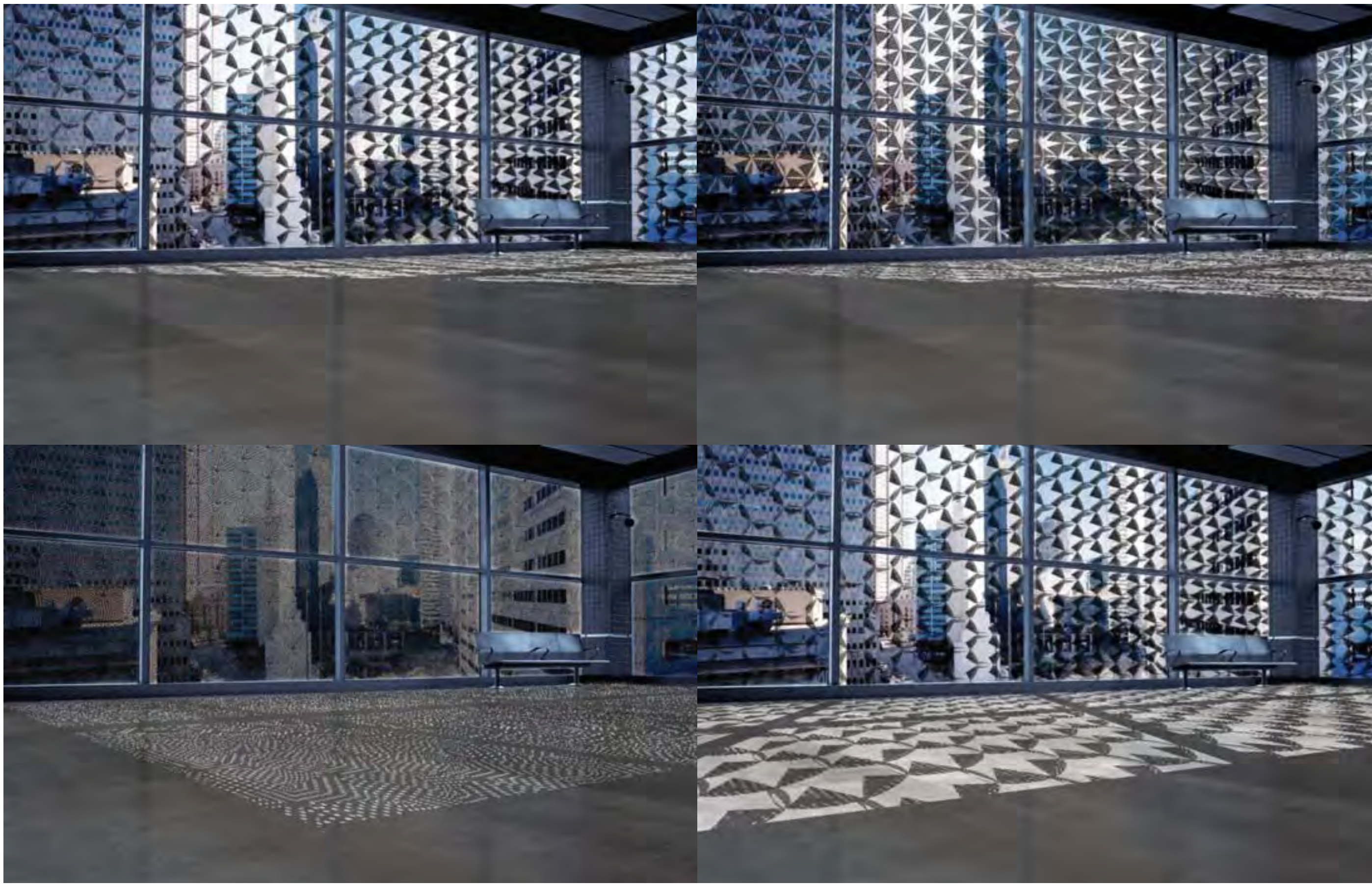
> *For more images from Ryann Ford's rest stop series, go to bit.ly/PitStopPreservation.*

COURTESY OMA

RFK by OMA

As gentrification spreads across the District of Columbia, there is, once again, discussion about what to do with the 190-acre RFK Stadium site between Capitol Hill and the Anacostia River, which is ever-more neglected since Dan Snyder took his NFL team to the suburbs and D.C. United announced a future move to Buzzard Point. Now comes the District and the Office for Metropolitan Architecture with two design concepts fleshed out around three potential programs: a 20,000-seat arena, an NFL stadium, and no primary anchor tenant. The District plans to review public feedback before moving on to the next phase of the project.

> *See more renderings and plans from OMA New York of the proposed RFK Stadium-Armory Campus Master Plan at bit.ly/RFKbyOMA.*



COURTESY DOSU STUDIO ARCHITECTURE

Windows to the Future

The AIA College of Fellows has awarded $100,000 in its 2015 Upjohn Research Initiative. The recipients are a thermobimetal shading system (above), by Doris Sung of DOSU Studio Architecture, in Rolling Hills, Calif.; an online tool to evaluate resilience and sustainability upgrades, by David Fannon, AIA, of Northeastern University, in Boston; a mechanical shade with microelectronic photovoltaics, by Kristina Yu, AIA, of McClain + Yu and the University of New Mexico, in Albuquerque, N.M.; and a tool to help students make healthy food choices, by Upali Nanda, ASSOC. AIA, of HKS in Dallas and Michelle Eichinger of Designing4Health, in Atlanta.

> *For more information on the 2015 Upjohn winners, visit bit.ly/2015UpjohnGrants.*

Climbing to the Past

Dutch firm MVRDV is helping its hometown of Rotterdam celebrate 75 years of rebuilding since World War II. This month, a 57-meter-long temporary set of stairs designed by the firm opens, starting at the square outside the entrance to the city's new Central Station, designed by Benthem Crouwel Architects, and extending 29 meters up to the Kriterion theater on the roof of the nearby Groot Handelsgebouw (above), one of the first buildings constructed after the war. According to MVRDV, ascending the steps gives one "a progression of perspectives over the city as you climb."

COURTESY MVRDV

> *See more renderings of the Stairs to Kriterion at bit.ly/StairsKriterion.*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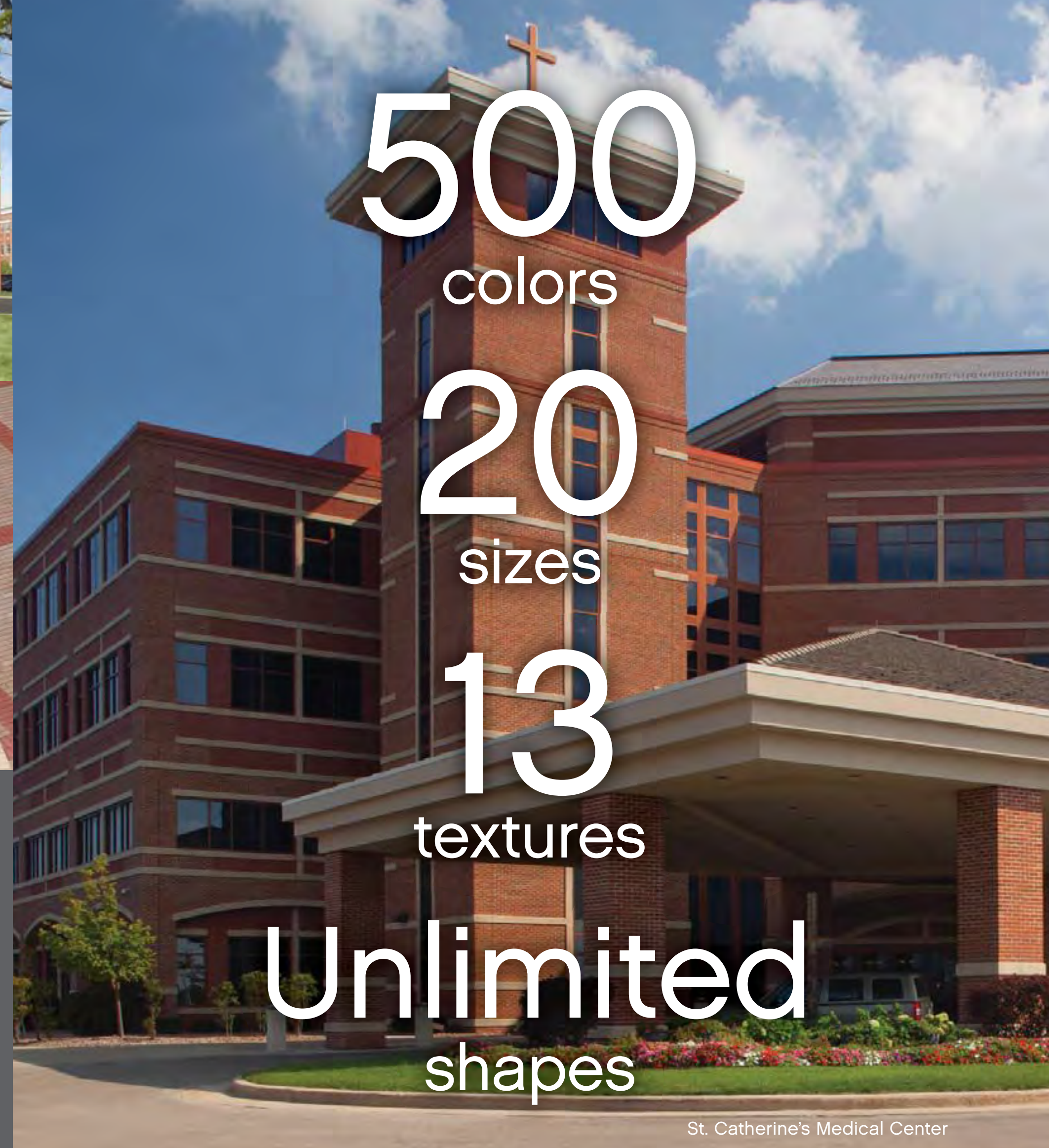

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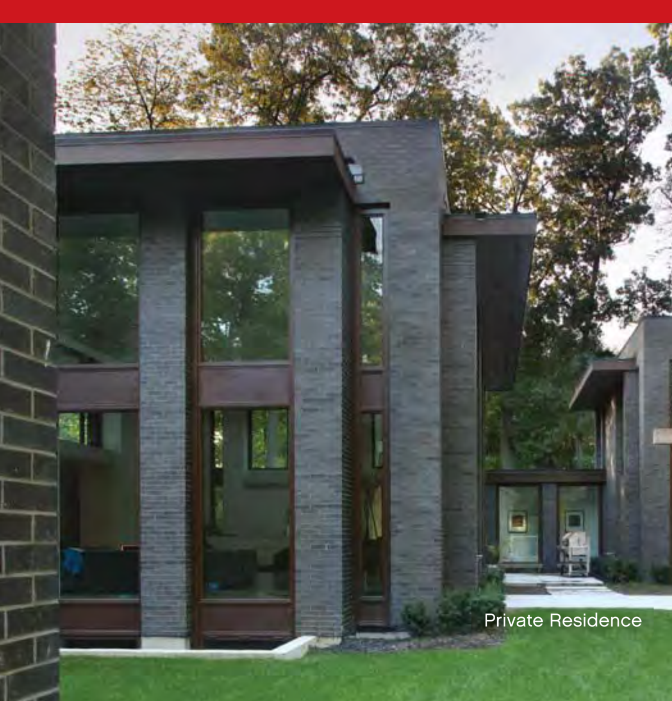
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Professional Development: Political Advocacy

TEXT BY BRIAN LIBBY

Feeling isolated as a sole practitioner, San Antonio architect Roberto Treviño, AIA, reached out to city council member (now mayor) Ivy Taylor in 2010 to ask how he might leverage his design expertise on local issues. She invited Treviño to join city committees on building and fire codes. When a council member resigned in 2014, Treviño was appointed to fill the spot. He was re-elected in 2015 and continues to serve on the council.

"Architecture is one of the most important things that we have to help communities shape themselves, both literally and figuratively," Treviño says. "However, when we start talking about the leaders of the community, most often you have people without an architectural background."

As local leaders, architects can bring an objective, analytical perspective to the organizations that run their communities. And there's already widespread interest among practitioners in making a difference. In a 2013 survey of 383 AIA-member architects by the Center for Public Interest Design at Portland State University's (PSU) School of Architecture, 8 in 10 respondents said that their desire to improve the quality of life in their communities has increased since they entered architecture school, while three-quarters think that architects should advocate for underrepresented groups, engage local stakeholders in decision-making, and conserve resources.

> "When design issues come up, my fellow council members defer to me."
>
> —Roberto Treviño, AIA, sole practitioner and councilman, San Antonio City Council, District No. 1

Getting Technical

It's possible to get involved in politics without being partisan, as architects' skill sets typically favor technical details and processes over fiery rhetoric, says J. Christopher Ball, AIA, of Jack Ball Architects, in Springfield, Mo., who has served as president for his city and state AIA chapters as well as on state boards and committees, including the AIA Missouri State Government Network and the Missouri Architects Political Action Committee. "It's what we do every day: Resolve what this group wants, what that group can afford, and how we can make it work for everyone," Ball says. "I can talk one side of sustainability, for example, to a client who's extremely green-minded, and I can talk energy savings and cost savings on the other side. These do not have to be polarizing issues."

The hard part is perseverance amid the sometimes-glacial pace of change, says Thomas Vonier, FAIA, the incoming president of the AIA National Board of Directors for 2017. "You learn how frustratingly slow progress can be, how much determination and stamina is needed to make even modest advances," he says. "Politics is a long game."

Looking Local

The key to effecting change is starting local, where politics can be less doctrinaire and more personal, says Sergio Palleroni, a PSU architecture professor who co-authored the 2013 study. "People feel more connected to their own issues, like where their kids go to school," he says. "They're trying to be engaged and see what change they can make happen. That desire has grown in our profession."

Layering design and planning expertise with local knowledge can help architects offer insight on the effects of proposed legislation. "We can be the ones to say, 'This highway will do great things, but it will separate this whole neighborhood from the services they need. You're going to put more people in cars,'" Ball says.

Treviño thinks that's why his role on City Council has been so well-received. "If I make a comment, the media describes me as 'City Councilman Treviño, who is also an architect,'" he says. The ability to explain how and why something goes from point A to point B, he adds, jibes with the needs of local government. An architect's advocacy isn't just another opinion—it rests on a foundation of professional expertise. "When design issues come up, my fellow council members actually defer to me," Treviño says. "They want to hear my expert opinion."

> For more about bringing architectural expertise to community organizations, visit bit.ly/PoliticalAdvocacy.


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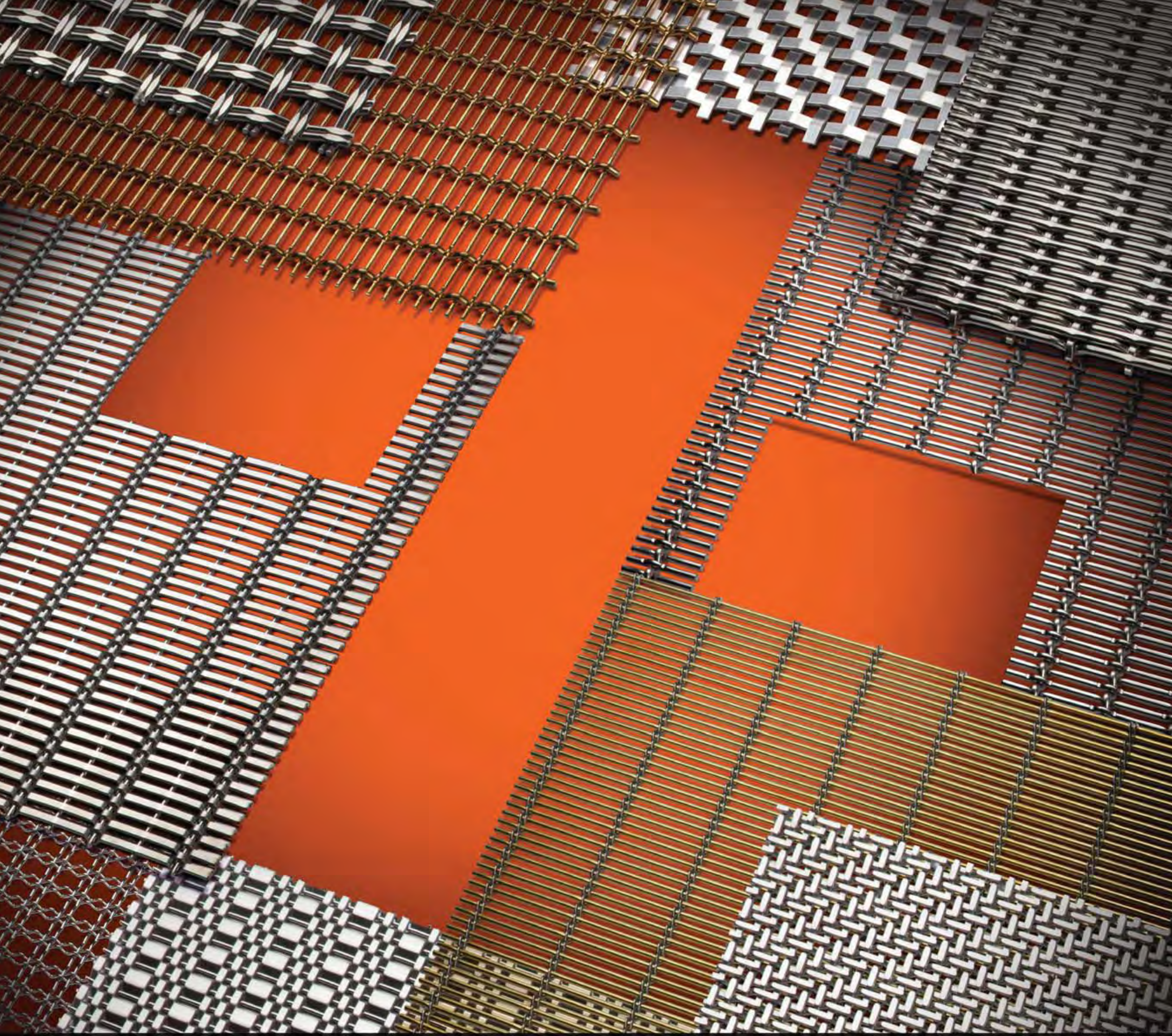


Best Practices: Mastering Economic Data

TEXT BY NATE BERG

Projecting demand for architectural services can be challenging, but it's not impossible. With a little effort and a little data, say firm leaders, business advisers, and economists, architects can anticipate and respond to shifts in the market before they happen.

Primary Indicators

A few top-level numbers can be used to gauge broad market trends. The U.S. prime interest rate should be on every firm's radar, since it affects what banks can charge for construction loans, says Saskia Dennis-van Dijl, a business and development consultant at the Cameron MacAllister Group, in Orinda, Calif. "That has a huge impact on the volume of construction because there's no work delivered without some form of a loan," she says. Monthly housing starts is another figure to watch, she adds, to help spot areas of new activity where commercial development may follow.

The job-growth and unemployment rates, along with housing prices, are also worth tracking, says AIA chief economist Kermit Baker, HON. AIA. Firms can use the AIA's monthly Architecture Billings Index to determine how their activity stacks up industry-wide. Monitoring these reports can be made a simple routine. "An administrative person at a firm could do that in 30 minutes a month," Baker says.

Digging into Data

For larger firms, brokered data may be worth the price. Michael Johnson, AIA, design principal at Carrier Johnson + Culture, in San Diego, says that his 85-person firm consults at least quarterly on active and potential markets using paid data from real-estate services firms like the CBRE Group and Jones Lang LaSalle. They also access local data through their involvement in organizations such as the city's Regional Economic Development Corp. and the Downtown San Diego Partnership. City-specific reports can show, for example, the volume of office space in use and how space needs will change in response to economic conditions. This data can also help firms determine when and where to take on new work, Johnson says. Knowing where the healthcare field was headed in California and nationwide, for example, informed his firm's decision in May 2015 to add a division to service that sector.

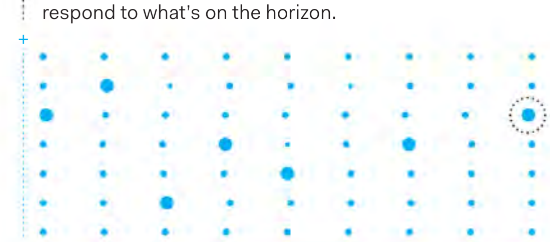
Firms don't have to shell out for detailed data, however. For example, spending time internally tracking what a firm has spent on materials and their overall job costs over time can reveal trends, like the growing use of one product in place of another, while helping firms differentiate and saving clients money on products. "You can anticipate a surge in a specific kind of construction type as a result of broader economic changes," says Michael Liu, AIA, vice president and principal of the Architectural Team, in Chelsea, Mass.

Build Expertise

Ultimately, becoming an expert in the markets your firm serves is the best way to track their trajectories, says Stephen Epstein, a management consultant at Strogoff Consulting, in Mill Valley, Calif., and a former principal at New York– and Los Angeles–based Pfeiffer Partners Architects. "You read the newsletters and you talk to other professionals and engineers," he says. "It's through those relationships and by being in that focused sector for so long that you get a vision of what's coming down the road two or three or four years out."

The AIA's Baker concedes that data can only reveal so much, especially in a field as nuanced as architecture. What affects firms working in one sector might not impact those in another, while other markets are more closely linked. "Understanding historically what those relationships have been is the starting point," he says.

No single piece of information will help an architecture firm see what's coming next. But by combining a few simple numbers, more detailed data, and a bit of hard-won expertise, firms will be better positioned to see and respond to what's on the horizon.



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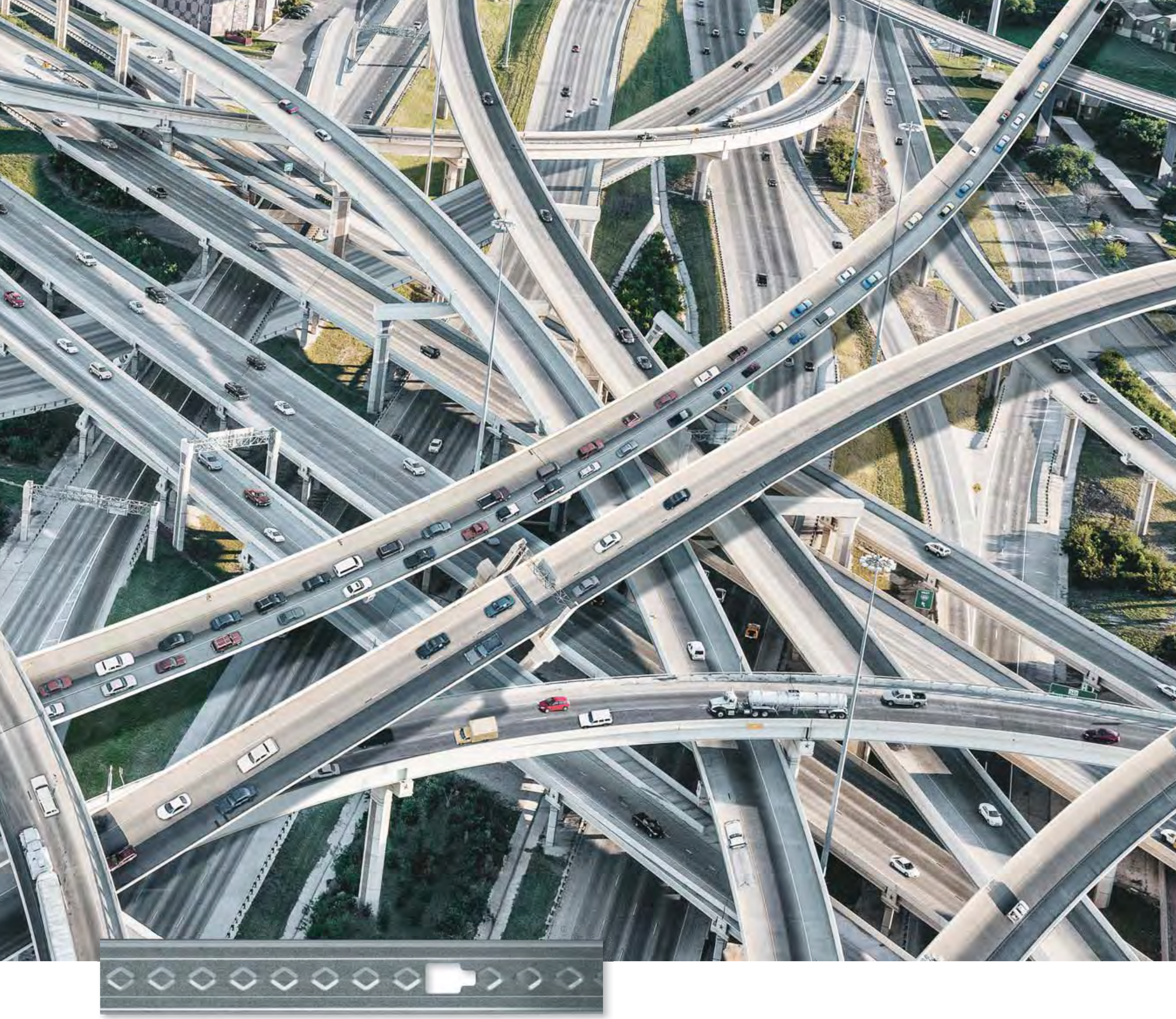

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Detail:
Crossrail Place Lattice Roof

TEXT BY TIMOTHY A. SCHULER

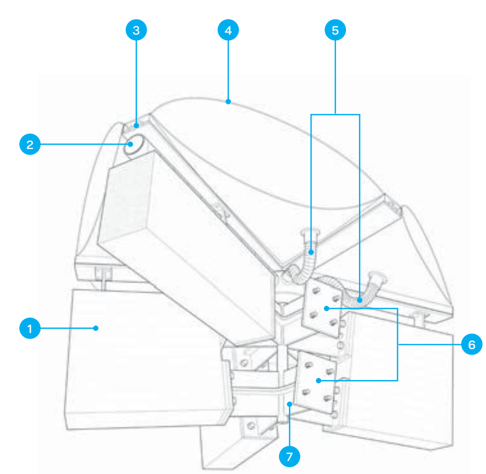
Though permanently moored among the docks of London's Canary Wharf, Crossrail Place has a central role in the city's bustling transportation and trade networks. Designed by Foster + Partners (F+P), the long, tubular structure contains one of nine new stations for London's East West Rail network as well as a shopping center and a public park.

Topped by an arched lattice roof of crisscrossing glulam spruce and a tessellated skin of billowing, triangular ETFE (ethylene tetrafluoroethylene) cushions, the futuristic form and materiality of Crossrail Place are a direct response to the area's maritime history, recalling the dozens of wooden clippers that once docked in this part of the city.

The roof spans the concrete box structure's 112-foot width and 1,017-foot length (longer than three football fields) and comprises 1,418 glulam beams and 564 custom steel nodes, 348 of which are unique in shape. The diagonal glulam members tie into the reinforced-concrete slab that supports the center's elevated park, while the glulam beams running parallel to grade are spaced every 6 meters (19.7 feet). Although the vault roof is curved, the individual glulam beams are straight. F+P explored two possibilities: double-curved beams with simpler steel-node connections or straight beams with more complex nodes. "The question was really where to put complexity and where to put simplicity," says F+P computational designer Jonathan Rabagliati.

Austrian timber contractor WIEHAG made the case that the latter option would be more cost effective, noting that the production of straight glulam beams could be almost completely automated. Thus the complex steel nodes, which resemble toy jacks, position up to six timber members at the angles necessary to create the roof's curvature.

Rabagliati says the project's visibility has undoubtedly raised the profile of timber construction in the city—and changed some perceptions of the firm. People "normally associate Foster + Partners with 'high-tech' architecture," he says. "What they don't appreciate is that engineered timber is probably more high-tech than steel."



1. 10" × 33" glulam timber beam, 13' to 25' long
2. Primary air pipe
3. Extruded aluminum mullions
4. ETFE pillow
5. Air pipe to individual ETFE pillows
6. Galvanized steel end plate
7. Galvanized steel node

NIGEL YOUNG/FOSTER + PARTNERS

WOOD: MULTIFAMILY DEVELOPMENT HOME RUN

The SoBe-esque 310-unit Brooklyn Riverside apartment community has not only helped revive a flagging neighborhood, but ably demonstrates the remarkable benefits of wood in multifamily development.

Jacksonville, Fla. isn't the first thing that comes to mind when you consider edgy urban chic.

Yet the once-sleepy Brooklyn neighborhood of this northern Florida coastal metropolis is undergoing a stirring Miami South Beach (SoBe)-flavored renaissance, led by a $40 million apartment community called The Brooklyn Riverside.

The four- and three-story Brooklyn Riverside, which was delivered in April 2015, is marked by bold festive colors and jaunty cantilevers. The aesthetic bears an unmistakable SoBe vibe. It's a design bet that is an "absolute home run" for the developer and the community.

Powered by Wood

"We kept the base of the building fairly simple," observes the project's lead architect, Jason Shephard, AIA, and principal of Dwell Design Studio, an award-winning national design firm specializing in low-, mid-, and high-density multifamily projects.

"We wanted to use pops of color to accentuate the large overhangs and some of the vertical bends to break up the overall mass of the building.

"People comment all the time, 'This isn't wood frame.' I tell them it's all wood frame, a type V structure. There's hardly any steel at all. It's all done with wood trusses and how we creatively framed the building to pick up those overhangs. It's very unexpected," Shephard says.

Wood plays a starring role in the success of the $40 million Brooklyn Riverside apartment community. Wood construction not only helped reduce project cost, but met all of the required safety and code requirements.

LEFT: The chic design aesthetic is especially favored by a surging marketplace of millennials looking for an urban, more car-free lifestyle. "The developer offers private garages available to any tenant," Shephard reports. "The garages aren't tied to any one particular unit. They can be rented to anyone. Through wood framing and building code, we're allowed to simplify the process and keep it cost-effective for all."

BELOW: The oversized front corner represents the grand entrance. A clubroom occupies the fourth floor, overlooking the city of Jacksonville. The view is spectacular. Tenants are invited to rent for parties and other social events. "A clubroom like this is completely unexpected, especially in a wood-frame structure," Shephard says. "You just don't see it in this product type, especially with surface parking."

Cost Savings

Wood is cost-effective and was central to the project development. Besides the near-absence of steel, the use of concrete was minimized too. There is no podium base. Parking is allocated to 77 private tuck-under garages and 373 surface spaces.

Shephard says his design ethos was shaped in part by the downturn. "Nobody could afford structured parking," the designer states. So Dwell Design has focused on a multifamily design concept called "ditch the deck." The idea: Rely solely on wood to drive design and development economics. "No concrete podium is huge, huge, huge from a cost perspective."

Code & Climate

Brooklyn Riverside even had code officials cheering. "They preferred it from a building code standpoint. We observed expected fire resistive practices, including a full sprinkler system and other code-compliant safeguards. We didn't have to increase our fire rating from a floor-ceiling standpoint, for example," Shephard says.

Building codes require all structures to perform to the same level of safety, regardless of material used, and wood-frame buildings can be designed to meet or exceed standards for fire protection and resistance to harsh weather. In the case of Brooklyn Riverside, code required a one-hour fire rating, typical of multifamily properties. Wood construction fully complies with that rating standard.

And Jacksonville's humid coastal climate? "We carefully considered wind-blown rain. We went with a zip-wall system. It's an engineered sheathing with a built-in vapor and air barrier. There's a bit of a cost bump, but it's minor. It's definitely worth it for this region."

39 Units/Acre

The bold aesthetic has earned its share of rave reviews. But Shephard points to the project economics with equal pride. For example, Brooklyn Riverside is nearly leased-up, with occupancy at about 97 percent. "They've been killing it" as Shephard says of the leasing pace.

With cost of land rising, developers want value-engineered solutions that deliver more density, surface parking and wood-frame performance capabilities. Brooklyn Riverside works from all perspectives—design, development, and community.

"It's an absolute home run."

Owner: Pollack Shores Real Estate Group

Architect: Dwell Design Studio

General Contractor: Cambridge Swinerton Builders

Structural Engineer: M2 Structural Engineering

Photography: Pollack Shores, Matrix Residential

Location: 100 Magnolia Street, Jacksonville, Florida

Awards: 2016 Wood Design Award—Regional Excellence Winner, WoodWorks

Practice: Eight Alternative Careers for Architects

TEXT BY ALICE LIAO

Need a break from design? Good news: Architects can change jobs relatively easily because skills such as creative problem solving and information synthesizing translate well into other professions. While the building industry itself offers myriad options, the eight industries below are a snapshot of the many fields that architects can successfully take on with their training—and we found former designers who have made the leap to prove it.

1. Writing
Designer: Megan Padalecki, children's book author and self-publisher, Padalecki Studio
Degree: B.Arch., University of Texas at Austin
Architecture Experience: Bohlin Cywinski Jackson, San Francisco, six years
Crossover Skills: CAD and Adobe software, drawing, project phasing, and scheduling. The six-month process to write, illustrate, and publish her first book, *Big Mo* (2015), was "eerily similar to that for designing a building," Padalecki says.
Skills to Acquire: Small-business management, accounting, financing, intellectual property law, product distribution and marketing, the last of which she does through her website and by visiting bookstores, contacting bloggers and book reviewers, and speaking to classrooms and libraries.
Advice: Be patient, proactive, and persistent, and solicit input from others. Writing and publishing a book is like "a slow building process," she says.

2. Law
Designer: Jay Wickersham, FAIA, attorney specializing in environmental and land-use law, Noble, Wickersham & Heart
Degree: M.Arch. and J.D., Harvard University
Architecture Experience: Various Boston firms, five years
Crossover Skills: As general counsel for several high-profile design firms, Wickersham regularly draws from his background. "I can read the plans and understand what the different parties are trying to do," he says.
Skills to Acquire: Advanced negotiation skills and the ability "to read very, very carefully and write very, very precisely," Wickersham says.
Advice: If you're seeking a career change but aren't sure in what, learn what your design clients and other project stakeholders do professionally.

3. Business
Designer: Jackie Wong, management consultant, McKinsey & Co.
Degree: M.Arch., University of Pennsylvania; MBA, Wharton School of the University of Pennsylvania
Architecture Experience: Skidmore, Owings & Merrill, New York, six years; lecturer at University of Pennsylvania, five years
Crossover Skills: Project phasing and collaboration, and learning and thinking on the spot. Wong sums up much of what he does now as design thinking—not unlike that used in architecture—to help clients improve performance.

> *To read more about these career paths and the designers who have pursued them, visit bit.ly/AR8AltCareers.*

**Practice:
Eight Alternative Careers**

Skills to Acquire: Team-management strategies, relationship building, accounting, Microsoft PowerPoint, and "Business 101," Wong says.
Advice: Be prepared to explain to potential employers how your architectural skills make you a good hire.

4. Animation
Designer: Alyce Tzue, director and animator, Smule
Degree: B.A. in Architecture, Princeton University; M.F.A. in 3D Animation, Academy of Art University
Architecture Experience: Pelli Clarke Pelli Architects, New York, one year
Crossover Skills: 3D modeling and animation programs, and visualization. The ability to place yourself in an imaginary space is critical.
Skills to Acquire: Collaboration. For her thesis project, *Soar*, an award-winning 3D animated short, the self-proclaimed introvert managed a team of 100 peers. "It's impossible to be a director without loving the process of bringing those people together," she says.
Advice: Hone your animation skills at an art school that offers a collaborative environment. For a more affordable option, try an online school, such as Animation Mentor or AnimSchool.

5. Culinary Arts
Designer: Francesco Crocenzi, personal chef, Frankie's Table
Degree: M.Arch., Syracuse University; Culinary Arts Degree, Seattle Culinary Academy and Quillisascut School of the Domestic Arts
Architecture Experience: Various firms on the West Coast, 16 years
Crossover Skills: Concept development, project phasing, and scheduling. Creating a new dish is an iterative process, Crocenzi says, while cooking efficiently requires a methodical, hierarchical approach.
Skills to Acquire: Small-business management skills and advanced cooking techniques such as pressure cooking and food safety.
Advice: "Be prepared for a slow year of ramping up," says Crocenzi, who garnered a repeat client base after 18 months of online marketing, social media, and mailings. "By the time I had a couple of dinner parties under my belt, my Yelp reviews started helping a lot with web traffic."

6. Marketing and Communications
Designer: Berna Fo, marketing communications director, National Host Committee for the International Union for Conservation of Nature, World Conservation Congress 2016, in Hawaii
Degree: M.Arch., Columbia University
Crossover Skills: Concept development, programming, salesmanship, people skills, visual design, and community engagement. The ability to "oscillate between the macro and micro" has also helped Fo plan marketing strategies, she says, as does the ability to look for alternative solutions to a problem.
Skills to Acquire: Clear, targeted verbal communication skills as well as the ability to convey information visually.
Advice: Architects are "natural communicators of large, abstract ideas," Fo says. Focus on that skill set and get real work experience.

7. Film
Designer: Christian D. Bruun, director, screenwriter, and producer, Light Cone Pictures
Degree: M.Arch., Aarhus School of Architecture, Denmark
Crossover Skills: Taking an idea from conceptual development to execution, visualization, drawing, and project management. "You have to think about the structure of the film and about what you want to say," Bruun notes.
Skills to Acquire: Technical aspects of filmmaking, such as how to use different lenses to create specific effects, how to light a scene for film, and how to secure financing.
Advice: Apply for a position that exposes you to pre- and post-production and gives you time on set during filming.

8. Entrepreneur
Designer: Emmanuelle Bourlier, CEO, Panelite
Degree: M.Arch. Columbia University
Architecture Experience: Various firms, two years
Crossover Skills: Research, experimentation, and designing within constraints. As a graduate student, Bourlier and then-classmate, now–business partner Christian Mitman invented a lightweight, translucent panel with a honeycomb core. It debuted in a loft project that landed on the cover of Spanish magazine *Diseño Interior*.
Skills to Acquire: How to run a business and lead marketing campaigns. Bourlier recommends reading *The Personal MBA* (Portfolio, 2010).
Advice: Don't take "No" for an answer. "We were told that translucent honeycomb panels just didn't exist," Bourlier says. "We said, 'They should, so let's make one.'"

Technology: The Promise of Energy Modeling

TEXT BY WANDA LAU

Architects touting high-performance projects—and, increasingly, the energy models to back their claims—fill speaker rosters at design conferences across the country. But step outside the trade show circuit, and the number of firms that routinely model their projects is surprisingly low.

Even within the portfolios of AIA 2030 Commitment signatories—a self-selected, green-centric group—only 44 percent of projects are modeled in the conceptual or schematic design phase, according to the *AIA 2030 Commitment 2014 Progress Report* released last October. Kim Shinn, a Nashville-based principal at TLC Engineering for Architecture, estimates that his office is asked to conduct energy models for one of out every five projects. And of the architects he works with, about 1 in 10 requests energy modeling services.

Generally speaking, architects want to design buildings that "touch the Earth as gently as possible," says John Bacus, the director of product for Sunnyvale, Calif.–based technology company Trimble. So why isn't energy modeling more prevalent?

Cost Concerns

Building owners would likely want to lower their operating expenditures, "but few understand how design can impact performance," says Greg Mella, FAIA, a Washington, D.C.–based vice president at SmithGroupJJR. Shinn notes that many architects also "don't feel comfortable" arguing that investing in energy modeling services will yield savings over the project lifetime, "mostly because they don't have the experience."

Even if energy modeling isn't conducted in the early stages of design, it'll likely happen during code review as jurisdictions adopt more stringent energy codes—including ASHRAE 90.1-2010 or 90.1-2013—and more projects step off the prescriptive path. By then, projects that fail to comply will be a costly endeavor to fix. But if teams have been regularly energy modeling from the project's start, Shinn says, "you can come up with solutions that are less expensive in first cost than if you follow the code's prescriptive path."

Software Woes

As recently as five years ago, the complexity of energy-modeling software was enough to discourage even the most well-intentioned of architects—which is not necessarily a criticism. "Modeling the energy use of buildings is a complex multivariate problem," Bacus says.

Software developers have since eased the learning curve by integrating the powerful computing engines of established programs with designer-friendly interfaces, a simplified input process, and near-real-time evaluation. Though Shinn is wary of architects taking the quantitative outputs literally—he recommends using preliminary results qualitatively, to compare design options—he appreciates that simulation tools are starting to take "user inexperience into account, and returning information in a way that it is easily understandable."

"The software is now there," Mella agrees. "The challenge is getting people to use it."

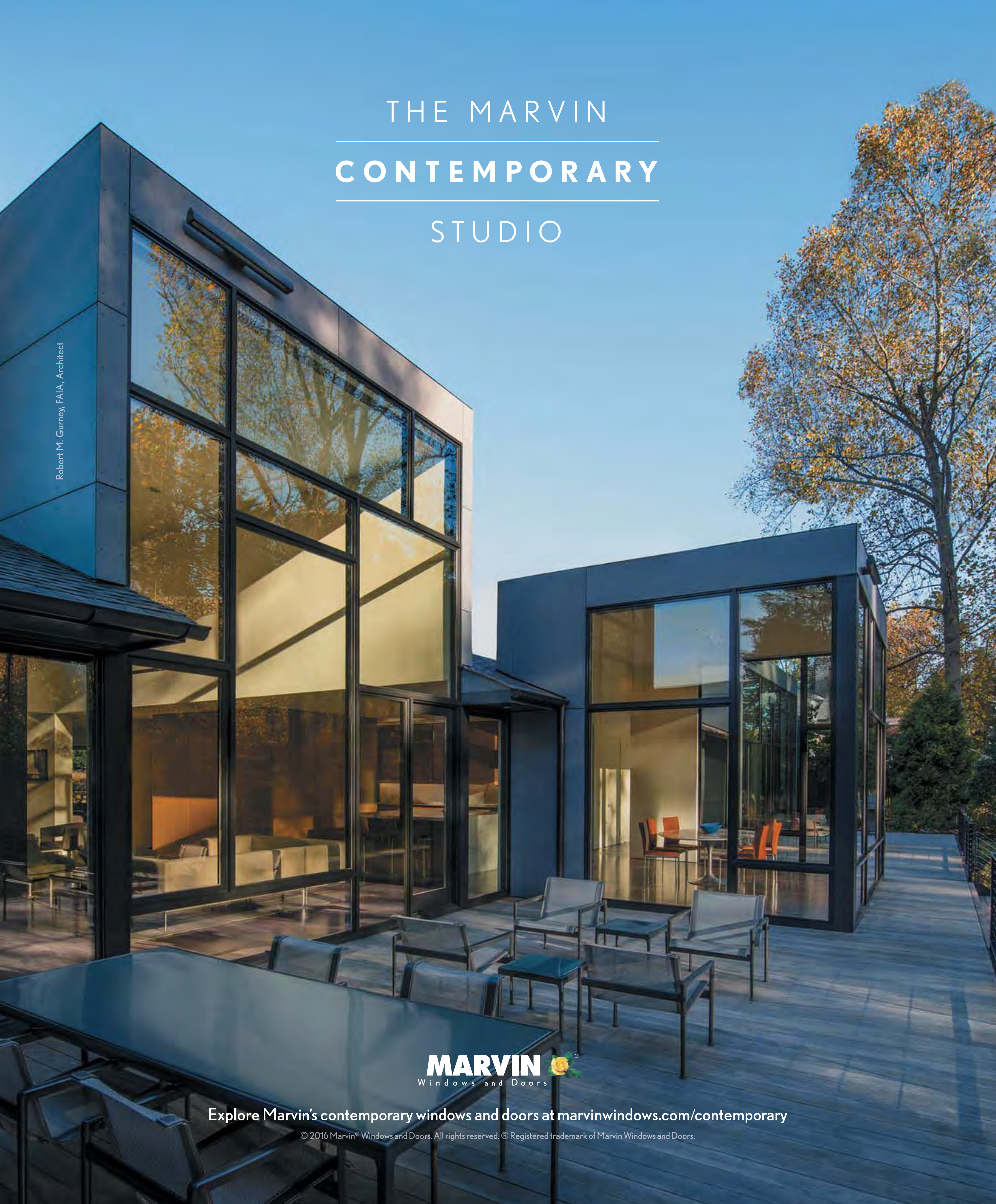
The Architect's Ego

But perhaps the underlying reason for the absence of energy modeling is not due to money or technology, but mindset. Many architects think "modeling would somehow impede their creative process or compromise their vision," Mella says. Though he acknowledges that design would be easier without considering performance, he sees this attitude as "irresponsible and lazy, and I do believe that constraints enhance the ingenuity of a solution, rather than impede a solution."

> "The software is now there. The challenge is getting people to use it."
>
> —Greg Mella, FAIA, vice president, SmithGroupJJR

And energy models can become an invaluable marketing tool. "When a designer can say, 'This solution is better because it provides more daylight space, better energy performance, and lower energy costs,' then [the clients] can see this as a home run," Mella says. Even if architects don't pick the best-performing design, they will at least make an informed decision.

> *To read more about overcoming the hurdles of energy modeling, visit bit.ly/ARenergyModel.*



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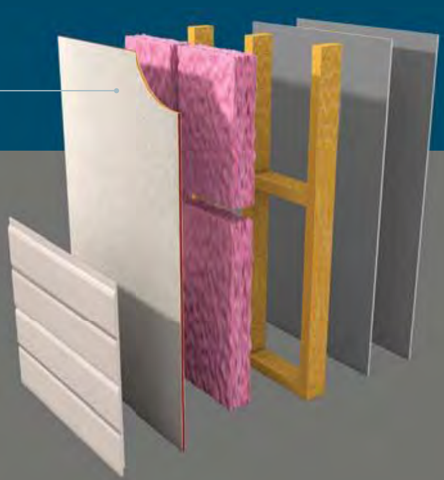

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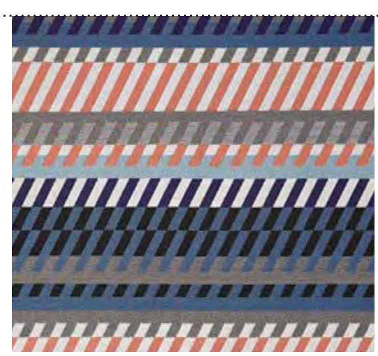
TEXT BY SELIN ASHABOGLU

Rio Concave Bench, Janus et Cie
Made of powdercoated aluminum tubing, this modular bench system comes in convex and concave shapes, allowing it to snake through a space. Each Rio unit can be backed or backless and comes in white or bronze (shown). *janusetcie.com*

Lakeside Planter, Landscape Forms
The playful cutouts in this planter's powdercoated steel shell let blue, green, yellow, or black liners peak through, adding pops of color to patios and pedestrian spaces. *landscapeforms.com*

Pivot, Broberg & Ridderstrale
Up to three fixed stools branch out from a central table in this one-piece patio set. Pivot's table is 28" tall, while seats are at either 18" or 24". Color options include beige, green, and blue (shown). *brda.se*

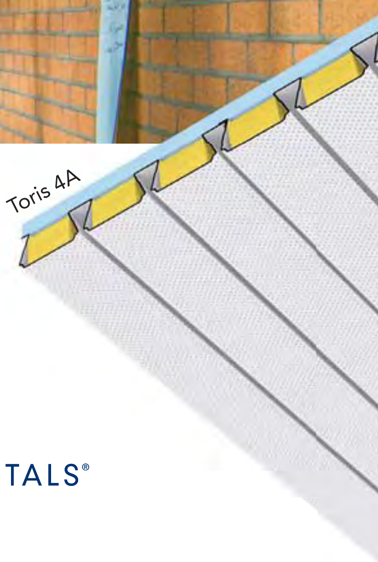


Marathon, Sina Pearson
Discontinuous striping defines this pastel-hued, woven Sunbrella upholstery, which is a blend of solution-dyed acrylic and polyester with a stain-repellent finish. In five colorways. *sinapearson.com*

Blau Tree Lamp, Gandia Blasco
This tree-inspired LED luminaire provides warm, 2700K light outdoors. Its thermo-lacquered aluminum frame comes in five colors, including white (shown), bronze, and anthracite. *gandiablasco.com*

> *To learn more about these outdoor products, visit bit.ly/OutdoorFurnishings.*

Ignacio High School, Ignacio, CO *Architect: RTA Architects, Colorado Springs, CO*



Next Progressives: Omar Gandhi

TEXT BY ALEX BOZIKOVIC
PORTRAIT BY RILEY SMITH

Omar Gandhi finds inspiration in context. In particular, he's drawn to the landscape and the rural vernacular architecture of Canada's Atlantic coast, where he lives and works. "I keep coming back to the word 'adaptation,'" the 36-year-old architect says, noting that he and his five-person practice in Halifax, Nova Scotia, "try to examine regional forms as well as the client's needs and their specific landscapes."

But while Gandhi's approach is meticulous, the buildings he shapes are far from timid. Focused on rural and suburban houses, he and his studio deliver clear forms with both spatial and narrative force, and the work has garnered Gandhi a string of accolades: the 2014 Professional Prix de Rome in Architecture from the Canada Council for the Arts, a nomination for the 2016 Mies Crown Hall Americas Prize (MCHAP), and a selection by the Architectural League of New York as one of its 2016 Emerging Voices.

Gandhi, who grew up in a Toronto suburb, earned his M.Arch. at Halifax's Dalhousie University, where he now teaches, and launched his office in 2010 after stints in two established practices, first at KPMB Architects in Toronto and then at MacKay-Lyons Sweetapple (MLS) in Halifax. His work echoes KPMB's quiet massing and rigorous detailing and MLS's engagement with local craft and building tradition.

Float, which received the MCHAP nomination, is a case in point. Located outside the city of Halifax, the house responds to a tough site up against a boulder in a glacial valley with a jagged, fragmented form of four sheds with roofs that slope in alternating directions. Those masses, clad in gray wood, look like what Gandhi calls "a continuation of the bedrock, as if it had fallen off and sheared the landscape." Inside, rooms are staggered in plan and connected by canted corridors, "so there is still a sense that you are moving through a field of rocks," he says.

Moore Studio, a home and studio Gandhi designed for a retired couple of visual artists, has the 45-degree gabled roof and long volume typical of barns in Nova Scotia. "It is the most archetypal of forms," he says. He specified vertical white cedar siding and a standing-seam metal roof to create a modernist character, and then pushed that shape halfway into a hillside berm, opening much of the interior into a double-height space, illuminated with a clerestory. The complexity of the section belies the modesty of the materials—the interior is largely clad with birch plywood—and of its budget.

Another project, the Rabbit Snare Gorge Cabin on the Nova Scotian island of Cape Breton, goes for a similar fusion of vernacular ease and formal innovation. Designed in collaboration with New York's Design Base 8, the two-and-a-half-story tower has a gabled roof and syncopated windows. Its most dramatic feature, however, is its "entry hoop," a 22-foot-tall rectangular protrusion of Cor-Ten steel that


Omar Gandhi

weighs 2 tons. Though the hoop may look invented, it is, in fact, borrowed from self-built dwellings in the region that have such appendages, made of plywood, to help keep strong sea winds from slamming doors.

Having already embraced the vernacular of Nova Scotia, Gandhi is now broadening his focus: He's opening a second office in Toronto and preparing for a round of larger residential, office, and commercial interior projects in that city and beyond.

"The challenge now is to see how I translate my way of working into an urban context," he says. "That's going to force me into taking on some big questions," such as "what are the critical elements that tell stories about places?"

For answers, Gandhi will seek projects that engage creatively with heritage buildings and that use his eye for narrative and context to "find deeper layers of meaning in form and material."

ARCHITECTURAL WOOD DOORS ADD MODERN ELEGANCE TO URBAN CHIC APARTMENT COMMUNITY

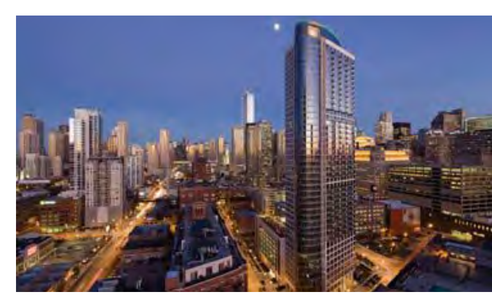
Hubbard Place, a 43-story, 450-unit luxury rental community in the River North neighborhood of Chicago, exemplifies the distinct vision of Daniel Levin, chairman and founder of the property's developer, The Habitat Company.

Delivered in late 2013 and designed to LEED Silver standards, Hubbard Place boldly embodies Levin's ideals. That process starts with close collaboration with the Hubbard Place architect, Chicago-based Solomon Cordwell Buenz. Tom Black, The Habitat Company senior vice president of development and licensed architect, describes the working relationship as "extensive."

You see that design discipline throughout Hubbard Place, from the architectural elements on the tower exterior to the units' doors. For example, Habitat wanted unit entrance doors that matched the wood veneer used in public areas. That proved challenging. "We looked at a number of different sources and proposed finishes," Black explains. "Only VT Industries had the look we wanted. This isn't the first time we've used their doors. We regard VT very highly."

That design rigor serves The Habitat Company well: Hubbard Place achieved nearly 100 percent occupancy six months ahead of schedule.

The Habitat Company is one of the nation's most respected residential property developers and managers with over $3 billion in assets and 24,000 units under management, across all multifamily classes.



Hubbard Place—owned by The Habitat Company and designed by Solomon Cordwell Buenz—is a 43-story luxury rental community located in the River North neighborhood of Chicago. *Photo credit: Paul Morgan*

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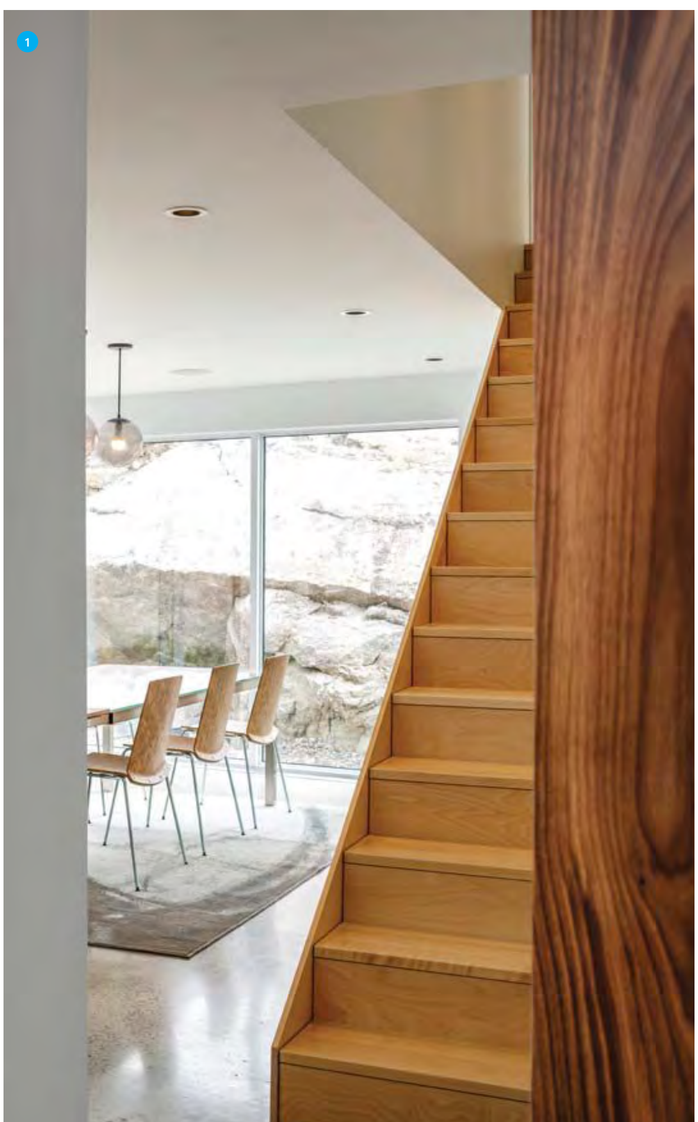
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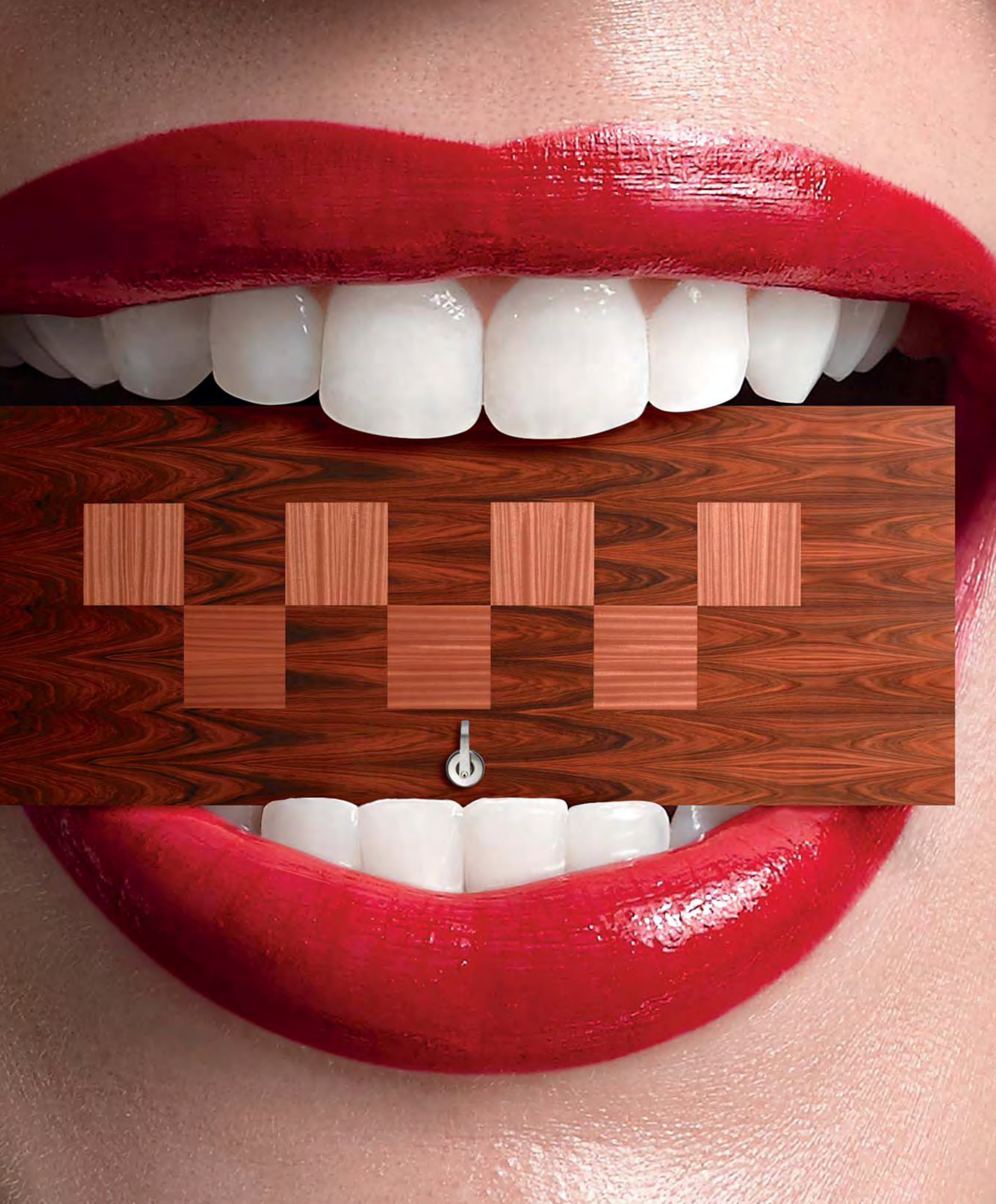
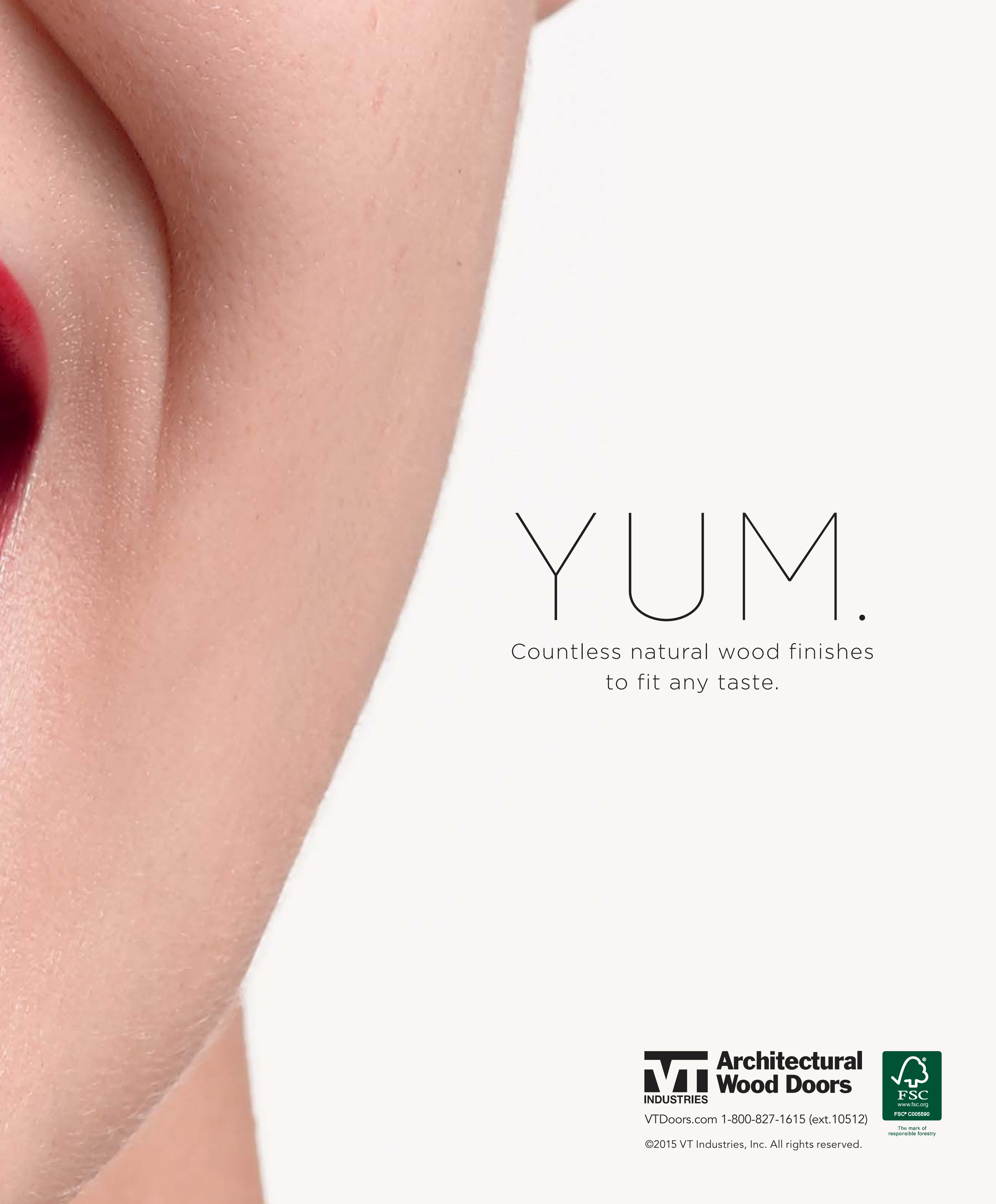
1–2, 6–7: DOUBLESPACE

1. Large boulders visible from the dining room of Float, a residence in Halifax, shelter the house and inspired its fractured volume. **2.** Float's staggered rooflines reference varying degrees of bedrock tectonic movement. **3.** Moore Studio plays on the archetypal gabled barn by appearing to have slipped down the hill in Hubbards upon which it was built. **4.** Lofted art spaces look into Moore Studio's double-height kitchen. **5.** A narrow band of windows on the inland side of another house—Shantih, in Hunts Point—contrasts with its double-height seaward façade. **6.** A Cor-Ten frame at the front door of Rabbit Snare, in Cape Breton, shelters its residents from stiff breezes. **7.** Slit windows cut into Rabbit Snare's elevations further emphasize its verticality.

3–5: GREG RICHARDSON

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Building Codes: Mass-Timber Construction

TEXT BY CLAY RISEN

Protective char layer on a cross-laminated timber panel.

COURTESY FPINNOVATIONS

In October, developers will break ground on Framework, a 12-story, 130-foot-tall mixed-use tower in Portland, Ore., designed by local firm Lever Architecture. Fast on its heels is SHoP Architects' 475 West 18th Street, a 10-story, 120-foot residential tower in Manhattan, which is now awaiting final approval from the city of New York. The two projects are set to become the tallest mass-timber towers in the U.S., but they represent something more noteworthy: a break in a fundamental building paradigm.

Hardly any mass-timber buildings of any height have been built in this country, despite a wide cross-section of the construction industry hailing cross-laminated timber (CLT, comprising several layers of wood planks glued together) as the building material of the future. America has lagged behind other countries, notably Norway and Canada, in large part because most state and local jurisdictions follow the International Building Code (IBC), which until the 2015 revision barely recognized CLT as a construction material. A proposed change to increase the maximum height for a CLT tower to nine floors from six for the next IBC update, in 2018, was defeated last year by the International Code Council (ICC), which oversees the IBC. (The council did create an ad hoc committee to guide the consideration of further CLT-related changes for the 2021 revision.)

The ICC's main worry is fire. Wood is flammable, obviously, and mass-timber skeptics point to a series of recent, high-profile conflagrations involving wood construction, including a 2015 residential development in Edgewater, N.J., and a research lab in Nottingham, England.

"There is a lot of combustible material in mass timber," says Paul Coats, the Southeast regional manager at the American Wood Council, which is based in Leesburg, Va. "But there are a lot of advantages to it. ... What mass timber brings is a high fire resistance. It's a solid wood slab."

Still, too little is known about the fire performance of tall wood construction, says Amanda Kimball, a research project manager at the Fire Protection Research Foundation, in Quincy, Mass. Though wood in mass timber chars, creating a protective layer against further fire damage, the durability of the adhesives used between the individual wood plies under intense heat is less understood. "What happens if planks fall off?" Kimball asks. "What happens to the char layer?"

For now, projects like Framework and 475 West 18th have to satisfy building code officials with performance-based workarounds, in which physical mock-ups and digital simulations are rigorously tested by third parties to determine whether the projects' safety would be comparable to prescriptive, code-compliant construction. Each building jurisdiction decides individually whether to allow performance-based code approval, as Portland and New York have. "Typically no one wants to be first, but a lot of people are happy to be second or third," says David Barber, a Washington, D.C.–based fire-engineering expert and principal at Arup.

But others are less sanguine. "A performance-based approach isn't in our DNA," says Chicago-based Skidmore, Owings & Merrill associate Benton Johnson, who has helped lead that firm's research into mass-timber construction. Instead, he believes, change will come through the slow process of revising the existing regulations. "For the foreseeable future," he says, "it's going to be one-offs until we make changes in the code."

> For more information on the future of tall-timber construction in the U.S., visit bit.ly/ARTallTimber.


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PHOTOGRAPHY: CARL BOWER

Critic's Choice

The war reporter turned architecture critic.

Inga Saffron, Pulitzer Prize–winning architecture critic for *The Philadelphia Inquirer*, discusses her past professional life as a war correspondent and how that experience plays into her criticism of architecture today. Saffron says that, over time, architecture criticism has expanded beyond coverage of new buildings designed by "starchitects" to include the things that make a city work—not just the things that make a city look distinctive.

As told to Caitlin Reagan

I had this romantic idea of being a foreign correspondent. After a few years of covering suburban towns, first for *The Courier News* [of central New Jersey] and then for *The Inquirer,* I was able to go overseas and cover the war in Yugoslavia, where I saw really terrible devastation of cities. That resonated with some of the worst urban renewal I saw in American cities. I became the Moscow correspondent later, and covered the war in Chechnya and saw more cities destroyed.

When I started working as an architecture critic, around 2000, I saw a lot of bad decisions being made in Philadelphia; buildings were being turned into surface parking lots and parking garages. I had a very strong feeling that that was not the right thing for Philadelphia to be doing because they were de-densifying the city and discouraging pedestrians. I would write these columns saying, "We should not be building stand-alone parking garages." In response, people would say, "Parking garages aren't what architecture critics should be writing about." They'd say, "We need parking because people won't come into downtown without it." They thought I was really nuts to focus on such ordinary buildings. Even my friends would come up to me and say, "What is it you don't like about parking?"

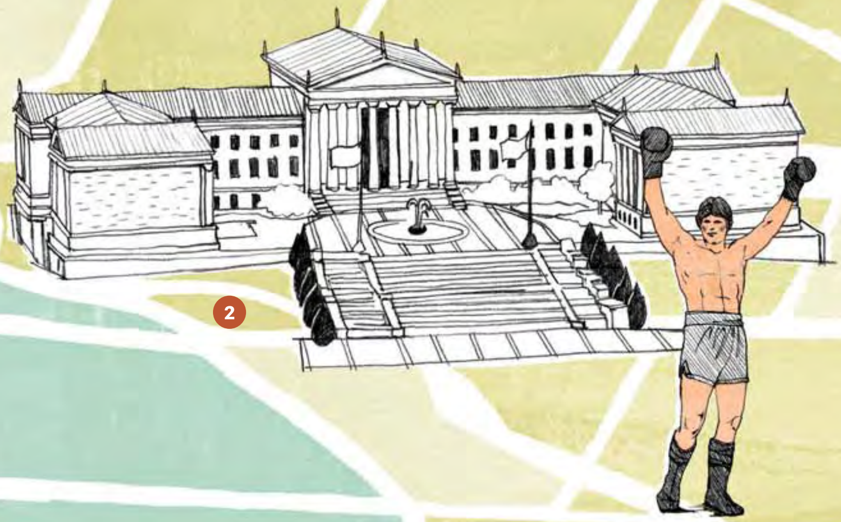
There's been a strong divide in the field between critics who focus on innovation as it is expressed in glamorous buildings and those who are concerned with how cities are made. When I started, the expectation was that critics would cover glamorous buildings. I did some of that, too, like when the Walt Disney Concert Hall opened in L.A. There used to be this pack of architectural journalists jetting from one opening to another who were interested in where a building fit in the continuum of architectural history. I realized that, as a critic, I could not be meaningful to my readers if that was all I talked about.

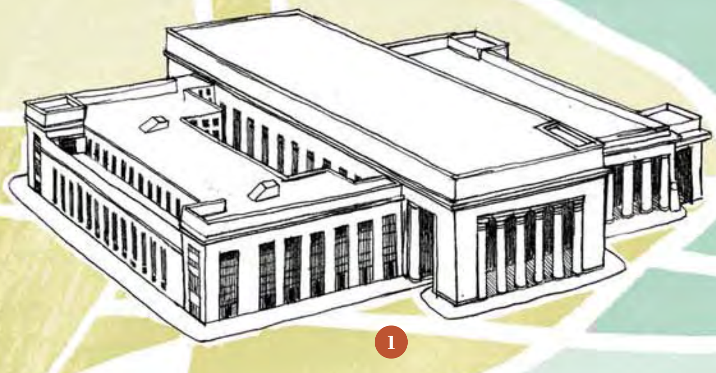
To be relevant, architecture critics have become city critics who write about sustainability, transit, equity, and parks—things that weren't typically in their wheelhouse. The definition of an architecture critic is much broader today than before. **AIA**

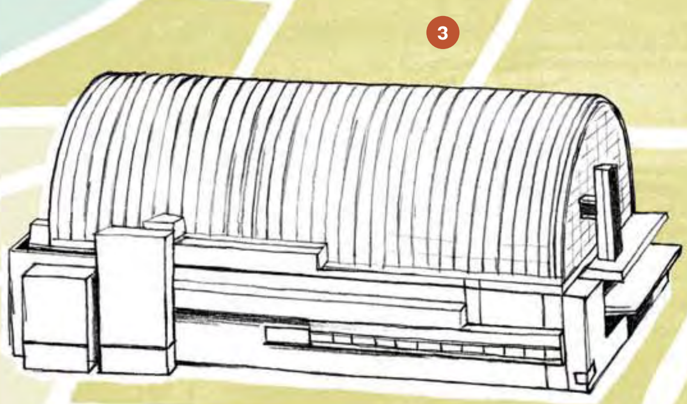
AIANow

It's My Town, but You're Welcome to Visit

Written by Steve Cimino
Art Direction by Jelena Schulz







They say that Philadelphians cannot survive on cheesesteaks alone, which is true. They also need roast pork and chicken cutlet sandwiches for a truly balanced diet. And no one knows that better than me: Born and raised in the city and a devout fan of all things Philly, I've spent much of my young life gazing upon its burgeoning skyline. With the AIA 2016 National Convention taking place in the City of Brotherly Love, I wouldn't be doing my job as a Philadelphian if I didn't highlight some of the things that architects—or any visitor—should appreciate about my hometown.

1. 30th Street Station
30th Street Station is what most visitors see when visiting Philadelphia for the first time or the hundredth time (and what most commuters see first thing in the morning). Designed by Chicago firm Graham, Anderson, Probst & White, 30th Street Station opened in 1933. It's a cavernous structure where the clip-clop of thousands of train riders rings off the walls and ceilings of the Art Deco main concourse. Like a good chunk of the city, the station was quite depressing during my younger days. After its 1991 renovation by Dan Peter Kopple & Associates, it is now riding a renewed interest in public transit to become more than just a transfer point.

2. Philadelphia Museum of Art
You may know this as the steps Rocky Balboa ran up in *Rocky*, but—surprise!—there's an actual art museum at the top of them. Designed Julian Abele, the most prominent African-American architect in the city's history, and Howell Lewis Shay of Horace Trumbauer, it has housed artworks from around the globe since the museum opened at this location in 1928. Dubbed the "Parthenon on the Parkway" for its pediment-and-column-heavy front entrance overlooking Ben Franklin Parkway, its 227,000 objects reinforce Philadelphia's reputation as a world-class city.

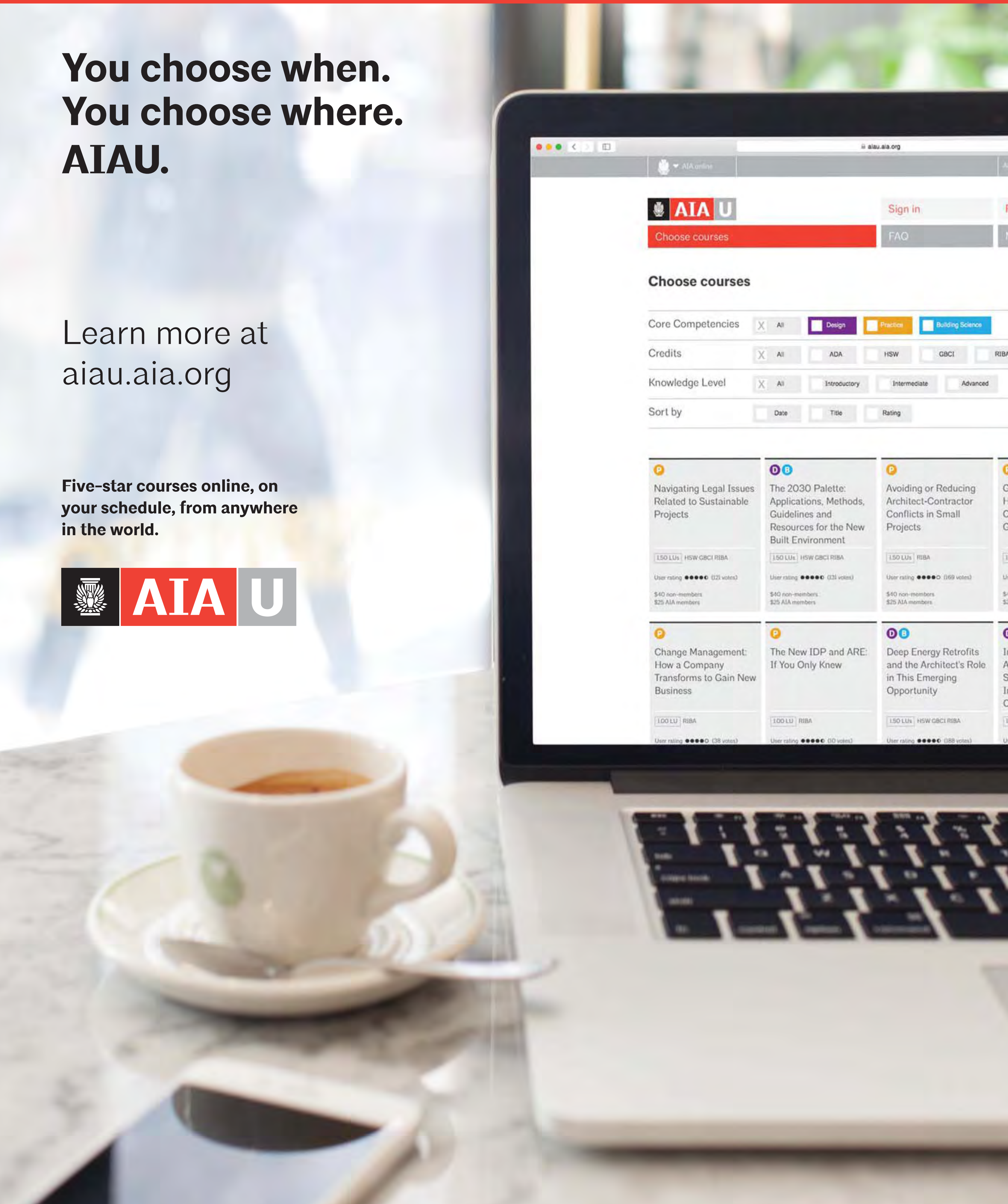
3. Kimmel Center for the Performing Arts
The Kimmel Center was approved in 1986 to replace the Academy of Music, but it didn't officially open until 2001—and I recall its construction on South Broad Street throughout my teens. Designed by Rafael Viñoly Architects, it's the home of the Philadelphia Orchestra and countless other theatrical and musical arts, from a Beatles cover band to Disney musicals. Moreover, it's a striking building with copious amounts of windows that provide spectacular city views—a true beacon of fine design on one of the city's main thoroughfares.

4. Comcast Center
A recent addition to the skyline, this skyscraper is the 19th tallest in the U.S. and the tallest in the city. Designed by Robert A.M. Stern Architects, the 974-foot-tall, 58-story tower is the corporate headquarters of cable conglomerate Comcast and was certified LEED Gold in 2009 by the U.S. Green Building Council. It's also a useful landmark when you're sprinting through Center City in an effort to catch an early-morning train; the Amtrak station is only a few blocks away.

5. Veterans Stadium and the Spectrum
You won't find these two on your map; they were demolished in 2004 and 2010, respectively. But for decades they defined sports in the city, housing the Eagles, Phillies, Flyers, and 76ers. The Vet (as it was affectionately referred to) was a massive octorad, a shape intended to provide great sight lines for fans, designed by Hugh Stubbins & Associates; it was also considered to be uninspired from day one. The Spectrum, designed by Skidmore, Owings & Merrill, had its roof blown off a year after opening. But for all their flaws, they were places where magic happened—and remain memorable to generations of athletes, coaches, and boosters.

6. Electric Factory
The Electric Factory is a concert venue that opened in 1994 in—you guessed it—a converted electric factory, which was (itself) a converted tire warehouse. It's one of many unique theaters in Philadelphia, the city that gave the world the Roots, Bill Haley, the Dovells, and Hall & Oates. I saw Elvis Costello and the Imposters here in 2007, a career-spanning performance with three encores that remains one of the highlights of my young life, and musical history is still made here on a nightly basis.

ILLUSTRATION: LAUREN NASSEF



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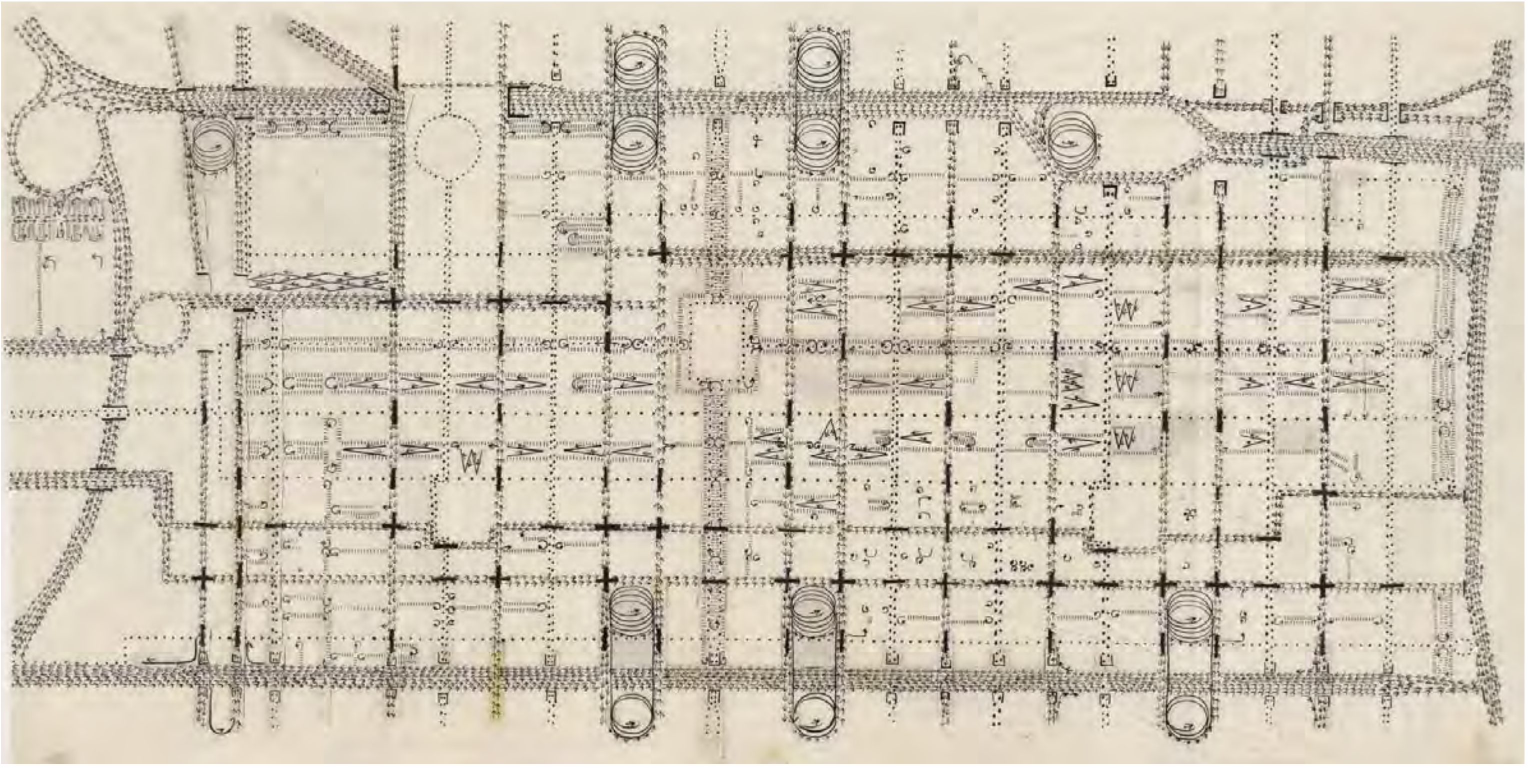

LOUIS I. KAHN, TRAFFIC STUDY, PROJECT, PHILADELPHIA, PENNSYLVANIA. PLAN OF PROPOSED TRAFFIC-MOVEMENT PATTERN, 1952. FROM THE COLLECTIONS OF THE MUSEUM OF MODERN ART, 389.1964.

Philadelphia, Almost

Louis Kahn's idea for a carless city.

A traffic study seems like an unlikely addition to the Museum of Modern Art's collection of architecture-related items. But to understand why Louis Kahn's 1952 ink, graphite, and decoupage traffic study for downtown Philadelphia became object number 389.1964 in MoMA's archives, you have to remember that modern art is not a style at all. Rather, it's an "attitude," as some historians hold, about the impact of industry and mechanization on humanity. It's modernity itself.

That sounds rather lofty. But when you consider the range of MoMA's collection—from the prismatic fruit bowls of Post-Impressionism, to the fevered strokes of Abstract Expressionism, to the villanelles of sober Rationalism—you start to see that subject of modern art is always some ineffable spirit, even if the object created or the symbol depicted is something specific, prosaic, and tangible. A pipe (or not a pipe), the figure five in gold, a fractured nude descending stairs, or the physicality of paint or clay itself—all of these represent new ways of thinking about a rapidly changing world.

How does this relate to a traffic study? Architects and city planners have been intimately connected to the industry and mechanization that created most of what we see around us in our everyday lives; indeed, they were the chief authors of modernity itself more than half a century before Kahn's birth in 1901. Nineteenth-century architects, planners, and city officials pursued a vision of urbanism based on City Beautiful principles—following Georges-Eugène Haussmann's boulevards in Paris and Kaiser Franz Joseph's incomparable Ringstraße in Vienna. Those urban experiments focused on notions of civility, simmering nationalism, new theories on sanitation, and what some observers have called "genteel beautification."

As cities like Philadelphia continued to explode in both population and size in the early 20th century, many architects and planners turned to a rational approach to organize the chaos: The neat order of a household could be amplified to the order of a city. More people, more buildings, and then cars created a need to prioritize how neighborhoods could accommodate the daily crush of activity. Kahn created several traffic studies for Philadelphia in the early 1950s based on studies he undertook in the 1940s on how scale and order could work together. It's also an interest he pursued throughout his entire career. (His AIA Gold Medal acceptance speech in 1971, "The Room, the Street, and Human Agreement," delivered three years before his death, is widely held to be his definitive philosophy on architecture.)

Object number 389.1964 is a piece of yellow tracing paper, roughly 2 feet wide by 3.5 feet long, that shows the central business district of Philadelphia from the Schuylkill River to the Delaware River. On it, Kahn has mapped the staccato movement of buses and trucks as dotted lines, and the more fluid movement of cars as arrows joined end-to-end. Anchoring it all are a series of parking garages, depicted as spirals, that form a defensive perimeter for roughly 264 square blocks of homes, businesses, and public parks. Kahn's idea was that the city is for people, and cars should be checked at the gates. The idea is a central part of Kahn lore: As medieval cities defended against ne'er-do-wells with brawny walls and bastions, our cities must defend against barbarous vehicles that threaten to flatten the ideal urban hierarchy into one unsustainable war between modernity and humanity. For the casual observer, the sketch can be read as a musical score or an inky cypher; it can even be read as a circuit board scheme. For Philadelphians, it can be read as the city that might have been, devised by an architect who never wanted to live anywhere else. AIA

William Richards

AIAFeature

The Spirit of the Quaker City

William Penn's vision for a green, safe Philadelphia is alive and well.

By Dominic Mercier

PHOTOGRAPHY: BOB KRIST FOR GTPMC

From the outside looking in, Philadelphia is a study in architectural contradictions. But in those spaces where the city's layers of history meet gleaming examples of modern architecture, a story emerges about a metropolis that has re-established its urban core while shaking off any lingering Quaker modesty.

As the first planned city in British North America, Philadelphia lays claim to the original urban planner: William Penn established his "greene countrie towne which will never be burnt and always be wholesome" on the 1,200-acre site that is now Center City in 1682, and envisioned a utopia focused on religious freedom and participatory government. To safeguard its citizens from the fire, disease, and overcrowding that was common in European cities at the time, Penn urged his surveyor general to organize the city on a rectangular grid woven around four green squares of open space, and one square for public buildings such as the Meeting House, that may reflect the ideologies of his Quaker faith.

"We haven't always followed it to the letter, but the spirit of Penn's plan of this city—that stretches river to river and has lots of green space, and was designed around values of humanism and public safety—was a landmark in its day," says Harris Steinberg, FAIA, executive director of the Lindy Institute for Urban Innovation at Drexel University. "And to this day it remains infused with who we are. The Quaker City is an important ethos for Philadelphia."

Overlaid on the grid—as well on the outlying 128 square miles of the County of Philadelphia that was consolidated in 1854—is a mosaic of architectural highlights from nearly every era that commingle with the city's collection of classic rowhomes. Georgian and Federal buildings rub elbows with landmark works by Frank Furness and Louis Kahn. The Loews Philadelphia Hotel—housed in the Philadelphia Saving Fund Building, Howe & Lescaze's first International Style skyscraper in America—faces off with Reading Terminal's Italian Renaissance Revival headhouse along Market Street. At the head of the Benjamin Franklin Parkway, the crown jewel of Philadelphia's City Beautiful movement, the Greek Revival–style Philadelphia Museum of Art, overlooks the city from its hilltop perch.

"We kept layering architectural design trends on top of one another over the years," says Denise Thompson, AIA, 2016 president of AIA Philadelphia and an associate at Francis Cauffman. "Sometimes they work together well, and sometimes they don't, but it gives architects an opportunity to constantly renew the city based on current design thinking and best practices at the time."

PHOTOGRAPHY: GEORGE WIDMAN

ABOVE (and in the distance OPPOSITE): The Philadelphia Museum of Art, designed by Julian Abele and Howell Lewis Shay of Horace Trumbauer's Philadelphia firm (and completed in 1928), defines the terminus of Benjamin Franklin Parkway. From an urban perspective, it also defines a hinge point in the city between the monumental core downtown and the leafy Mainline neighborhoods beyond Fairmount Park.

AIAFeature

CONTINUED

Agreements Were Made to Be Broken

A pattern of constant renewal is evident in the architectural sea change that began in the mid-1980s when Helmut Jahn, FAIA, and developer Willard Rouse were bold enough to eschew the longstanding gentleman's agreement not to build higher than Alexander Milne Calder's bronze effigy of William Penn atop City Hall.

Despite outcry from citizens, media outlets, and cherished city planner Edmund Bacon, Jahn and Rouse's Liberty Place project—a complex comprising two glass towers topping out at 945 and 848 feet, a 289-room hotel, and ground-level retail space—freed Philadelphia's skyline from its self-imposed stubbiness. Since then the city has welcomed a number of tall buildings, most notably the 975 feet of sustainable architecture that is the Comcast Center, designed by Robert A.M. Stern Architects. The cable television giant stands to further dominate both the area's living room screens and the skyline when the 1,121-foot Sir Norman Foster–designed Comcast Innovation and Technology Center is completed in 2017.

It's arguable, however, that much of the city's most engaging new architecture sits much closer to the ground. On Franklin Parkway, the luminous new home for the Barnes Foundation's world-class collection of Impressionist paintings, housed in a building designed by Tod Williams Billie Tsien Architects | Partners, is a linchpin for the avenue achieving its full potential. Nearby, Frank Gehry, FAIA's master plan and gallery expansion for the Philadelphia Museum of Art is providing an inspiring blueprint for one of America's largest and most significant museums. Across the Schuylkill River in West Philadelphia, where the city's "eds and meds" exert their economic might, Weiss/Manfredi's Krishna P. Singh Center for Nanotechnology on the eastern edge of the University of Pennsylvania's campus demonstrates just how astounding an educational facility can be.

While the work of outside firms is highly visible across Philadelphia's landscape, the city's architects who cut their teeth in Kahn's classroom or founded firms after working under visionaries like Vincent Kling, FAIA, or Robert Venturi, FAIA, and Denise Scott Brown, HON. FAIA, are forging a new legacy with their work both at home and abroad.

KieranTimberlake, in particular, has made waves with its U.S. Embassy project in London as well as new office space at the repurposed Ortlieb Brewing Co.'s 1948 bottling house in Philly's rebounding Northern Liberties neighborhood. More important, they've been making a profound impact on Philadelphia's public space. The firm transformed Dilworth Park—previously a dark, uninviting, sunken concrete court adjacent to City Hall—into a thriving level-ground public plaza with green space, a wintertime ice skating rink, and a

"We kept layering architectural design trends on top of one another over the years."
—Denise Thompson, AIA

PHOTOGRAPHY: M. FISCHETTI

ABOVE: KieranTimberlake transformed Dilworth Park, formerly a dark and uninviting plaza adjacent to City Hall, into thriving meeting spot.

sweeping glass entrance to underground transportation. In February, they also unveiled a collaborative plan with Hargreaves Associates and Pentagram to revitalize Philadelphia's iconic LOVE Park.

Places for People

Rebecca Johnson, AIA Philadelphia's executive director, says the city's design community is keenly aware of the city becoming much more people-centric. The important work of designing the space between buildings, she says, is most noticeable among the pop-up parks and beer gardens that are now commonplace sights in places like the banks of the Schuylkill River. A recent extension of the trail that runs alongside the river includes an elegant boardwalk that juts 50 feet over the water to accommodate sightseers, runners, and cyclists. In the winter, ground was broken for another trail extension that will connect Center City with Southwest Philadelphia in an entirely new and carless way.

"The public perception of our built environment and our public spaces is changing," Johnson says. "We want nice places, and we intuitively understand how well-designed public space and the buildings that inhabit them are making a difference."

While Philadelphia's architecture stands on the shoulders of Kahn's philosophy, Venturi and Scott Brown's wry wit, and Furness' idiosyncrasies, its planning legacy is deeply rooted in Bacon's Better Philadelphia Exhibition. In 1947, on two floors of a downtown department store, Bacon presented a 50-year postwar vision for Philadelphia that included the city hosting the 1976 World's Fair, a transportation hub, and development along the Delaware River waterfront. Only some of Bacon's plan has been realized, but the recent confluence of a supportive city administration and shifting, positive views of city life has reignited those ideals, says Steinberg.

In his previous role as executive director of PennPraxis, a nonprofit outreach organization that creates opportunities for architecture faculty and students to collaborate on real-world projects, Steinberg unveiled a vision for the Delaware River waterfront informed by over 4,000 citizens across 200 community meetings. The plan provides sorely needed guidance in responding to development pressures along the waterfront, as well as addressing the disconnect that stems from the city's bisection by Interstate 95 and six more lanes of local traffic.

"If you go down to the waterfront, while there's still a huge way to go, all of the elements are in place for a long-term build-out as long as the political will and public pressure is there," says Steinberg. "As we know with these things, the game's never over. We need to keep vigilant."

As the city sets its sights on other significant projects—namely, unleashing the potential of 2,050-acre Fairmount Park—all this recent attention to planning has paid off. Philadelphia has experienced a decade of steady population growth, enjoyed an exploding restaurant scene, and reveled in a host of highly visible accolades. Last fall, after the city cleared its streets for Pope Francis' multiday visit, it was named a World Heritage City, joining the ranks of Berlin, Jerusalem, Paris and about 250 other places. It also hosts the 2016 Democratic National Convention in July, further brightening the spotlight.

"What these [events] are most important for is our own self-image," says Steinberg. "When we lost our ascendancy in finance and government, we retreated to being a polite, post-Quaker society with no strong public image. That has been a detriment to many generations of Philadelphians."

A detriment no longer. Philadelphia is finally and firmly on the upswing. AIA

PHOTOGRAPHY: BOB KRIST FOR GTPMC (THIS PAGE)

ABOVE, LEFT: The Barnes Foundation's new home, by Tod Williams Billie Tsien Architects | Partners, is a new anchor for Benjamin Franklin Parkway, which connects City Hall to the Philadelphia Museum of Art.

ABOVE, RIGHT: The Comcast Center, designed by Robert A.M. Stern Architects, acts as a beacon for Center City that tourists and locals alike use as a reference point.


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Public Consumption

Philly's best eats can be found in a restored train terminal.

When it opened for business in 1893, Reading Terminal was the Philadelphia & Reading Railroad's response to the fortress-like Broad Street Station, its main competitor constructed on the west side of City Hall.

Jointly designed by Francis H. Kimball and Wilson Brothers & Co., it served as the point of embarkment for passengers on their way to places as far away as Chicago and Toronto. But in 1971, the railroad filed for its fourth and final bankruptcy, just five years before the complex would be named a National Historic Landmark. One final, commemorative train rumbled away from the terminal in 1984.

Driven by economic development and plans for the adjacent Pennsylvania Convention Center, the city purchased the terminal in the early 1990s and deployed a clever strategy to inject it with new life, says Caroline Boyce, executive director of the Preservation Alliance for Greater Philadelphia. The shed's impressive roof was reinforced and restored, and the cavernous space beneath it became the center's grand entrance and the spot for its ballroom.

"There was some creative entrepreneurial thinking about how to take a space that's very difficult and connect it to the convention center and hotel," Boyce says. "You have pieces of new use and old use fitting in with the larger development that is taking place all around it."

Forget the Train, Grab a Sandwich

While the terminal itself is a study in thoughtful conservation and adaptive reuse, Reading Terminal Market has remained a stalwart culinary destination. Philadelphians are deeply passionate about their food, as anyone who has ordered a cheesesteak improperly can attest. But beyond the lines that burst from the city's steak joints, nowhere is that spirit more evident than within the market.

With the help of two major renovations—the first in 1994 and another in 2012—and the growth of the local food movement, the market has weathered two World Wars, the Great Depression, and the proliferation of supermarkets. It remains a dynamic space where gourmands, the Center City lunch crowd, and everyday grocery shoppers pack it cheek by jowl daily.

Now overseen by a nonprofit corporation, market officials say its annual draw is about 6 million visitors. They shop among nearly 80 merchants for a variety of goods, from Amish whoopie pies to regional produce. The market also serves a vital function for those who need it most, says general manager Anuj Gupta, as it is regularly one of the city's top venues for the redemption of Supplemental Nutrition Assistance Program (SNAP) vouchers.

"Food and the products our merchants sell cut across every kind of social barrier you can imagine, whether it's geographic, economic, or racial," Gupta says of the market's success and longevity. "Whether you come here to shop or

AIADesign
CONTINUED

dine—and you can do both with equal culinary quality—you're going to get really good value between the diversity and authenticity of what the merchants sell."

A Link for the City

While the market celebrates its heritage, officials continue to explore ways in which they can further the enjoyment of one of the city's most diverse public spaces. Last year the market received a $160,000 grant from ArtPlace America to improve the area along Filbert Street on its south side, currently an uninviting space where terminal shoppers exit into darkness amid idling taxis and choking fumes. Not exactly a good end to a great meal.

Gupta says the market has assembled its team—including design firm ex;it and landscape architects Ground Reconsidered—and expects an innovative solution in about a year. In the meantime, they've flirted with interventions in the form of outdoor seating and a monthly flower market.

"We're excited about the design process," Gupta says. "I hope, at the end of all of this, what we have is another great public space for the City of Philadelphia." AIA

Dominic Mercier

While the market is a case study in adaptive reuse, it is also a stalwart culinary destination. Fresh produce, butchers, cheese shops, and confectionaries cater to more than 6 million visitors each year.

AIAPerspective

PHOTOGRAPHY: CARL BOWER

What Lies Beyond Imagination?

It's not about value added. It's about value embodied.

Each building is essentially a prototype—an invention that defines a specific place in the world, driven to fruition by the architect along with a group of talented specialists. And where better to come together to focus on the innovation and collaboration that is part of the architectural design process than Philadelphia, the city where the prototype for our democracy was invented?

The "value added" by the architect and the project team for an invented space extends beyond merely achieving a functional solution for a reasonable budget. It is often the extra insight, the stretching of our client's sense of possibilities, that differentiates architects as the true leaders of the design process. The 2016 AIA Convention in Philadelphia (May 19–21) focuses on how value is added to projects through the insights offered by architects, a program we are calling "Imagine +."

Our opening keynote speaker, actor Kevin Spacey, shares his insights on how his innovative approach to creating and producing an award winning series has changed the way that traditional television programming is conceived (and consumed). We also hear from one of the most innovative architects in the design world, Neri Oxman, who harnesses the power of digital design and fabrication. But to say that what she does is innovative is an understatement. It is, in fact, revolutionary—Oxman generates form in fresh ways that are inspired by biology and ecological systems.

Finally, Rem Koolhaas, HON. FAIA, delivers a keynote address about how imagination can add value to ordinary functional programs and how to make truly extraordinary architecture. A pioneer theorist and educator, Koolhaas will discuss the projects and processes that helped inspire his students, who have worked with him over the years and, notably, gone out into the world to transform architecture in their own ways—I'm thinking of Zaha Hadid, HON. FAIA, Jeanne Gang, FAIA, and Bjarke Ingels.

May is a time to renew our passion for why we entered the profession and reconnect with the people and places that inspire us. The convention is designed to be an experience that you will not only enjoy, but that will also empower you to imagine new possibilities. Let's come together and share how we innovate, invent, and create a new prototype every day for every project, in Philadelphia. AIA

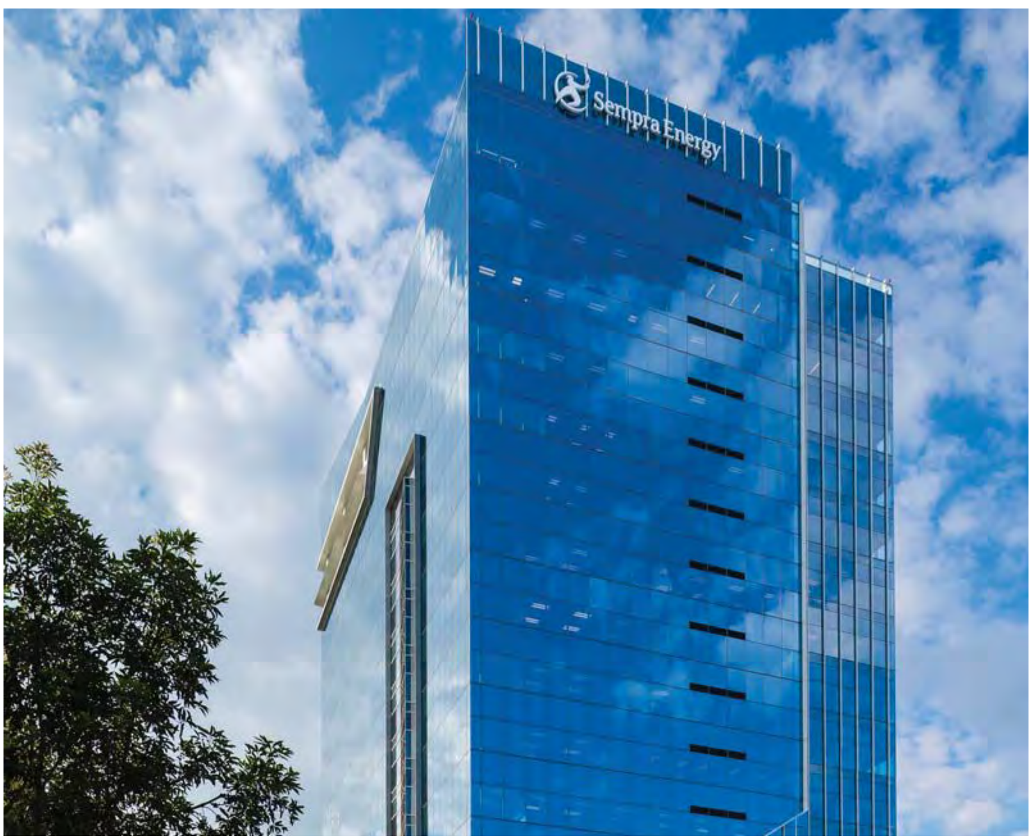
Russell A. Davidson, FAIA
2016 AIA President

SOUND-MITIGATING STEEL

HOW TO DETAIL STRUCTURAL STEEL SYSTEMS FOR OPTIMIZED ACOUSTICS

Presented by:

Steel Institute of New York



For Sempra Energy's structural steel headquarters tower in San Diego, Carrier Johnson + CULTURE specified a double stud wall with an air space in between, in addition to an isolator clip, in some locations, to float one of the gypsum wall board layers within a single stud wall assembly. In this way, acoustic performance was optimized. Photo courtesy of Carrier Johnson + CULTURE

LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Identify the basic concepts of sound and vibration and how to isolate the sources in steel-framed buildings.
2. Gain techniques for enabling structural steel construction to acoustically perform just as well or better than concrete construction.
3. Scroll through the advantages and disadvantages of various acoustic floor treatments.
4. Distinguish the causes of flanking paths and how to rectify them.

CONTINUING EDUCATION

CREDIT: 1 LU/HSW

COURSE NUMBER: ARmay2016.1

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR516Course1 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

Listen up: Good acoustics is such a major issue among building occupants that a 2014 Associated Press article ranked noise as the No. 1 quality-of-life complaint in New York City[1].

Similarly, an American Society of Interior Designers-commissioned study reported that 70 percent of surveyed office workers believe productivity would increase if office noise decreased.

Perhaps even more shocking is that a number of studies analyzing green-certified buildings discovered a noted increase in acoustical performance complaints, including the U.S. General Services Administration's "Sound Matters" white paper1 and the University of California, Berkeley's Center for the Built Environment study[2], "Occupant satisfaction with indoor environmental quality in green buildings."

Fortunately, newer eco-friendly building programs, such as the International WELL Building Institute's WELL Building Standard[3], are encouraging building teams to carefully detail structural systems and select appropriate building systems, finishes and interiors in order to keep facilities below key acoustic values such as maximum noise criteria (NC) and reverberation time (RT).

"The WELL Building Standard is the only building certification that highlights acoustical performance as a human comfort design criterion through as many as six credits," explains Nicholas Holt, AIA, LEED AP BD+C, director, SOM, New York. "As WELL continues to gain traction in an otherwise saturated market for certifications and standards, we should expect more acoustic-based design criteria from clients and their employees, if not simply better-educated dialogue."

Christopher Pollock, P.E., CTS, LEED AP BD+C, partner, Cerami & Associates, New York, agrees, stating, "Any certification program that acknowledges acoustical performance as a factor that affects how all building occupants experience a building is a step forward. These newer standards bring a greater focus to how better acoustic performance enhances peoples' experience within buildings."

For example, according to WELL, open office spaces and lobbies shouldn't exceed an NC of 40, and the maximum RT for conference rooms is 0.6 seconds.

"The criteria outlined in newer building certification programs, such as WELL, are not substantially different than best practices have governed for years," remarks Julie A. Wiebusch, INCE, LEED AP, president, The Greenbusch Group, Seattle. "However, programs likes these are drawing more attention to the acoustical characteristics of a building and legitimizing the significance of the acoustical environment."

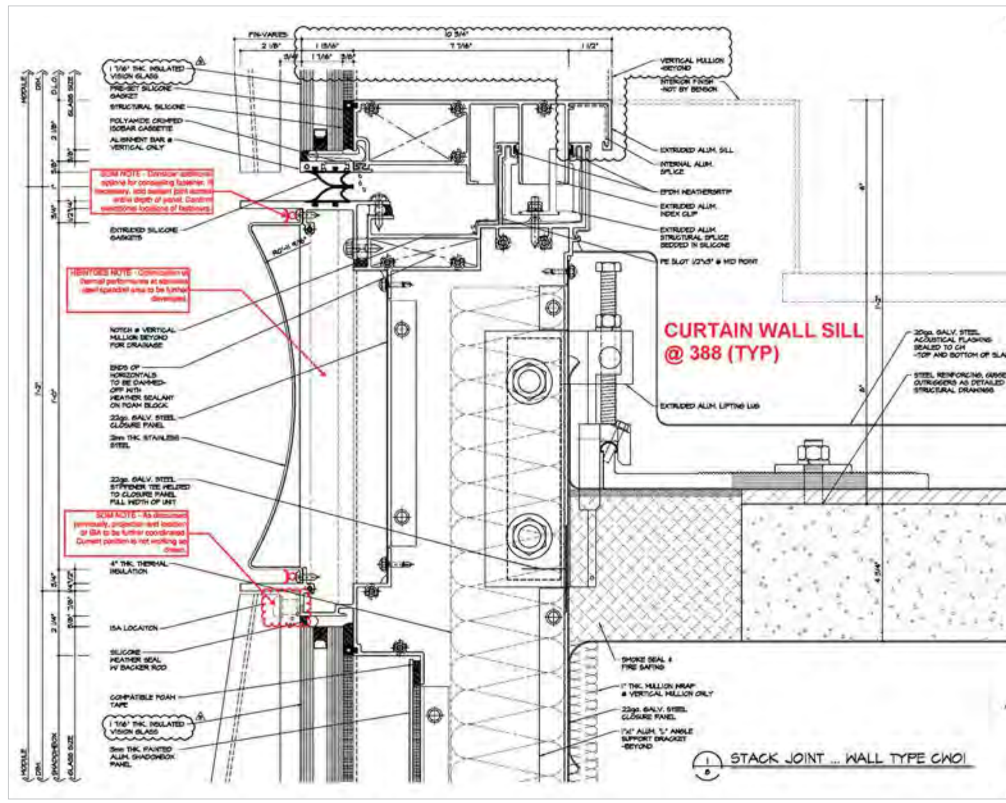
STRUCTURAL STEEL AND ACOUSTICS

Although steel naturally acts as a conductor for sound, properly designing and detailing a steel-framed building can ensure good acoustics.

As clearly laid out on the U.K.-based Steel Construction Institute's website[4], some specific benefits which light steel construction lends to good acoustic performance include the fact that the material utilizes multiple layers of construction, which is ideal for promoting acoustic insulation; junctions can easily be detailed to minimize flanking sound; and special studs and resilient bars, specifically designed to reduce sound transmission, can easily be installed.

In addition, steel fabrication and modular construction leverages a higher level of quality control in the factory, and consequently, more predictable acoustic performance.

Pointing out another advantage, albeit an indirect one, Patty Boyle, AIA, LEED AP BD+C, architect, SmithGroupJJR, Detroit, explains that steel-framed construction provides better long-term flexibility of the space and envelope, which in turn, supports the acoustic design's ability to meet sound-mitigating requirements over time.



As depicted in this sill detail, the connecting hardware and support system utilizes steel plates and other strategies to limit the sound transmission, which is common at the slab edge and joints in a typical curtain wall sill. Image courtesy of Cerami & Associates

While there are many factors building teams must consider when choosing a structural frame, a major variable is cost. "Steel-framed buildings can comfortably satisfy acoustic requirements and may provide a good economical solution for the building owners," states Boyle's colleague Andrea K. Reynolds, S.E., P.E., LEED AP, director of structural engineering.

STEEL VS. CONCRETE

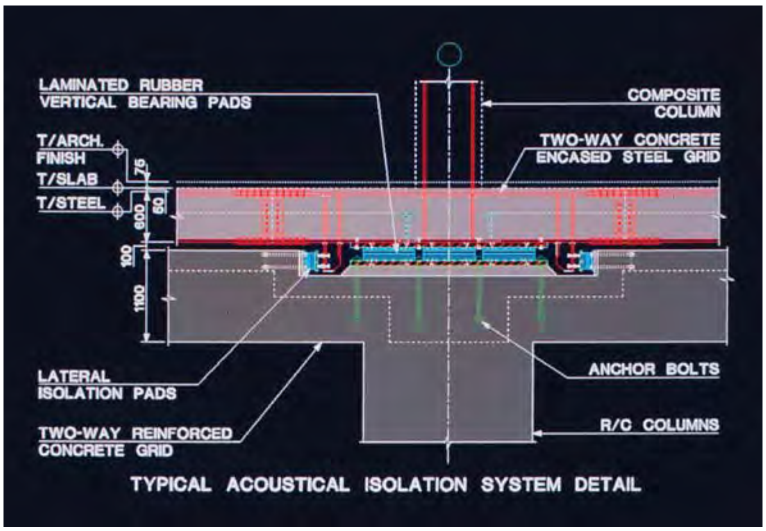
A commonly asked question is how steel construction can measure up to the acoustical performance leveraged by the heavier, inherently greater mass proffered by structural concrete.

For starters, Wiebusch explains that by creating composite structures with mass—i.e., an air space and another mass layer—the structure is then capable of performing just as well as concrete's thicker solid mass.

"Assemblies in steel buildings should typically be designed to incorporate upgraded components, such as resilient clips and vibration isolation hangers, to provide sound barrier and isolation performance similar to that of heavier systems in concrete buildings," adds Fred Moritz, vice president, Shiner + Associates, Chicago.

Pointing the compass even more in the favor of steel-framed construction for acoustics, Benjamin Markham, LEED AP, director of architectural acoustics, Acentech Inc., Cambridge, Mass., states, "two masses separated by an air gap—such as a steel deck and a suspended ceiling—can, if you get the details right, block more sound than a monolithic mass, even if the monolithic mass is heavier than the combined weight of the two separate ones."

This technique is delineated in the American Institute of Steel Construction's new Design Guide 30: Sound Isolation and Noise Control in Steel Buildings[5], which Markham authored with his Acentech colleague, Chief Engineering Scientist Eric Ungar, Sc.D., P.E.: A commonly used floor-ceiling assembly, constructed with a composite concrete/metal deck and a suspended ceiling to create those two separate mass layers, is often supplemented with sound-absorbing insulation on the ceiling plenum to increase the sound transmission loss of the assembly.



At Lucky Goldstar Kangnam Art Hall in Seoul, South Korea, this typical acoustical isolation system detail features lateral isolation pads and a reinforced concrete grid within the structural steel system.
Photo courtesy of SOM

For wall construction, conventional partitions with gypsum board on each side of steel studs can sometimes block more sound than a comparatively heavier partition built from concrete masonry units, he adds, but with the caveat that the details matter. Bringing up another point, Franklin D. Lancaster, P.E., RA, F.ASCE, LEED AP BD+C, structural technical director, EYP Architecture & Engineering, Albany, N.Y., explains that higher strength, lighter weight materials—such as steel frames—support longer spans, however, this makes proper design for acoustics and vibration even more important. So in order to improve the vibration performance of floor framing, the mass and stiffness of the floor system must be increased.

As stated, concrete buildings inherently have more mass than steel, and concrete slabs, beams, joists and columns placed monolithically have a high degree of stiffness. As a result, engineers must make modifications to steel buildings in order to increase mass and stiffness. Some viable solutions include using thicker, normal weight concrete slabs on metal deck; deeper steel beams and girders; and closer column spacing.

"Controlling these aspects of a steel-framed building can result in a structure that successfully mitigates vibration problems as well as a concrete building," asserts Lancaster.

Yet another point worth noting is the fact that steel-framed buildings typically include a concrete component in their floor make up, which ends up enhancing the performance-limiting vertical sound transmission. "Because the concrete is poured onto a metal decking, any airspaces are sealed, making a continuous floor element that can be very effective at blocking sound," explains Pollock.

Holt mentions that a steel floor assembly that uses spray-on fireproofing may also pose a small advantage over concrete, due to the sound absorbing characteristics of the spray-on fireproofing.

IMPACT ISOLATION

Delving into the specifics of impact isolation performance, the Impact Insulation Class (ICC) metric measures how an assembly can block impact sound such as footsteps radiating from the floor below.

For example, according to AISC's latest design guide on acoustics, if resilient underlayments are used on the floors, and resilient hangers or clips are used to suspend the ceilings, then the IIC of most floor/ceiling assemblies in steel buildings will be between IIC 50 and IIC 65.

In order to impact performance levels of the floor/ceiling system, this is dependent on the finish flooring material, the type of impact control underlayment and the type of finish ceiling, Moritz explains.

For instance, harder surface finishes, such as tile or stone, will transmit more high-frequency sound, whereas softer finishes like vinyl and carpeting will better mitigate sound.

> "Because the concrete is poured onto a metal decking, any airspaces are sealed, making a continuous floor element that can be very effective at blocking sound."
>
> *—Christopher Pollock, P.E., CTS, LEED AP BD+C, partner, Cerami & Associates, New York*

"The key is to arrange the components of the assembly in ways that promote a separation between the floor surface and the space below," instructs Markham. "In steel buildings, this often can be readily achieved with good ceiling design."

At the same time, Wiebusch points out that the long floor span of steel structures may have sufficient deflection to generate a tactile bounce that one can feel when walking across the floor. The energy from this movement can then be re-radiated as airborne sound below in the form of a thud-like noise, and this is not reflected in the quality of the IIC ratings.

That said, Markham still maintains that typical steel-frame construction can deliver impact isolation performance that is equal to or better than concrete framing.

As is detailed in AISC's design guide, Markham and Ungar give an example of a 6-inch-thick composite deck comprised of lightweight concrete on a 3-inch-thick metal deck, with a 2-inch-thick lightweight gypsum wall board ceiling suspended 22 inches below the deck on wire hangers with insulation in the ceiling cavity. The total weight of this assembly is approximately 55 psf with a Sound Transmission Class rating—a metric determining airborne sound transmission loss—of STC 55.

Meanwhile, a 6-inch-thick cast-in-place concrete slab weighs significantly more, at approximately 75 psf, but has the same STC rating of 55.

BEST PRACTICES

When embarking upon sound attenuation design for steel-framed buildings, Pollock recommends first identifying sources of noise and their characteristics, gaining an understanding of the building and its acoustical requirements and then determining how to best detail the construction to meet those goals.

In some cases, acoustic levels will be mandated by code or directed by an industry standard, and other times, the design team must deduce the sound isolation goals in a step-by-step process, says Markham. That process starts with an understanding of the activity in the room, and of the programmed uses and how much background noise can be tolerated.

"Once the noise goal is established and the levels of the sound sources are known, the sound isolation criterion is mere subtraction. Having established that criterion, the design team can then go about designing partitions, floor/ceiling assemblies, window and door details, and source-level noise mitigation, as appropriate," he explains.

Typical strategies for isolating sound include sealing gaps, boosting mass, separating or de-coupling between mass layers, and adding sound-absorbing insulation between mass layers.

For instance, a wall with a high mass, such as a concrete masonry unit partition, will have a higher STC than a stud wall with a layer of drywall on each side. However, the STC of a stud wall can be significantly increased by breaking the sound transmission path though the wall.

This article continues on http://go.hw.net/AR516Course1. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. The WELL Building Standard approaches acoustics standards from the following standpoint:
   a. Scientific research b. Recycled materials
   c. Human comfort d. None of the above

2. Light steel construction is amenable to good acoustic performance in the following ways:
   a. Structural steel utilizes multiple layers of construction. b. The junctions can easily be detailed.
   c. Sound-mitigating studs and resilient bars. can easily be installed d. All of the above

3. When designed with an air space and another mass layer, structural steel can acoustically perform just as well as concrete construction.
   a. True b. False

4. The following is a good strategy for increasing mass and stiffness in structural steel buildings:
   a. Increasing the weight of the concrete slabs on the metal deck b. Using shallower beams and girders
   c. Increasing the thickness of the concrete slabs on the metal deck d. Using wider column spacing

5. The Impact Insulation Class (ICC) metric is used to measure the following:
   a. The time it takes to dissipate from the point of impact to silence b. The extent to which a building assembly can block the impact of sound
   c. How much airborne sound is traveling from one space to another d. The decibel level inside of a room

6. Acoustic performance levels of the floor/ceiling system are affected by
   a. the finish floor material. b. the type of impact control underlayment.
   c. the type of finish materials. d. All of the above

7. At the start of a sound attenuation project for steel-framed buildings, designers should first
   a. identify sources of noise and their characteristics. b. select acoustical materials for the assemblies.
   c. seal the gaps in the partitions. d. detail the windows and doors.

8. Breaking or separating the walls at each floor works to
   a. decrease the NC rating. b. prevent sound from moving vertically from floor to floor.
   c. limit flanking. d. directly impact the reverberation time.

9. In order to approve the STC rating for floor and ceiling assemblies, designers are advised to
   a. use a thicker concrete slab. b. install a ceiling system with isolation hangers that decouple the ceiling from the floor structure.
   c. install ceiling drywall on resilient channels. d. All of the above

10. Lightweight screed systems offer the following advantage:
   a. They are not susceptible to cracking. b. They are excellent for retrofit construction.
   c. The material is noncombustible. d. The concrete deck substrate requires scarifying for surface preparation.

THE IMPACT OF WOOD USE ON NORTH AMERICAN FORESTS

CAN SPECIFYING WOOD FOR BUILDINGS CONTRIBUTE TO FOREST SUSTAINABILITY?

Presented by:

reTHINK WOOD®

Regenerating forest, Oregon. Photo: Ian Shive, courtesy of Plum Creek

LEARNING OBJECTIVES

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

1. Evaluate the use of wood as a construction material in the context of long-term forest sustainability as well as attributes such as low embodied energy and light carbon footprint.
2. Discuss forest sustainability measures such as biodiversity, soil and water quality, and harvest vs. net growth.
3. Examine the concept that using wood in buildings provides an incentive to landowners to keep forested lands forested instead of converting them to uses such as urban development.
4. Compare the carbon benefits of an unmanaged forest vs. a managed forest where timber is used for wood buildings.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/HSW
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AIA COURSE NUMBER: ARMAY2016.2
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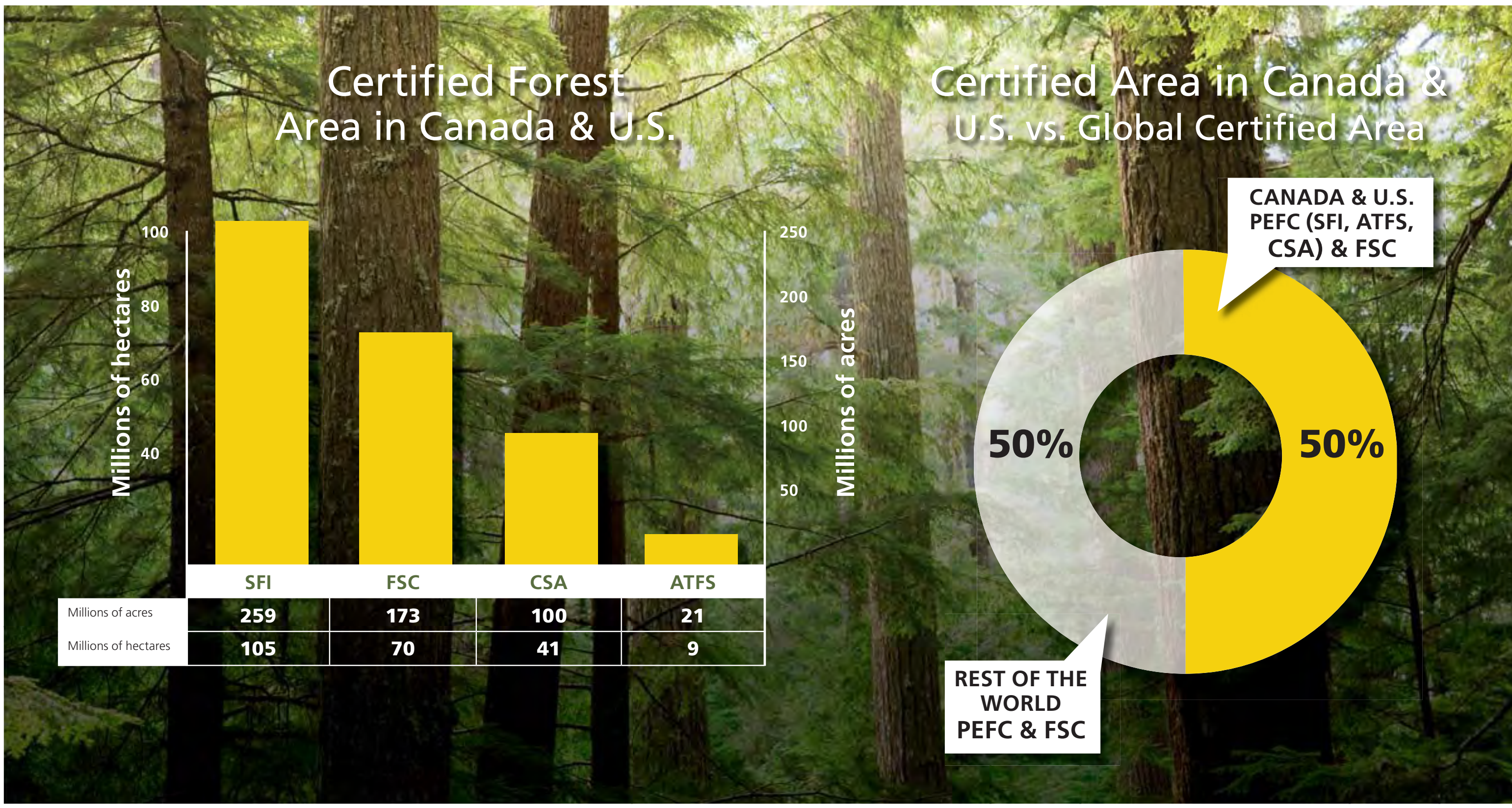
By Roxane Ward and Dave Patterson, RPF

As green building has evolved beyond its initial emphasis on energy efficiency, greater attention has been given to the choice of structural materials and the degree to which they influence a building's environmental footprint. Increasingly, wood from sustainably managed forests is viewed as a responsible choice—for a number of reasons. Wood grows naturally by harnessing energy from the sun, absorbing carbon dioxide and releasing oxygen. It is renewable and a carbon sink, and outperforms other materials in terms of embodied energy, air and water pollution, and other impact indicators.[1]

But what about the forest? The benefits above notwithstanding, how can building designers be sure that specifying wood doesn't negatively impact the North American forest resource?

As this course will demonstrate, the answer to that question has several elements. On one hand, North American forest practices are among the world's best and the amount of forested land, in both the U.S. and Canada, has been stable for decades. On the other, there are threats—such as climate change, increased wildfire, insect infestation and disease, and deforestation due to urban development—which are broader than the forest industry and must be addressed at a societal level. Drawing from a wide range of research publications, the following pages will examine the current state of North American forests, modern forest practices and criteria for sustainability, and consider some of the challenges that could profoundly impact the future of the forest resource. In this context, the course will also discuss why strong markets for wood products provide an incentive for landowners, not only to invest in forest management, but to keep forested land forested even though greater profit can often be made by converting it to other uses.



Forest certification credit: www.sfiprogram.org, www.pefc.org, www.fsc.org, www.forestfoundation.org. Photo: Frank Rosenstein, courtesy of Plum Creek

IS NORTH AMERICA RUNNING OUT OF FORESTS?

"On the whole, no evidence suggests that we are using up our forests. In fact, the total area of forests has been stable, and the volume of wood on them increasing."—National Report on Sustainable Forests–2010[2]

Until the early 1900s, settlers coming to North America cleared an average of 2.1 acres of forest per person to survive and grow food.[3] Since then, the establishment of industrial agriculture and other changes in land use have mitigated the need for forest clearing and forest acreage has been stable for close to a century.

The U.S. reported an annual increase in forest area of 0.12 percent in the 1990s and 0.05 percent from 2000 to 2005, while Canada reported no change.[4] In both countries, responsible forest management has resulted in more than 50 consecutive years of net forest growth that exceeds annual forest harvests.

United States

According to the National Report on Sustainable Forests–2010, the U.S. has approximately 751 million acres of forest area, which is about one third of the country's total land area. "This stability is in spite of a nearly three-fold increase in population over the same period and is in marked contrast with many countries where wide-scale deforestation remains a pressing concern."

> Deforestation is the permanent conversion of forest land to non-forest land uses. Around the world, it is a major issue and contributor to global warming. In the U.S. and Canada, the rate of deforestation has been virtually zero for decades[5]; however, the value of forest land in agriculture and real estate maintains pressure to convert.

Forty-four percent of U.S. forests are owned by entities such as national, state and local governments; the rest are owned by private landowners, including more than 22 million family forest owners. The fact that net forest growth has outpaced the amount of wood harvested for decades supports the idea that landowners who depend economically on the resource have a strong incentive for their sustainable management. This aligns with global forest data, which indicates that forest products and industrial roundwood demands provide the revenue and policy incentives to support sustainable forest management.[6] However, with urban development and other uses increasingly vying for land, an issue going forward will be making sure that landowners continue to have reasons to keep forested lands forested.

Canada

Canada has 860 million acres of forestland,[7] which is about 90 percent of the forested area it had before European settlement.[8] Ninety-four percent of the forest is publicly owned and managed by provincial, federal and territorial governments. The remaining

Tree planters. Photo courtesy of www.naturallywood.com

6 percent is on private property belonging to more than 450,000 private landowners.

Wood supply is the term used to describe the estimated volume of timber that can be harvested from an area while meeting environmental, economic and social objectives. Governments regulate harvest levels on public lands by specifying an annual allowable cut.

TOOLS FOR ACCOUNTABILITY

Although types of ownership vary, forest management in the U.S. and Canada operates under layers of federal, state/provincial and local regulations and guidelines that foresters and harvesting professionals must follow to protect water quality, wildlife habitat, soil and other resources. Laws addressing safety and workers' rights also govern forestry activities. Training, continuing education and certification for loggers and foresters support continuous improvement as well as the use of forestry best management practices (BMPs). Government agencies monitor forest management activities for compliance with regulations.

Forest Certification

While forestry is practiced in keeping with regulations and guidelines that consider environmental, economic and social values for that particular country, voluntary forest certification allows forest companies to demonstrate the effectiveness of their practices by having them independently assessed against sustainability standards.

Wood is the only building material that has third-party certification programs in place to demonstrate that products being sold have come from a responsibly managed resource. As of January 2015, more than 500 million acres of forest in the U.S. and Canada were certified under one of the four internationally recognized programs used in North America: the Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), Canadian Standards Association's Sustainable Forest Management Standards (CSA), and American Tree Farm System (ATFS). This represents approximately half of the world's certified forests.[9]

According to the National Association of State Foresters, "credible forest certification programs include the following fundamental elements: independent governance, multi-stakeholder standard, independent certification, complaints/appeals process, open participation and transparency. While in different manners, the ATFS, FSC, and SFI systems include the fundamental elements of credibility and make positive contributions to forest sustainability."[10] Similarly, the World Business Council on Sustainable Development released a statement supporting an inclusive approach that recognizes these programs as well as CSA (and others).

Managed forest in the Southern U.S. Photo courtesy of Weyerhaeuser

The FSC, SFI, CSA and ATFS programs all depend on third-party audits where independent auditors measure the planning, procedures, systems and performance of on-the-ground forest operations against the predetermined standard. The audits, performed by experienced, independent foresters, biologists, socio-economists or other professionals, are conducted by certification bodies accredited to award certificates under each of the programs. A certificate is issued if a forest operation is found to be in conformance with the specified forest certification standard.[11]

DEFINING FOREST SUSTAINABILITY

Forest sustainability was first described in the book Sylvicultura oeconomica by German author Hans Carl von Carlowitz, published in 1713—and, while our understanding of what constitutes sustainability has evolved significantly in 300 years, it has long been a cornerstone of forest management.

Von Carlowitz's work planted the seed for what we now know as sustainable development, defined in the landmark 1987 report of the World Commission on Environment and Development (the 'Brundtland Report') as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The United Nations Food and Agriculture Organization (UNFAO) defines sustainable forest management as "the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biological diversity, productivity, regeneration capacity, vitality and their potential to fulfill, now and in the future, relevant ecological economic and social functions, at local, national and global levels, and that does not cause damage on other ecosystems."

In the U.S. and Canada, forest sustainability is measured against criteria and indicators that represent the full range of forest values, including biodiversity, ecosystem condition and productivity, soil and water, global ecological cycles, economic and social benefits, and social responsibility. Sustainability criteria and indicators form the basis of individual country regulations as well as third-party sustainable forest certification programs.

THE ART AND SCIENCE OF FOREST MANAGEMENT

There is a good reason forestry is often described as a blending of art and science. Foresters must follow the laws, regulations and best practices of forestry and apply forest science and the results of ongoing research. They must also nurture the art of recognizing the unique features of a specific forest and site and develop the management design that will meet diverse environmental, economic and social interests, including the needs and objectives of the landowner.

The blending of art and science that occurs in forest management is similar to what occurs in a building project. Like the multi-disciplinary team that designs and constructs buildings, sustainable forest management involves a team that includes foresters, engineers, biologists, hydrologists, surveyors and loggers that plan and care for the forest. In both cases, members of the team must address the technical requirements and obligations of their profession

Douglas-fir working forest in Tillamook County, Oregon. Photo courtesy of the Oregon Forest Resources Institute

while taking into consideration the tastes and desires of the project partners and owners. In the case of forestry, this includes caring for the forest while meeting the needs of landowners, the environment and their community.

PLANNING FORESTS OF THE FUTURE

Although approaches differ, effective multi-decade planning is a fundamental part of forest sustainability.

On national forests in the U.S., for example, conformance with the National Forest Management Act (NFMA) requires the development of a comprehensive plan, utilizing substantial public involvement and sound science to guide management decisions.

This article continues on http://go.hw.net/AR516Course2. Go online to read the rest of the article and complete the corresponding quiz for credit.

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reThink Wood represents North America's softwood lumber industry. We share a passion for wood and the forests it comes from. Our goal is to generate awareness and understanding of wood's advantages in the built environment. Join the reThink Wood community to make a difference for the future. Be part of the message to "rethink" wood use, address misperceptions and enhance awareness of wood's benefits and choices. Visit rethinkwood.com/CEU to learn more and join.

QUIZ

1. In the U.S. and Canada, responsible forest management has resulted in forest growth that has exceeded annual forest harvests for how many years:
   - a. 5
   - b. 20
   - c. 50
   - d. Forest growth never exceeds forest harvest in the U.S. and Canada

2. The concept of forest sustainability was first introduced:
   - a. In 1713, in the book *Slvicultura oeconomica*
   - b. In the 1800s, when settlers coming to North America cleared an average of 2.1 acres of forest per person
   - c. In 1987, by the World Commission on Environment and Development
   - d. In 1992, as part of the United Nations Conference on Environment and Development

3. Which of the following is not used as a measure of forest sustainability:
   - a. Ecosystem condition
   - b. Biodiversity
   - c. Economic and social values
   - d. Forest ownership scenarios

4. Clearcutting is considered an appropriate silvicultural tool:
   - a.When young trees of a species need an abundance of sunlight to germinate and compete successfully with other plants and species
   - b. On private lands only
   - c. When woody debris in the forest builds up and increases the risk of wildfire
   - d. When the forest company is in a hurry to finish harvesting before winter

5. In the U.S., commercial and government use of herbicides (which includes forestry) accounts for what percent vs. the percentages used in home and garden and agriculture:
   - a. 30 percent forest / 10 percent home and garden / 60 percent agriculture
   - b. 43 percent forest / 12 percent home and garden / 45 percent agriculture
   - c. 9 percent forest / 13 percent home and garden / 78 percent agriculture
   - d. 18 percent forest / 28 percent home and garden / 54 percent agriculture

6. All of the following contribute to biodiversity except which one:
   - a. Planning forest management to maintain habitat patterns
   - b. Managing forests so they resemble forests established by natural disturbance (such as fire or wind)
   - c. Creating parks and protected areas
   - d. Adding diversion ditches and water bars to forest roads

7. Deforestation is defined as:
   - a. Areas impacted by insects or wildfire prior to regeneration
   - b. Harvested areas prior to regeneration
   - c. Forested lands that have been permanently converted to other uses
   - d. Areas that need additional treatments when the regenerating forests are young

8. The carbon benefits associated with forests include all of the following except which one:
   - a. The use of carbon calculators
   - b. Carbon absorbed from the atmosphere by forests
   - c. Carbon stored in wood products
   - d. Using wood instead of products that require large amounts of fossil fuels to manufacture
   - e. The use of biomass energy

9. The latest forest inventory systems use light detection and ranging technology to do which of the following:
   - a. Identify habitat and sensitive areas
   - b. Determine the best intermediate treatment techniques
   - c. Build more environmentally sound road systems
   - d. Identify popular areas for backwoods camping
   - e. A and B but not C or D
   - f. A and C but not B or D

10. Threats to forest sustainability include:
    - a. Forest fragmentation
    - b. Urban development
    - c. Increased wildfire and insect infestation
    - d. All of the above

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ARCHITECTURAL PAVING SYSTEMS

ADVANCEMENTS IN SURFACE TECHNOLOGIES AND FINISHES

Paving stones laid from building front to building front helped revitalize Toronto's trendy Yorkville Avenue shopping district.

LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Describe the history of concrete pavers.
2. Understand the manufacturing process and standards of concrete paving stones.
3. List new paver technology and industry trends.
4. Understand the diversity of application types available.
5. Examine the potential options for contribution to LEED criteria.

CONTINUING EDUCATION

CREDIT: 1 LU

COURSE NUMBER: ARmay2016.3

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By Kathy Price-Robinson

When the City of Toronto decided to revitalize Yorkville Avenue, arguably Canada's trendiest shopping district, planners wanted to enhance the sidewalks and the roadway with paving stones that were sophisticated, contemporary and durable.

"The durability of the pavers was of the utmost importance," said Brett Hoornaert, landscape architect and an associate with The Planning Partnership. Paving stones had been in place outside Yorkville Avenue's fire station for 40 years, and Hoornaert cited this as evidence that paving stones could deliver the long-term durability required for the project.

Working with the manufacturer, the design team chose a plank style paving stone laid in a herringbone pattern, with a pleasing mix of grey tones, and umber-colored stones added for the sidewalk. Now, the avenue feels both trendy and historic with paving stones from building face to building face.

Today, the specification of concrete paver systems offers more diverse architectural choices than ever before. However, not all concrete paving materials are created equal. To withstand harsh environments and heavy use with minimal color and surface wear, paving products should employ the latest technologies and manufacturing processes available. This will ensure that the architect, landscape architect, or engineer is specifying concrete pavers that will withstand the test of time. The range of color and finish options for these products is greater than ever before, allowing the designer to explore creative options in partnership with a supportive manufacturer. This article explores how to recognize, design for, and build with, the highest quality concrete pavers available in the industry.

THE LONG HISTORY OF CONCRETE PAVERS

Segmental paved surfaces have a long history of function and durability. The Romans used paving stones of varying materials, and a layered construction method to build over 50,000 miles of paved roads. Base materials consisted of a bedding layer of fine cement combined with a number of layers of rubble of increasing size to ensure proper drainage.

The history of paving stones dates back to Roman times, and beyond.

Roman segmental paved surfaces were built to resist rain, freezing, and flooding, and to require as little repair as possible. It's clear that these construction methods worked, as some of these roads are still in use today.

Throughout history, many urban roads were paved in segmental stone or brick. Cobblestones, a commonly used surface, were typically sourced from riverbeds and provided a rough and uneven surface. By the 1700s, this river rock began to be replaced by quarried stone dressed in rectangular shapes. In the U.S., basalt, sandstone, and even limestone were used. This surface stone sat on a bed of course sand; sand was also used to fill joints.

Brick pavements have been used for hundreds of years, most commonly in areas where there wasn't enough local stone. A similar base of sand and sometimes an additional layer of broken stone was used. Joints were filled with sand or a bituminous material.

The issue with brick pavers was their tendency to suffer surface damage, which limited their lifespan to about 20 years.

The use of concrete block pavers began in Germany prior to World War I. These were seen as a replacement for stone and brick pavers, providing greater uniformity.

PAVERS IN POST-WAR EUROPE

After World War II, Holland began manufacturing concrete pavers in earnest. Because clay bricks were needed for building construction, manufacturers created concrete pavers for use in road repair and rebuilding. Originally, these concrete pavers were manufactured to match clay brick sizes, but eventually new formats and sizes were created. These new concrete pavers were less expensive than their clay counterparts and had greater consistency of size. The concrete paver soon evolved into shapes that were denated, meaning they had "teeth," which allowed the blocks to be easily placed without the use of lugs. This reduced the need for skilled installation labor, thus lowering costs.

During the same period, Fritz Von Langsdorff, an engineer from Germany, developed new shapes and integrated colors for concrete pavers that featured tremendous pressure resistance and low moisture content. The first of these new paving stones were installed in Stuttgart, and Germany soon became recognized as the leader in this field. The Germans are responsible for many of the new paver products and much of the manufacturing technology we use today, and concrete pavers remain a very popular choice in Europe.

NORTH AMERICAN PAVER TECHNOLOGY FROM 1970 TO PRESENT

Pavers were introduced to North America in the 1970s, with the first stones made in Barrie, Ontario, Canada. They were made six units at a time, 3,000 per day and palleted by hand. At that time, natural-colored (grey) pavers were the only available option. Here is the timeline:

1970s: First generation pavers all had a standard finish, meaning that the concrete mix was the same from top to bottom. In 1975, new paver shapes were developed that combined the classic shapes of a square and an octagon into one versatile paver.

1980s: The first circle system paver is introduced in 1983. Heavy-duty pavers were developed in 1989 in response to a need for an attractive pavement option capable of sustaining enormous loads. These properties make this type of paver ideal for mechanical installation, which allows for economic paving of large areas.

1990s: Distressed pavers, designed to mimic natural worn stone, were introduced in North America following the popularity of tumbled pavers in Europe. This second generation paver had a different texture, derived from the first generation finish and concrete mix.

Early in the decade, third generation pavers were introduced with face mix technology, where the mix design on the surface of the paver was denser than the base. This allowed for new surface textures to be developed that were more durable over time. As well, an innovative, new paver shape was introduced with larger voids between the pavers, providing drainage for rainwater and runoff into the sub-base. These new pavers were called 'permeable'.

Plank-style paving stones are among the latest design trends.

2000's: Wetcast manufacturing technologies allowed for new shapes and surface textures that more closely reflected the look of natural stone, with advanced color retention and wear capabilities. This fourth generation of pavers introduced different casting methods that could also take advantage of face mix technology. Built-in surface treatments created pavers that were easier to clean than standard pavers. As well, different formulas allowed for varying degrees of stain resistance.

2010s: New shapes were introduced, allowing for more rapid installation (up to 30 percent faster than regular paving stones). Wetcast products, reminiscent of historical street pavers, were introduced in a permeable version, improving the aesthetic options within this emerging category. And finally, the latest in the permeable line of products are plank-style pavers that are machine installed, allowing a contractor to install 5,000 to 6,000 square feet per day with a two- to three-person crew.

YORKVILLE FIRE HALL AND YORKVILLE AVENUE, TORONTO

In 1974, a first-generation paver was installed at the Fire Hall on Yorkville Avenue in Toronto. Unit pavers were a brand new paving concept in North America at the time, having been introduced to the market only two years prior.

In 2014, the pavers were still intact and enduring the rigors of daily fire truck traffic.

"They have endured for over 40 years," said Paul Halls, Toronto Fire District Chief, who joined the department just after the pavers were installed.

The paving stones installed outside the Fire Hall on Toronto's Yorkville Avenue held up for more than 40 years of heavy traffic from fire trucks weighing more than 35 tons.

"Over 250,000 emergency responses in that time have come out these doors and across this platform," Halls explained. "The stones have withstood so much pounding. The aerial truck, the ladder truck, weighs over 35 tons. So rolling in and out for a quarter of a million responses in the 40 years they've been here is huge."

By 2014, it was determined that the pavers should be replaced. A new style from the original manufacturer's line was chosen for its aesthetic to fit with the heritage building and accents, as well as its ability to withstand the demands of the fire hall. The proctor density of the original granular base was tested and no modifications were required Therefore, new pavers were installed on top of the existing base. The 4" x 12" x 4" paver was laid in a herringbone pattern for maximum 'lock up', adding strength to handle the rotational forces of the fire trucks.

After more than 40 years of reliable service, the original paving stones were replaced in 2014.

"We need good equipment, good material," Halls added. "Part of that is a good platform. The big thing for us is durability. So the way they (the pavers) are built—way thicker—to withstand the pounding of the trucks, that means something to

A variety of colors and shades add interest to the Yorkville Avenue paving stones.

us. We need to rely on this. It doesn't matter the weather, the time of year. We need this to survive."

Concurrent with the new Fire Hall project, efforts were in the works to develop a master plan for Yorkville Avenue itself, which is one of the premier shopping districts in Toronto. The design focused on creating a pedestrian-friendly environment using appropriately durable materials and construction methods to ensure the roadway and sidewalks would withstand the harsh winter environment. The road reconstruction consisted of a 10" concrete road base with PVC drainage pipes located along the curb. The pipes were covered with filter cloth at the inlets to prevent clogging and 4"x12"x4" plank pavers were set in a 1" sand setting bed. The next phase included the roadway and sidewalks and here, an additional color was incorporated into the sidewalk for more visual definition and interest.

THE KEYS TO DURABLE PAVERS: COMPOSITION AND MANUFACTURING

The evolution of pavers, and their upward trajectory of style and substance over the decades, is due to continual technological improvements in paver composition.

The combination of coarse and fine aggregates in a concrete mix design is vital to achieve high strength, a low absorption rate, and good surface textures. Only with the proper blending and balancing of fine and coarse aggregates, can a top-quality product be produced.

Cement acts as the "glue" within the mix, bonding together particles of coarse and fine aggregate. With mix designs using a large amount of fine material, more cement is required to coat each aggregate particle, compared to the amount of cement needed with a mix of larger aggregate particles.

The more cement used in the mix, the more expensive the product becomes; finding the right balance is key to producing quality material at a good price.

Cement can be partially replaced with other materials, which are known as supplementary cementitious material (SCM). These materials may include:

- Fly ashes type C and F—Residue from combustion of pulverized coal.
- Silica fume—Residue resulting from the production of silica.
- Slag cement—Ground granulated blast furnace (GGBF) slag, formed by rapidly chilling molten blast furnace slag.
- Natural pozzolans—Materials that, when finely divided, will react chemically with calcium hydroxide in the presence of water to participate in a cementitious reaction.

The use of supplementary materials decreases the environmental impact associated with concrete production by reducing energy requirements and CO_2 emissions.

Importance of Admixture

Another contributor to superior concrete is admixtures, which are dry or liquid additives in the concrete mix that augment performance characteristics based on application requirements. Admixtures are used to plasticize the concrete to make it more fluid, which assists in the filling process and increases densification. They also help control efflorescence, and improve the concrete quality overall.

Admixtures may contain air entrainers. The Portland Cement Association explains that air-entrained concrete contains billions of microscopic air cells in each cubic foot and that these air pockets relieve internal pressure on the concrete by providing tiny chambers for water to expand into when it freezes.

Admixtures which improve the quality and durability of the concrete may include water reducers, super plasticizers, retarders, accelerators, viscosity modifiers, alkali-silica reactivity reducers, shrinkage reducers, expansion agents, etc. Some contain chemicals (including calcium stearates) that repel water from the concrete after curing. Note that silane/siloxane technology is now common in admixture development and is permanent, whereas calcium stearates break down over a period of time.

Some admixtures help control efflorescence. Efflorescence is observed as a whitish/grey deposit of soluble salt left behind by water evaporating from the concrete. Most concrete products will have some efflorescence, as it is the natural salt found in the aggregate used to create the concrete. It will disappear in time on its own.

Efflorescence will not directly harm concrete products, but in excess it can be an indication of other potential problems, such as poor curing, high permeability, and low strength.

Modern and ancient technologies make possible a wide range of paving stone colors, including a virtually unlimited number of custom colors.

Color in Concrete

Pavers are available in a wide palette of colors in order to complement nearly any design vision. Some manufacturers use synthetic iron oxides (pigments) to tint concrete. A smaller particle size in the batch allows for higher strength tinting, lower loading, and cost savings.

Even when the same pigments are used, product color can vary based on the source of the aggregates used in the concrete mix. Different regions or quarries produce different aggregates which can have a significant effect on the color of the finished product. Different cements also have an effect on the concrete color.

This article continues on http://go.hw.net/AR516Course3.
Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. The use of concrete block pavers began prior to World War I. These were seen as a replacement for stone and brick pavers, providing greater uniformity and eliminating the need to dress the stone. In what country did the use of these pavers begin?

   a. Japan
   b. Germany
   c. Australia
   d. Fiji

2. In the 1970s, first generation pavers with a standard finish and a consistent concrete mix from top to bottom were introduced to North America. In the 1990s, a new technology was introduced where the mix design on the surface of the paver was denser than the base, and allowed for new surface textures to be developed. What is that technology called?

   a. Stacked mix technology
   b. Parallel mix technology
   c. Face mix technology
   d. Pancake mix technology

3. Shortly after concrete paving stones were introduced to North America in the 1970s, they were installed outside a Fire Hall in Toronto. With trucks weighing as much as 35 tons rolling over them many times a day, equaling some 250,000 emergency responses, how long did the paving stones last?

   a. More than 10 years
   b. More than 20 years
   c. More than 30 years
   d. More than 40 years

4. Cement can be partially replaced with supplementary materials, which are known as supplementary cementitious material (SCM). The use of these materials decreases the environmental impact associated with concrete production by reducing energy requirements and CO_2 emissions. These materials may include:

   a. Fly ashes type C and F, which is residue from combustion of pulverized coal.
   b. Silica fume or slag cement
   c. Natural pozzolans, which are materials that when finely divided will react chemically with calcium hydroxide when in the presence of water to participate in a cementitious reaction.
   d. All of the above

5. There are two types of manufacturing processes for pavers: Drycast and wetcast. In which process is the mix poured into flexible polyurethane molds, which allows manufacturers to create more realistic looking products that resemble stone or old brick?

   a. Wetcast
   b. Drycast
   c. Both of the above
   d. None of the above

6. Absorption is critical to the longevity of a surface. If a surface absorbs high levels of water above 5 percent, freeze thaw durability will be compromised. When comparing concrete, concrete pavers and clay pavers, which has the lowest absorption rate of 4 percent to 5 percent?

   a. Poured concrete has lowest absorption rate
   b. Concrete pavers have lowest absorption rate
   c. Clay pavers have the lowest absorption rate
   d. All absorption rates are equal

7. True or False: Paving stones are also covered under ASTM International C936 Standard Specification for Solid Concrete Interlocking Paving Units.

   a. True
   b. False

8. What shape of paving stone is currently on trend?

   a. Rectangular (plank) shape
   b. Octagon shape
   c. Round shape
   d. Trapezoid shape

9. Concrete pavers can clean themselves with exposure to sunlight and rain when they are made with photocatalytic cement. What is the ingredient in the coating that facilitates this process?

   a. Copper
   b. Titanium dioxide
   c. Sodium silicate
   d. Colloidal silver

10. The renovation of Navy Pier in Illinois includes many sustainable features inspired by the Sustainable Sites Initiative of the Green Building Certification Institute. To increase the project's sustainability, what supplemental material was used in the production of the pavers that actually increased the strength of the product?

    a. 30 percent fly ash
    b. 30 percent copper slag
    c. 30 percent ground glass
    d. None of the above

MERGING ARCHITECTURE AND LANDSCAPE DESIGNS

Skylights provide abundant natural lighting in the Gateway Center and Plaza at the University of Minnesota. Design by Antoine Predock Architect PC. Photo ©Tim Hursley.

LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Understand how architecture and landscape architecture practices can be merged.
2. List the energy efficiency and sustainability benefits of melding site and architectural design.
3. Explain the importance of early planning and coordination with all members of the design and build teams for successful integration of interior and exterior design and features.
4. Describe the benefits to the designer, builder, and occupant of merging indoor and outdoor architectural design strategies and features.

CONTINUING EDUCATION

CREDIT: 1 LU

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By Andrew Hunt

SITE LOCATION FOR OPTIMAL LIGHT, WIND, AND PROTECTION

Many of the benefits of integrating a building's design with the local environment stem from careful consideration of the chosen building site. Where a building is positioned on a particular site can impact how an architect includes natural lighting features, how natural ventilation functions in the structure, and, on some sites, whether the structure may be protected from the elements.

Some of the issues designers need to consider include positioning windows or skylights to balance heat gain and loss, to control the glare within their own project and with neighboring properties, and to accommodate the variability of available daylight throughout the changing seasons. Designers will make different decisions regarding window size, shape, glass type, reflectivity, and position within the structure depending on the location and climate.

Buildings should be positioned to maximize or minimize solar access for warmth and daylighting, depending on the climate. For example, residential structures in a temperate climate may benefit from larger windows that allow for ample sunlight year-round, where

Built within the jagged mountains of the Swiss Alps, the Monte Rosa Hut has its own water supply provided by the mountainous terrain and was designed to blend with the surroundings and minimize the facility's exposure to wind and snow. Photo courtesy of Holcim Foundation and Wikimedia Commons.

structures in a warmer climate may benefit from designs that promote natural or built-in shade. In northern climates, buildings should be positioned to minimize any shade that may be present on the site's southern boundary. This may include trees, hillsides, or other buildings. In tropical settings, however, a designer may opt for ambient rather than direct sunlight as a way to maximize natural daylight access while also minimizing solar heat gain. These decisions can be included in both residential and commercial projects, as well as new builds and retrofits.

Wind is another important factor in building site selection and use. Designers and builders need to carefully consider the direction of the prevailing wind, local climate, and whether the site has its own microclimate, as all issues can affect a building's natural ventilation, roof and exterior building stresses, local wind tunnel effects, and exterior noise generation.

Both prevailing wind and location climate may be presented in terms of a site's microclimate, and the effects of that climate can greatly impact how a designer positions a building on a site. For example, topography such as ridges and valleys—or even other built structures—are likely to funnel wind and create a wind tunnel effect. There will also be stronger wind closer to the ridge. Open spaces tend to have more wind overall, and so building sites that border large open spaces such as parks, fields, or large bodies of water will need to be designed and positioned with those considerations in mind.

Commonly used ways to mitigate excessive wind on a residential building site include accommodating the direction of the prevailing wind by positioning the building in a way that

The Grandes Combes Courchevel blends with the snowy landscape to preserve the pristine vistas of the French Alps. Photo courtesy of Auer+Weber+Assoziiertte GmbH.

streamlines the wind around it, rather than blocks or buffers it, and positioning frequently used windows and doors away from the prevailing wind. By avoiding the prevailing wind, windows and doors can be kept open even on windy days, and in turn help provide natural ventilation to the building. Another useful strategy on windy sites is to design the building so that rooms that need to be quiet (for example, bedrooms) are situated on a wind-protected side of the residence. Again, on residential properties, designers may also choose to provide physical wind buffers such as fences, hedges, or courtyards. Such designs are best done in conjunction with a landscape architect, who can help fuse the natural surrounding with the building in a manner that helps mitigate wind impact.

PRESERVING VISTAS THROUGH INTEGRATED DESIGNS

Working with the site does more than manage light and wind; it allows architects to design structures that move with the land and preserve stunning, natural vistas. Take The Grandes Combes Courchevel, a resort and recreation hotspot between two mountains in the French Alps. The curving roof and sweeping design mimic the appearance of snow drifts and make the expansive resort blend seamlessly into the Alpine landscape.

BRINGING THE OUTSIDE IN

Designers are doing more than integrating their buildings with the site; they are merging exterior landscape features with interior spaces, offering a wide range of benefits for the environment, as well as its occupants.

Successfully fusing exterior landscape features with interior design requires an expanded

Designers and builders need to carefully consider the direction of the prevailing wind, local climate, and whether the site has its own microclimate, as all issues can affect a building's natural ventilation, roof and exterior building stresses, local wind tunnel effects, and exterior noise generation.

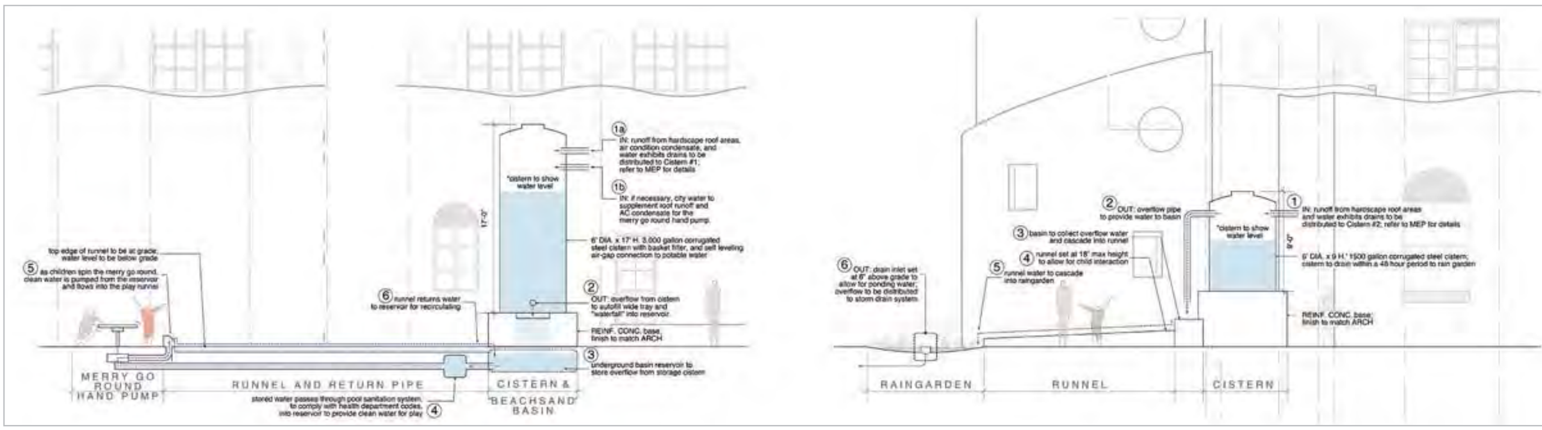
knowledge base, as well as an accommodating workflow, and it starts with a willingness to have all members of the design and build teams working together in early planning. Further, the designer must understand both the benefits of an integrated approach and the common challenges.

WATER CONSERVATION INCLUDING RAINWATER CAPTURE

Landscape and building architects can both benefit from water conservation techniques on a building site, especially if they include plans for water conversation in their early designs. Two of the more common practices are rainwater capture and water recycling. Both practices can work to integrate the natural environment and the built environment in a manner that addresses aesthetic and energy-efficient design choices.

Rainwater capture, also known as rainwater harvesting, catches and stores rainwater from elevated surfaces such as rooftops or rock catchments. In some situations, however, designers may be in a position to create underground collection sites.

Rooftop rainwater collection is simple, and usually involves a combination of gutters and down-pipes that divert the rooftop water into a basin or rain barrel, which may have a screen on top to help filter out sediment. Designers interested in using this technique should consider the health implications of the roofing materials and choose materials that are known to not impact the quality of the water. For example, bamboo and coated or painted roofs may leach



At Moxi, The Wolf Museum of Exploration and Innovation, rainwater capture capabilities are deployed for fun and educational purposes in a raingarden and a childrens' playground. Design by Van Atta Associates, Inc.

chemicals into the water, where galvanized, corrugated iron or aluminum roofs will not. Rain barrels should also be constructed of non-leaching materials, and the roof catchments should be regularly cleaned and maintained to ensure that the collected water is clean.

Another means of collecting rainwater is through ground-level catchments, which can also help improve the water runoff of a property. This technique uses a combination of drains and collection basins to harvest the water from a larger surface area than typical rooftop collection allows. Landscape architects can use this technique to build in water features on the property, such as small streams with storage reservoirs and even dams, if needed, to help provide water during times with less rain. One challenge of this technique is that much water is lost to natural seepage into the ground; another is water quality. The water obtained from ground-level catchments is best used for watering outdoor plants and gardens, rather than home-use.

INNOVATIVE INTERIOR ARCHITECTURAL PRACTICES THAT INCORPORATE LANDSCAPE DESIGN

The process of integrating exterior and interior features often begins with a desire to both physically enhance the occupant experience inside the built environment while also addressing energy efficiency and sustainability goals. Integrating a building into the landscape allows architects to design for the environment and lowers a building's ecological footprint. It also allows the architect to preserve natural vistas by creating buildings that move with the land.

Traditionally, building design and landscape design were done separately with only minimal integration. However, as the lines between architecture and landscape blur, architects and landscape architects may be called upon to collaborate on projects more frequently than they have in the past. Often, the landscape design was completed only after the initial building design was finished. Now, however, when merging the two spaces, collaborative design becomes central to the overall project. For example, a building may be designed to promote a sense of awe of the natural surroundings, or to invite occupants to appreciate the openness of a space. The process of creating this experience can only be done through the close work and shared vision of the building and landscape architects. Often, these designs bring together some of the philosophies of landscape architecture to the building itself.

The Ohio Veteran's Memorial and Museum in Columbus, Ohio is a good example of this kind of merged design. The partly subterranean building was designed by Allied Works and integrates the surrounding parkland landscape. Portions of the building are carved into the surface with a circular, spiraling terrace and curved slope that rises above the ground as a path to the sanctuary. This room will be used for ceremony, celebration, and reflection.

Designs such as the Ohio Veteran's Memorial and Museum are becoming increasingly common in civic structures and in commercial properties, but similar innovative designs are also used for residential properties. Less dramatic designs that merge the local and built environment can also be seen in urban centers, where the lower levels of buildings are designed to soften the urban experience. For example, gardens or small parks with benches may be incorporated into the design in place of traditional concrete surroundings. This practice gives back to the city and invites citizens to engage with the structure, rather than presenting an unwelcoming space.

BENEFITS OF BRINGING NATURAL, OUTDOOR ELEMENTS TO THE BUILDING DESIGN

While the art of creating an aesthetically pleasing or awe-inspiring space often drives architectural design, there are many practical benefits of integrating site and landscape features with the overall building design. For example, the design may present high-ceilinged, open indoor spaces with large windows that overlook vast, open outdoor spaces. Alternatively, the space may fuse exterior gardens with indoor green walls. The design options will depend on the client's needs and on the site itself.

NATURAL LIGHTING BENEFITS

Buildings that are designed to include natural lighting choices, such as floor-to-ceiling windows, glass walls, strategically placed windows, glazed porches, or skylights that maximize the occupants' access to natural outdoor light, have been found to have a number of benefits. From a health and happiness standpoint, natural light—also referred to as daylighting—has been shown to improve the overall well-being of building occupants through increased productivity in workplaces and improved comfort in residential and commercial spaces. The link between natural light and human circadian rhythms is the underlying basis for why access to natural light (as opposed to artificial) is particularly important in

Green space intermingled with walkways make this urban area feel rich and alive. Photo courtesy of Town and Gardens, LTD.

workplace settings, where occupants benefit from the visual and mental stimulation of natural light.

Of course, a downside of natural lighting is that it also increases thermal load on a building. In colder climates, this can lower heating costs in the winter. However, in warmer months, the extended sunlight may require an increase in cooling costs.

NATURAL VENTILATION BENEFITS

Natural ventilation can provide numerous benefits when appropriately included in building design. A primary benefit is energy-savings during warmer months, when a building may be cooled through natural airflow rather than with air conditioners or fans, all while providing fresh, indoor air.

The two most common types of natural ventilation are **wind-driven** and **buoyancy ventilation**. Both types use the pressure differences between the air outside of the building and the air inside. The difference between the two is that, as its name suggests, wind-driven ventilation uses the pressure of naturally occurring wind, where buoyancy uses the air pressure that is created by differences in temperature and humidity.

This article continues on http://go.hw.net/AR516Course4.
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QUIZ

1. What is the primary benefit of natural ventilation?
   a. Energy savings during warm months
   b. Sensory smells from outdoors
   c. Decrease indoor humidity
   d. Reduce allergens in the work space

2. True or False. Cool tower ventilation only works in low humidity environments.

3. Which of the following roof products may leach chemicals into rain water collection?
   a. Galvanized iron
   b. Aluminum
   c. Corrugated iron
   d. Bamboo or painted tiles

4. True or False: Buildings should be positioned to maximize or minimize solar access for warmth and daylighting, depending on the climate.

5. What typically causes wind tunnel effect?
   a. Manmade cylinders funneling wind
   b. Topography and other buildings
   c. Open areas
   d. Large snow covered mountains

6. Where can green walls be installed?
   a. Indoors
   b. Outdoors
   c. Indoors or outdoors
   d. In greenhouse structures

7. What is a heat island?
   a. Higher temperatures in urban areas
   b. Higher temperatures on structures built by water
   c. Higher temperatures in rural areas
   d. Higher temperatures in higher elevation

8. What is the main benefit of a design-build system?
   a. Allows each builder to work autonomously on their job
   b. Adds multiple people to the chain of command
   c. Puts all the responsibility on the client
   d. Streamlines the project through a single source

9. Who benefits from merging landscape design and building architecture?
   a. Architect
   b. Builder
   c. Owner
   d. All of the above

10. What groups need to work closely in the planning stage to bring together the natural landscape and built environment?
    a. Landscaper and owner
    b. Occupants and contractors
    c. Building architects and landscape architects
    d. Architects and Occupants

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ARCHITECTURAL ULTRA HIGH PERFORMANCE CONCRETE

Presented by:

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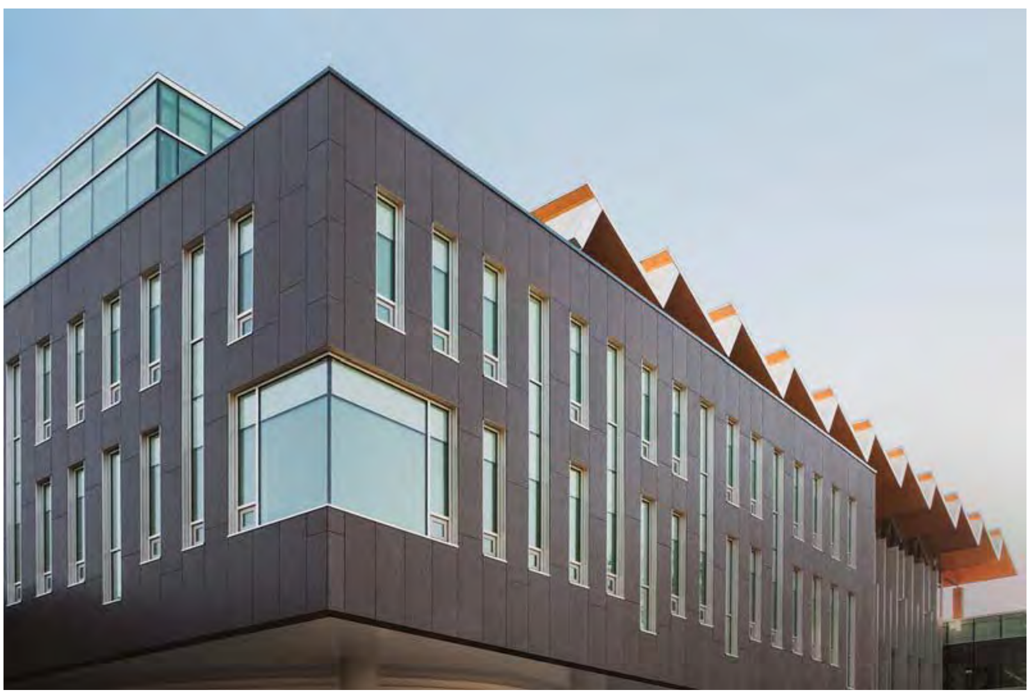


LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Explain the properties and performance of Ultra High Performance Concrete (UHPC).
2. Describe the history of UHPC and current architectural applications.
3. Examine Architectural UHPC panel and cast facade element applications.
4. Outline manufacturing processes and related design-cost considerations.

CONTINUING EDUCATION

CREDIT: 1 LU

COURSE NUMBER: ARmay2016.5

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR516Course5 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

Kevin Gannon, LEED AP, Building Enclosure Council

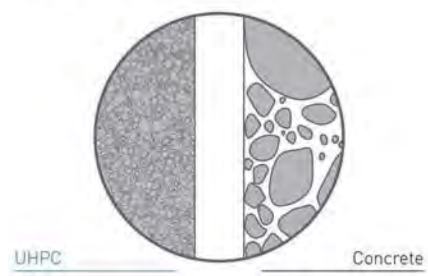
The next generation of concrete technology is changing what is possible for architecture, engineering and construction professionals. Ultra High Performance Concrete (UHPC), along with parametric modeling, rapid prototyping, CNC fabrication, and automated manufacturing are coming together to provide unprecedented possibilities for architectural concrete components and building skins.

WHAT IS ULTRA HIGH PERFORMANCE CONCRETE (UHPC)?

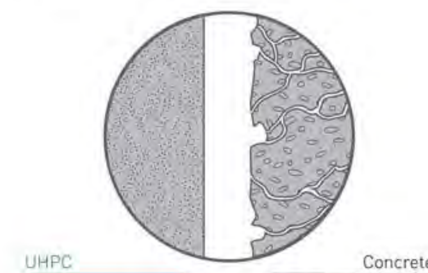
UHPC is a category of concrete characterized by high strength, low water absorption, and high resistance to waterborne and airborne chemical degradation. The compressive strength of UHPC used in architectural applications typically ranges from 17,000 psi to 25,000 psi, with flexural strength ranging from 3,600 psi to 6,000 psi and beyond. Although extremely high compressive strengths can be achieved with UHPC, for thin architectural elements, the mix design favors flexural strength over compressive strength. This high strength matrix is further augmented with a small percentage of alkali resistant (AR) glass fibers, polyvinyl alcohol (PVA) fibers, or steel fibers. For aesthetic and in some cases fire code reasons, AR glass fibers are most common in Architectural UHPC. However, because the base matrix strength is so much higher than conventional GFRC, the concentration of fibers is significantly lower. In fact, glass fiber reinforced UHPC (GFR-UHPC) does not utilize enough glass fibers by percentage of volume to be placed in a GFRC category according to the Precast Concrete Institute (PCI). Therefore, UHPC manufacturing plants producing architectural products are most often certified under the requirements of PCI MNL 117-13, Quality Control for Plants and Production of Architectural Precast Concrete Products. Three-dimensional UHPC elements can also incorporate reinforcement, such as steel bars, glass or carbon fiber rods, as well as be pre-stressed; however, such reinforcements are not typically necessary for most architectural applications.

The basic raw materials of UHPC are familiar to everyone who knows concrete: water, sand, cement, silica fume, and plasticizers. It sounds simple enough, but UHPC is an order of magnitude different from traditional categories of concrete. There are no magic ingredients: resins, cellulose, or special polymers are not used to achieve the outstanding properties of thin Architectural UHPC profiles. The secret lies in extremely small particle size and carefully

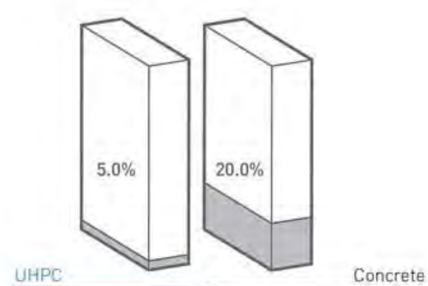
Diag. A | **Matrix Density**



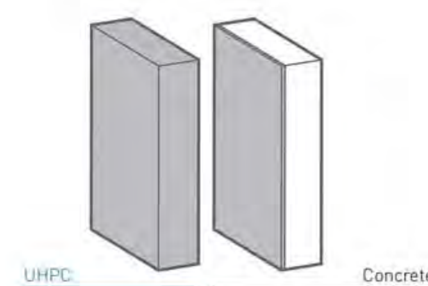
Diag. B | **Surface Quality**



Diag. C | **Water Content**



Diag. D | **Color Integrity**



selected particle chemistry and geometries that combine under exacting mixing, vibration, and curing regimens to form a base matrix with tightly packed particles and very strong molecular bonds. The design and calibration of UHPC formulas and selection of raw materials involves state of the art concrete chemistry and micro/nano-particle engineering to optimize chemical and mechanical bonds.

Because the mixing operation, casting techniques, and curing procedures require highly specialized equipment and controls unique to UHPC, and particularly Architectural UHPC, products are typically delivered as finished, pre-cast elements rather than produced on-site with a UHPC pre-mix. Automated dosing and mixing equipment is required to precisely measure and thoroughly mix the raw materials. UHPC contains significantly less cement and water by volume compared with traditional pre-cast concrete. Because the formula contains so little water, a small amount of specialized plasticizers are needed to allow the material to flow into molds. The process of adding plasticizers is both time and temperature dependent. Once cast, the parts require even and level vibration to eliminate trapped air before moving by conveyor to a level, temperature controlled chamber. The entire casting process from material delivery to the mixer through final vibration, is highly time dependent. This is yet another reason that controlled factory conditions are required. The net effect is maximum compactness and an extremely small, disconnected pore structure.

The performance properties of UHPC manufactured in automated, controlled conditions are:

- High compressive and flexural strength
- High impact resistance
- Extremely low coefficient of thermal expansion, shrinkage, and creep
- Very low water absorption and zero water movement
- High resistance chemical degradation (salts and carbonation)
- Excellent freeze/thaw strength and surface appearance retention

HISTORY OF UHPC—CIVIL APPLICATIONS

UHPC has been in use for more than 30 years, developed initially for large and specialized civil engineering applications that could benefit from its high strength and durability under extreme conditions. Such applications—seawall anchors, bridge abutments, super thin arches, bridge decks, pre-cast beams for nuclear power—are still the predominant use cases for UHPC.

However, today a wide variety of formulations are being developed that advance the performance characteristics of this category of concrete and are tailored to requirements of specific applications—everything from cast refractory components and injection-molded complex parts to extruded profiles. Industrial, architectural, and landscape design professionals are now embracing UHPC for its aesthetic potential in addition to its outstanding strength and durability.

HIGH TECH CONCRETE MEETS ARCHITECTURAL DESIGN

All the properties and characteristics of UHPC that are desired in special civil engineering construction are harnessed and molded into high quality Architectural UHPC elements with surfaces, shapes, and assembled systems not possible a few short years ago. If ever there was a material that was imbued with Vitruvius' united triad of architecture values; "firmitas" (solidity, materiality), "utilitas" (function & commodity), and "venustas" (beauty and desire), UHPC is especially qualified.

We now have a material that is not only very strong and durable, but also a material that, when combined with today's advanced manufacturing technology and tooling techniques, can provide for the demands of high performance building requirements, design aspirations, and construction economics. Below are listed just a few of the aspects of the material that make it an exceptional fit for architectural applications:

- Precisely replicates mold surfaces and geometries, creating limitless possibilities for patterns, textures, and shapes
- Natural, mineral-based raw materials afford graceful weathering and aging of material
- Extremely durable and low maintenance, outperforming CIP and many types of stone
- Inherent strength that allows thinner and lighter panels and profiles than stone, conventional pre-cast concrete, and most profiled terracotta
- Higher span to weight ratios that result in fewer attachment points and sub-frame components, reduced installation labor, and lower specialized hardware costs
- The ability to precisely process and finish parts post-casting—CNC cutting, drilling, media-blasting—and assemble parts with high performance adhesive.

ARCHITECTURAL APPLICATIONS

The Architectural UHPC industry is just getting started in the United States and, in fact, there are only a few fully integrated manufacturers of Architectural UHPC in the world. It will be a very long time before we exhaust the potential for the material and its architectural applications. Within the last six years, Architectural UHPC has been installed on government buildings, including foreign consulates and courthouses, university buildings, museums, airports, commercial office buildings, as well as hotel and residential high-rise developments. Applications for Architectural UHPC are varied and include:

- Cladding panels (close cladding and ventilated facades)
- Unitized curtain wall (integrated with glazing assembly or opaque units)
- Cast corners matching the thickness of panels
- Shading devices or light reflectors
- Screens and lattices (hung or self-supporting)
- Acoustical barrier and/or diffusion/reflection parts
- Fins, copings, sills and headers, water tables, etc. for masonry facades
- Manufactured permanent formwork for high quality finish face of structural elements
- Planters, benches, bollards, and other landscape elements
- Columns, beams, and floor spanning slabs

Additional applications are being developed for manufacture every day. For the purposes of this unit, we will focus on the characteristics and manufacture of facade elements and panels.

DRIVERS FOR FACADE AESTHETICS AND PERFORMANCE

Demands upon building envelopes have intensified within the last 15 years with greater emphasis on light-weight, high-performance facades and the layering of facades to achieve both aesthetic and performance design intent. Simultaneously, building owners and designers are seeking options to "impress" a building with unique identity and appropriate contextual response.

Therefore, the design challenge is to meet the high-performance building envelope targets, control the weight and cost (related to the primary, secondary and tertiary structure cost), and to have a durable edifice that defines urban space and delineates the form of the building in a meaningful way. All this is achieved within 3 to 8 inches of a facade assembly depth. It is not by chance that many of today's facade designers are focused on surface pattern and variety, looking for color and value contrast, pushing the boundaries of materials for thin profiles, and reviving the preferences for natural, authentic materials.

BUILDING ENVELOPE PERFORMANCE AND UHPC

In response to new code standards with higher energy conservation requirements and designer and client communities looking to exceed prescribed or minimum energy code compliance, opaque facade designs are on the rise. Continuous insulation wall assemblies, recently adopted by the IBC and ASHRAE 90, support the increased use of opaque facade design. Architectural UHPC panels are a natural fit with ventilated facades offering a variety of cladding panel sizes, reduced weight to area ratio, and the ability to control thicknesses for any facade composition. Regardless of the fire rating of the enclosing wall, non-combustible materials are essential to multi-story wall assemblies. Architectural UHPC is a non-combustible material and has zero flame spread.

Efforts to construct better buildings, delivered faster, and at lower cost, are creating innovations in pre-fabrication and pre-assembly. The reduced weight and efficiency of installing unitized systems, combined with the quality assurance that comes with factory pre-assembly, are attractive options for meeting today's construction schedules. The use of these delivery methods for critical facade components increases every year. Working with an automated manufacturer and its knowledgeable project management staff best leverages the benefits of pre-assembled Architectural UHPC components. Projects also frequently combine curtain wall unitization of UHPC with field installed UHPC elements, requiring the proactive coordination of schedules and communication between the manufacturer's project manager, unitizing processor, and installation contractor.

There is now a greater focus on durable, low maintenance materials, not only for the longevity of building finishes, but also for the durability of products during shipping, handling, and construction processes. Architectural UPHC should outlast the life of the building and weather gracefully. The inherent strength of the material greatly reduces the need for overstock or replacement from shipping or construction site handling.

LOOKING SPECIFICALLY AT ARCHITECTURAL UHPC FACADE PANELS

Pound for pound, Architectural UHPC is more expensive than conventional pre-cast concrete or even high performing concrete; however, far less material is used to achieve the same panel sizes or shapes. Therefore, when properly comparing the cost of full-wall assemblies and installation labor, Architectural UHPC has the potential to produce an integrated solution that is higher performing and less expensive than pre-cast or traditional GFRC.

Although the particles in UHPC are packed more compactly, the density of Architectural UHPC is actually similar to other concrete, averaging 140 pounds per cubic foot. 5/8" thick panels weigh 7.2 pounds per square foot and are easily manufactured in 4'x10' or 5'x12' panel sizes. This weight and area is only 25–35% of the weight of 1½"–2" thick stone and 10–15% of the weight of 4"–6" pre-cast concrete. Further, stone would likely be divided into smaller panels for the same coverage area. The weight of 5/8" Architectural UHPC is aligned most closely with that of Insulated Glass Units. The ability to manufacture thin panel sizes up to 60"x144" makes Architectural UHPC cladding panels attractive for both ventilated facade and curtain wall applications.

This article continues on http://go.hw.net/AR516Course5. Go online to read the rest of the article and complete the corresponding quiz for credit.

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TAKTL is the first company to fully integrate Ultra High Performance Concrete (UHPC) formulation, design, mold making, and automated manufacturing to deliver high quality architectural products, made in the USA. TAKTL offers a variety of standard and custom programs to address the needs of projects spanning a wide range of design requirements, budgets, and schedules.

QUIZ

1. UHPC has both high compressive strength and ductility, meaning it has tensile and bending capacity that is not found in concrete. What compressive and flexural strength ranges apply to manufactured thin Architectural UHPC?
   a. Compressive: 3500–5000 psi | Flexural: 500–700 psi
   b. Compressive: 4500–5500 psi | Flexural: 700–900 psi
   c. Compressive: 5500–7500 psi | Flexural: 900–1200 psi
   d. Compressive: 17,000–20,000 psi | Flexural: 3600–6000 psi

2. What contributes to the high strength of Architectural UHPC?
   a. Finely calibrated and automated raw material dosing and high intensity mixing
   b. The range of particle sizes and shapes, extending down to nano scale.
   c. Reduced water in the mix and controlled curing
   d. All of the above
   e. None of the above

3. True or false: Architectural UHPC is sold as a pre-mix and can be mixed on-site with conventional concrete mixing equipment.

4. How does Architectural UHPC have less of an environmental impact compared to conventional concrete?
   a. 75% less water by volume
   b. Reduced weight: less fuel/sf area transported
   c. Reduced Carbon footprint—less cement/sf area
   d. Bulk materials are sourced locally
   e. All of the above

5. Architectural UHPC can be produced in thin panels or profiled shapes. How does this advantage compare to conventional pre-cast 4"–6" thickness (50–70 lbs./sf) for a 5'x10' panel: what would the thickness and weight be for the same size panel in UHPC?
   a. 2" and 22.5 lbs./sf
   b. 5/8" and 7.2 lbs/sf
   c. 1 1/2" and 17 lbs/sf
   d. 3/4" and 8.4 lbs/sf

6. For thin facade panels what are the two most critical structural performance factors for wind load?
   a. Thermal expansion and anchor shear
   b. Compressive strength and anchor shear strength
   c. Flexural strength and anchor tensile strength
   d. Joints width and floor deflection

7. The tight packing of particles in architectural UHPC results in very low water absorption. Which performance characteristic below is NOT also the result of the densely packed material matrix.
   a. Excellent freeze thaw performance
   b. Resistance to chemical degradation
   c. High compressive and flexural strength
   d. Faster cure time
   e. Replication of fine detail of molds

8. Automated media blasting of Architectural UHPC is a low environmental impact way to reveal decorative aggregates or change the surface of the cast part because__________.
   a. It utilizes plant based compounds
   b. It is human powered
   c. It changes the chemistry of the concrete
   d. It does not use harmful chemicals and is a fully contained process that recycles the media

9. Architectural UHPC panels are an excellent cladding for ventilated facades assemblies. For what other applications is the material well suited?
   a. Integration into unitized curtain-walls
   b. Pier and column finish
   c. Perforated screen walls
   d. Fins and masonry trim
   e. Urban and landscape elements
   f. All of the above

10. Although many factors are considered and combined to generate a budget for production of Architectural UHPC panels and shapes, which two cost factors are Architectural UHPC panel manufacturers most sensitive to?
   a. Color and texture
   b. Wall assembly and sub-frame material
   c. Panel utilization and mold reusability
   d. Thickness and wall assembly

"Even McMansions can't change the fact that the Saarinen building is an uncanny, industrial-scaled deployment of square footage."

The Bargain That Revived Bell Labs by Karrie Jacobs

The fact that the Bell Labs building in suburban Holmdel, N.J., still exists is a miracle. The 2 million-square-foot hard-edged hunk of black mirrored glass was designed in the late 1950s by Eero Saarinen for the research arm of what was then the only telephone company in the U.S. For decades, the building was a hothouse where groundbreaking work was done on telecommunication satellites, cellular phones, and fiber optics. The Touch-Tone phone was invented here. Scientists won Nobel prizes almost routinely, including one for the discovery of cosmic microwave background radiation, an essential element of the Big Bang theory. Then, in 2007, long after the Bell monopoly was broken up and the labs were reformed as a smaller entity called Alcatel-Lucent, the building was abandoned and slated for demolition. But it was saved by a campaign waged by hundreds of outraged scientists, who couldn't fathom that their grand laboratory might be replaced by just another subdivision.

Today, to visit the complex—recently renamed Bell Works by its owner, a company called Somerset Development—is to glimpse the pre-history of our current technological moment. The set of four mirrored-glass boxes linked by a gargantuan cross-shaped atrium was designed by Saarinen beginning in 1957, a follow-up to his acclaimed General Motors Technical Center outside Detroit and his IBM Thomas J. Watson Research Center north of New York City. The first section, one pair of black boxes, was completed in 1964, several years after the architect's death, and the second pair was finished in 1966. In the 1980s, the four buildings were extended with matching additions by Kevin Roche, FAIA, and John Dinkeloo, who had worked on the original under Saarinen.

Like most suburban office complexes of its day, Bell Labs is swimming in land (472 acres) and features two manmade lakes (front and back), endless lawns, cherry trees, and parking lots all rigorously landscaped by Sasaki Walker Associates (now SWA): nature specifically designed to be viewed through glass. It's a configuration typical of the 1950s and '60s, when corporations fled cities. Now, the same corporations are turning their backs on the suburbs, leaving behind massive buildings that don't easily lend themselves to new uses. But this one—perhaps because it was built not as the centerpiece of bureaucracy, but as a factory for the production of scientific ideas—is tantalizingly contemporary inside. There is something about the big atrium, lined with tiers of laboratories, that suggests possibility.

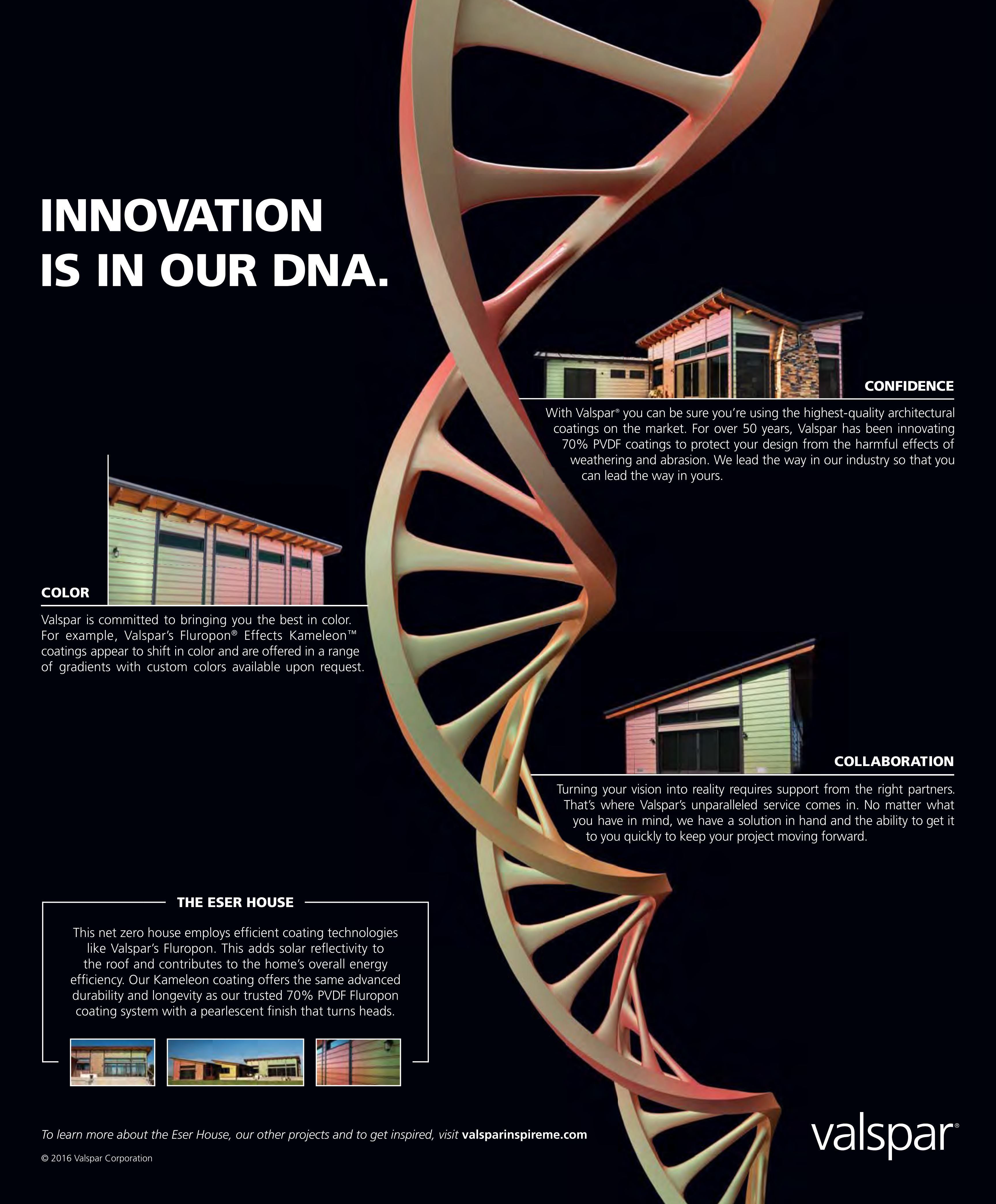
Urban Bones

"When I walked in, I saw a pedestrian street, slicing right down the middle," recalls Ralph Zucker, the president of Somerset, who considers himself one of the New Urbanists, a champion of dense, pedestrian-friendly residential communities. He spent five years, from 2008 to 2013, angling to buy the property, and is now, finally, in the process of renovating it and leasing it out one office at a time to a variety of tenants, especially tech companies. "It was obvious to me that this building had incredible bones for creating an urban core, even though it's in suburbia. What struck me was the utter simplicity of Saarinen's design, the brilliant clarity of the linear space."

Injecting urbanity into disused bits of suburbia—that's what Zucker does. He argues that New Urbanism should go beyond "trying to create places for people on the Florida Panhandle" or other greenfield sites he thinks of as "clean places." In one suburban New Jersey development, Wesmont Station, he turned the site of an old aircraft-engine plant into a cluster of apartments with a rail link to New York City. And in Aberdeen, N.J., he's currently creating a mixed-use development on the site of an abandoned glass factory. But the Bell Labs project is more an outgrowth of something he and some partners attempted about 15 years ago in New York City, when

Bell Labs from southwest, looking across ornamental lake

CHRISTOPHER PAYNE/ESTO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they hired New Urbanist guru Andrés Duany, FAIA, to come up with new uses for Industry City, a massive complex of manufacturing buildings on the Brooklyn waterfront. They staged a charrette, proposing a mix of uses for the complex including office space, hotel rooms, and cafés. That particular version of Industry City went nowhere (the space is now being leased out by a different developer), but the concept re-emerged as a template for Bell Labs.

When Zucker was first contemplating buying the Saarinen building, he asked an architect whom he'd met at the Industry City charrette, Alexander Gorlin, FAIA, to come take a look: "We walked around, and it was completely abandoned," Gorlin remembers. "It was like coming into the Baths of Caracalla." Around the same time, Zucker asked for help from another member of Duany's circle, Jeff Speck. A prominent advocate for pedestrian-friendly development, Speck drew up a fast-and-dirty site plan that created a residential community with almost 300 rowhouses clustered at either end of Saarinen's glass box, where SWA had placed the parking lots, and where the houses would arguably be less conspicuous. "The central building will remain intact but reconfigured, not just to hold apartments, offices, hotel, and civic uses, but also to function as the public heart of the community, its internal atrium reconceived as Main Street," Speck wrote. He also penciled in "villas" along the property's ring road that would contain hundreds of apartments. It was a lovely scheme: dense, urbane, walkable, even a little utopian. But the idea proved too much for suburban Holmdel, a highly affluent town (average household income over $200,000) that, like many such communities, lives in fear of overcrowding in the school system. Zucker's initial presentation to the townspeople fell flat. According to Zucker, area residents told him, "This is not Brooklyn. This is not the Meatpacking District."

Of course, the town's rejection of the initial plan saved Zucker from building during the worst housing downturn in living memory. With the assistance of New Jersey's state government, which is never shy about promoting job growth, Zucker spent five years persuading Holmdel to change its "archaic" zoning, restrictions that would have permitted only a single tenant in the building. In 2009, he staged an open house at Bell Labs where local residents could walk through a mock-up of the "town center" he envisioned. Eventually, Holmdel's need to collect tax revenue from the site (once the financial engine of the town) and concessions from Zucker on the number and type of residences on the property led to an agreement. In 2013, the town agreed to a mixed-use concept, putting Zucker and his partners in a position to finally close the deal and buy the property from Alcatel-Lucent for $27 million.

4,000-Square-Foot Compromises

Unfortunately, Zucker had to make what one observer has termed a Faustian bargain. To help finance the project, he sold off 103 acres to the luxury home builder Toll Brothers, which, as stipulated in the covenants that Zucker signed when he purchased the property,

Jeff Speck's Bell Labs proposal, circa 2008

Current development scheme, showing the Toll Brothers houses

TOP: JEFF SPECK; BOTTOM: GORLIN ARCHITECTS

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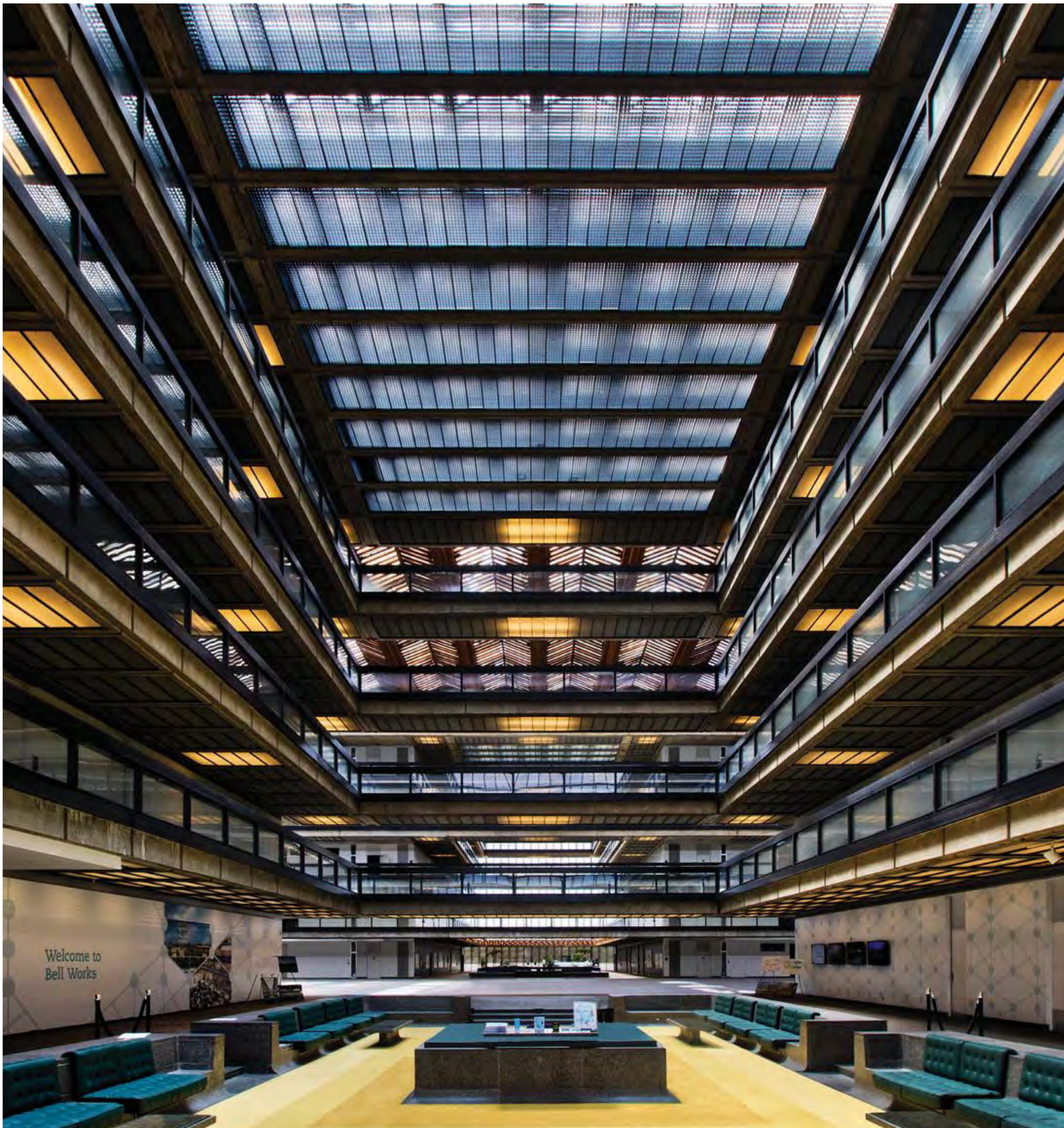
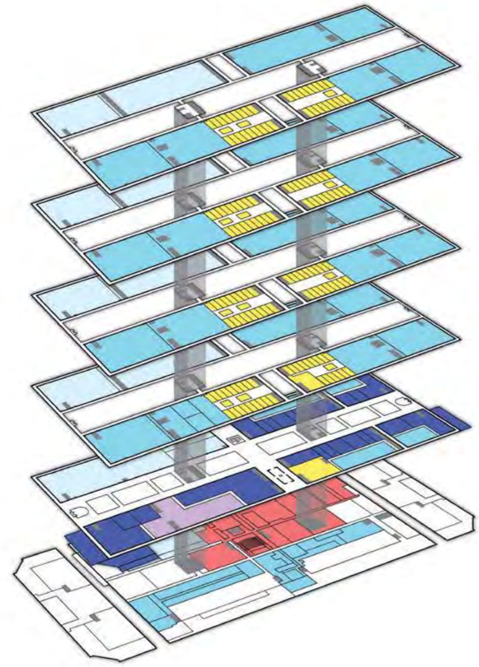


Sunken reception area in Saarinen's atrium

CONNIE ZHOU/OTTO



Axonometric of a renovated Bell Labs

can construct 225 homes, most of them "age-restricted" to those 55 and older, households unlikely to contain school-age children. Toll Brothers is now in the process of dropping an archetypal subdivision on Saarinen's front lawn, and Hideo Sasaki's formalist landscape will be marred by a series of 1-acre home sites clustered around cul-de-sacs. The Toll Brothers homes—4,000-square-foot multi-gabled McMansions—and their sprawly arrangement are antithetical to the principles of New Urbanism and diminish Zucker's dream to make the modernist glass box the centerpiece of a new kind of city. "Every development of this size has some compromises in it," Zucker argues. "It just makes the Saarinen but one more pod in a collection of dumb suburban pods," grumbles Speck.

But this overstates the case. Even McMansions can't change the fact that the Saarinen building is an uncanny, industrial-scaled deployment of square footage. When I recently explored the atrium with Gorlin, strolling beneath a long, leaky glass roof 80 feet above our heads, the architect pointed out his minor interventions: He cleared out the leftover planters and overflow offices and installed Italian ceramic floors that, near the elevator cores, turn into geometric compositions evoking Josef Albers, he told me, "so it wouldn't be an undifferentiated mass of tile."

Gorlin has a theory about the universality of the space: "The 100-foot width of the atrium is equal to many great avenues and public spaces historically, including Lincoln Road, one of the great pedestrian streets that Morris Lapidus adapted to the pedestrian mall, and the Crystal Palace in London, and St. Peter's Basilica ... " According to Gorlin, whether

COURTESY BELL WORKS

it's measured in feet or meters, the width is always the same. "It's some kind of human dimension of grandeur and intimacy," he says.

As Gorlin and I walked the endless open corridors that overlook the atrium (with ashtrays installed in the railings at 20-foot intervals), I began to think that the rigid simplicity of the interior layout is a bit like an urban grid, something that is highly structured yet encourages an incredible range of activities within. In other words, the urbanity that Zucker is hoping to deliver (in a town that has rejected the concept) is embedded in Saarinen's architecture.

Bell Labs, in its heyday, featured interior offices without daylight

EZRA STOLLER/ESTO

Bell Labs was, in fact, designed for maximum flexibility. The labs and offices that are hidden behind sheets of metal, painted white, on each tier, could be reconfigured as the nature of the work demanded. The application for the building's designation as a National Historic Place, granted last year, discusses this aspect in detail: "Alterations to interior workspaces were routinely made … to accommodate changing project teams and their needs. Indeed, the building was designed to foster such changes." Gorlin has used the building's protean quality when making a case to the National Park Service (overseer of Historic Places) to swap out the opaque white metal lab walls for glass, a change that's essential to turning the old labs into leasable offices.

A Mini Silicon Valley

Zucker's vision of the place is both highly speculative and very clear. It's a hub for Millennials, innovators who perhaps can't afford to set up shop in New York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City, a Silicon Valley in microcosm, thrumming with life. He's hoping to convert a large section of the building into a hotel, which will make the epic 15,000-square-foot, glass-enclosed cafeteria on the lower level and the adjacent theater valuable for conferences and other functions. But right now, they're a little ghostly. Much of the building is still unoccupied. The couple of stretches of corridor with newly occupied offices are inhabited by people who look, encouragingly, like the target market: beards; headphones; screens, big and small. One tenant, Nvidia Corp., a graphics processing company, will design software for self-driving cars. Another, Acacia

Rendering of renovated building at full occupancy

Communications, helps businesses migrate to the cloud. These companies couldn't exist if Bell Labs hadn't spent much of the 20th century laying the groundwork. The concept is perfect.

Still, there are limits to how genuinely urban this place can be. For one thing, it's hard to get to Bell Works without a car; the nearest train station is about 5 miles away. For another thing, Holmdel's low tolerance for perceived Brooklynization and the all-too-common bias against density is the reason New Urbanism is always an easier sell in those "clean locations." Bedroom suburbs have a built-in resistance to urbanity; residents may work in New York or Philadelphia, but they don't want to live there. Nonetheless, bit by bit, much of Zucker's vision is becoming reality. And if this extraordinary example of Saarinen's boldness—which also happens to be place of inarguable historic significance—can be preserved and rejuvenated, maybe it doesn't also have to solve the problem of sprawl. After all, Silicon Valley is very much a suburb, too.

GORLIN ARCHITECTS

> "Her death does not signal the end of an era. She helped open an era that continues. She changed the field, she lived large, she belonged to the world."

Zaha Hadid, Friend by Joseph Giovannini

1950

2016

She was architecture's comet, shooting out of the firmament as if from nowhere, and now, just as suddenly, she is gone, vanished, the likes of her luminous talent not to reappear again for generations.

Zaha. Just 65, she died suddenly of a heart attack on March 31 while being treated in a Miami hospital for bronchitis. She was scheduled to lecture at Yale the following week, where she was teaching a design studio on the high-rise. In late April, her topologically streaming Maritime Terminal in Salerno, in the works for a decade, opened during a ceremony attended by Italy's prime minister. But Zaha wasn't there wearing her tetrahedral plastic cape and her fuzzy fur ring, or something else equally as funny, outrageous, and perfect. It wasn't the same. Zaha added Zaha to everything she touched.

She stored all her medals in a cabinet, out of sight, in her blazing white apartment in London. In 2004, she was the first woman to win the Pritzker. In 2012, she was "knighted" a dame of the British Empire. The Queen, perhaps understanding best what it's like for a woman to have and hold power in a dominantly male world, elevated Zaha before the starched British architectural establishment could face her towering talent: The Royal Institute of British Architects finally awarded her its gold medal earlier this year, the first time it's been given to a woman practicing solo.

You can't count the number of magazine covers she occupied or the students she inspired or the lectures she gave or the number of people who just adored her. One young man, spotting her along the Grand Canal in Venice during a Biennale, at which she was a regular over the years, kneeled at her feet, ripped open his shirt, handed her a pen, and asked her to emblazon his chest with her autograph. She was a storm in an energy field of her own creation that swept up thousands. Just check out the flood of comments on Facebook after her death.

"They Thought They Could Turn Me Into a Lady"

Her aristocratic parents (her father was Iraq's finance minister during the country's brief democratic regime) didn't quite know what to do with this growing force of nature. She refused to wear the frilly dresses they bought in Baghdad, so they hired a seamstress to sew up Zaha's own confections. She liked the midcentury Italian furniture her parents bought for their Bauhaus-styled home, the first modernist house in Baghdad. Inspired, she designed her own bedroom suite of furniture, and her parents had a craftsman build it. Other clients liked it, so the craftsman copied and sold her designs to others. She was enrolled in a Catholic school run by nuns for the daughters of progressives intent on educating them to become professionals. Later, her parents sent her to boarding school in Switzerland: "They thought they could turn me into a lady," she said, rolling her preternaturally huge eyes, speaking in her smoky voice with calligraphic cadences that rolled consonants over into mellifluous vowels.

She went on to study math at the American University in Beirut, where you could find her on Saturday nights in clubs: She loved to dance. She enrolled at the Architectural Association (AA) in 1972, where Rem Koolhaas, HON. FAIA, her mentor, locked her up in a studio so that she would focus on learning how to draw. In 1977, she won the first of her architectural awards, the Diploma Prize, given only to one graduating student. She lived in a small mews house which, after the AA, became her first

PHILIP SINDEN

studio: She entertained her friends from the stoop, singing sultry songs in her sultry voice, every inch a chanteuse, but singing satire.

The Zaha comet burst onto the scene in 1983 when Arata Isozaki, HON. FAIA, rescued her entry for the Peak, a competition to design a sports club in the heights above Hong Kong, from the pile of schemes that had been rejected. Zaha never designed or drew down to her audience, and even the professional jury could barely understand the cryptic drawings of what looked like Zeus' fistful of splayed shards thrown from the side of the mountain. An elevated roadway ran through the dislocated stack, sweeping over a pool.

This building was not an extrusion of repetitive floors: Each floor shifted. Abstract but not modernist, it was something else, perhaps geological. Like rock crystals. No one had seen anything like it before. Nobody knew about emerging chaos science or even knew the word "fractal." The jury debated for days until, finally, the sponsor of the project and competition asked the jurors to come to the front window. He had usually driven his Rolls to the proceedings, but there in the drive was his Lamborghini. He said, "I want the project to look like that." The opponents threw in the towel, and the sponsor called the architect in London, asking to speak to Mr. Hadid.

Scores of architects had entered the competition, so the news spread internationally, catapulting Zaha into the eye of the profession: It caused a sensation, no less than a new form of beauty, possibly even a paradigm shift. One architect, perhaps her first enemy, threatened to sue the developer because he felt the vision wasn't buildable. Finally, the issue was moot: The developer's family encountered severe financial difficulties, and the project died. But arguably the Peak launched Zaha's career and, with it, the great expectations that surrounded her from the start.

What Conflict Wrought

Early on, in 1980, with her entry for the Irish Prime Minister's Residence competition, she hit a rectangle with a triangle and generated architecture in the exploding fallout. An architect can never really design outside her temperament and character, and Zaha, as a person, was not afraid of conflict and the unexpected consequences of collision. Recently, she walked out on an accusatory BBC interviewer who was aggressively wielding erroneous information. She sued *The New York Review of Books* for defamation over an article that accused her of indifference to a thousand workers who had supposedly died on a construction site for the Al Wakrah soccer stadium in Qatar. In fact, the building was not yet even under construction. The *Review* settled out of court, and she donated the money to a workers' organization.

Zaha's buildings were a portrait of her through and through: complex, detailed, sweeping, confident, disciplined, wild. Koolhaas said that the buildings were simultaneously powerful and fragile. That was true, but it also described Zaha. Always, the buildings were as generous as she was, offering public spaces inside and out that were gifts of welcome for the public. She had the heart of a socialist and believed that though the disadvantaged might live in modest homes, they should at least enjoy public spaces that were elevating. She architecturalized urban space, and urbanized architecture, cultivating public space outside while sweeping it into the buildings with ramps and promenades.

Arguably, it was a blessing that she didn't get to build for almost a decade after the Peak, but focused on research for competitions, carried out through drawings, paintings, and models created in her lofty studio in a Victorian school room (her 400 employees now occupy the entire building). So when she was commissioned for her first major project—the Vitra Fire Station, in Weil am Rhein, Germany—she was prepared, and the design was a sophisticated, successfully executed vision that put to rest any lingering accusations that Zaha was a paper architect, and the architecture unbuildable. The forced perspectives of its three main horizontal concrete prisms zoomed like airplane wings to different, contradictory vanishing points, creating a subtly thrilling sense of spatial irrationality that drew on the Suprematist vision that had been her foundational inspiration since graduate school.

The successes accelerated. The sculpturally suave ski jump in Innsbruck, Austria, whose skin flowed around its tower like a chignon; a series of tram stations, housed in bubbles of translucent glass, also in Innsbruck; and an angular, leaning intermodal transportation interchange in Strasbourg, France, formed the basis of her Pritzker-winning portfolio.

She designed the Phaeno Science Center, in Wolfsburg, Germany, its elevated shape the result of a grid deformed by a computer; the National Museum of the 21st Century Arts, in Rome, more baroque and sweeping than Bernini; and the Aquatics Center for London's 2012 Olympics, whose form abstracted the movement of a swimmer doing the butterfly stroke. Her American projects included the Rosenthal Center for Contemporary Art, in Cincinnati, a jumbled stack of prisms scaled to adjacent buildings; the dramatically angular Broad Art Museum at Michigan State University, with a quilted stainless steel façade; and a split-level, dynamically contoured condominium development next to the High Line, in Manhattan.

Asia loved her. Guangzhou commissioned her for its opera house, its auditoria looking like rocks smoothed over by rivers flowing through the grounds; the Galaxy SoHo office and entertainment complex, in Beijing, composed of bread-loaf shapes linked by outdoor corridors streaming on many levels. In Seoul, South Korea, she lifted the volume of the Dongdaemun Design Plaza, a cultural center, to form monumental public spaces, while greening the roof to form a public park. Always, the public good.

Beautiful and Practical

Her portfolio spans the gap between analog and digital design, the computer smoothing the fragmentary nature of her designs into flows of form and space. The most complex were tours de force of

engineering that advanced building technology.

Many of the projects were triumphs; some were masterpieces. All entered the public realm as icons, and not incidentally as topics of discussion. But anything as radically new as her work provoked opposition, including the inevitable scolds who believed that her democratically motivated designs had no social agenda, and that they didn't respond to program.

I headed the competition for the Broad Art Museum as a non-voting member of the jury, and just a few weeks ago an official told me that their stunning building works perfectly: They have no complaints. Armchair critics seem to think that if a building is as beautiful as Zaha's, it can't be practical, and that ugly buildings must be practical, because why else would they be ugly? Her efforts are often misunderstood and falsely accused by the lesser talents whose position she displaced—and, of course, by the bean counters.

There were setbacks in Zaha's march to infinity. In Wales, she won the competition to design Cardiff's opera house twice, and lost it twice to shenanigans that gave new meaning to the expression "welshing." The Japanese prime minister, Shinzo Abe, recently canceled Zaha's project to design the stadium for the 2020 Tokyo Olympics because of cost overruns, without acknowledging that Zaha had substantially increased the size of the stadium per the clients' requests, and without attempting to open the bid beyond two pre-selected contractors. The two competed in a closed, counterproductive, unnecessarily expensive process.

Zaha was sometimes called the most talented female architect alive, or even the most talented woman architect of all time. But that boxed appreciation ghettoizes and diminishes her, and women, too: She was quite simply one of the most inventive architects ever. She created her own language, and everything she touched turned to intelligent beauty.

Her death does not signal the end of an era. She helped open an era that continues. She changed the field, she lived large, she belonged to the world.

And Zaha, wherever you are, just know that we loved you.

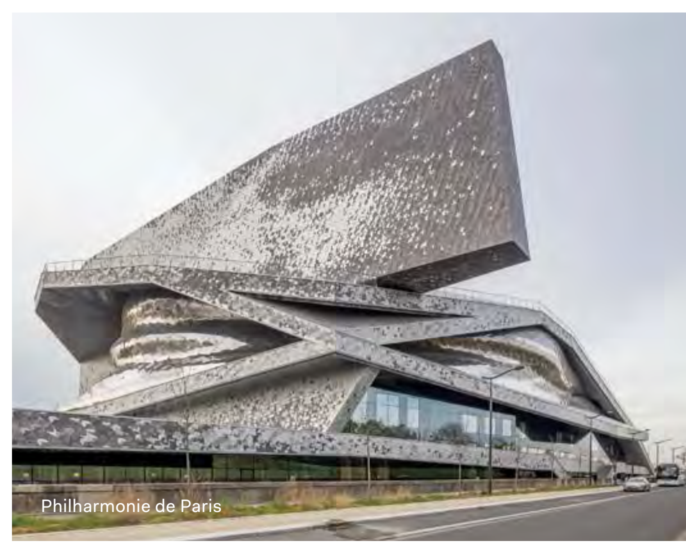
“Today, when all urban concert halls aspire to be iconic landmarks, it’s easy to forget that they used to be designed quite differently.”

The Concert Hall, Reimagined by Witold Rybczynski, HON. FAIA

The Philharmonie de Paris, a new concert hall designed by Jean Nouvel, HON. FAIA, opened last year. While the construction was costly and the remote location at the northeastern edge of the city remains controversial, the hall has received plaudits for its musical ambience. "From first impressions it seems acoustically marvelous," wrote Anthony Tommasini of the *New York Times*. Alex Ross of the *New Yorker* found the sound to be "rather wonderful," although he characterized the building itself as a "menacing presence." The *Guardian*'s architecture critic, Oliver Wainwright, went further and described the exterior as "a tyrannical hulk of a thing." Tyrannical or not, a concert hall conceived as a "thing"—a freestanding object—is pretty much par for the course these days.

The freestanding concert hall, in a plaza, on a waterfront, or in a park (the Philharmonie sits in the Parc de la Villette), sends the unmistakable message that culture is a thing apart. Today, when all urban concert halls aspire to be iconic landmarks, it's easy to forget that they used to be designed quite differently.

Salle Pleyel


Philharmonie de Paris

Part of the Urban Fabric

The $505 million Philharmonie replaces the Salle Pleyel as Paris' chief orchestral hall. The Salle, which was built by the renowned French piano maker Pleyel et Cie in 1927, was designed by Jacques Marcel Auburtin, André Granet, and Jean-Baptiste Mathon. The building sits on the Rue de Faubourg Saint-Honoré in the fashionable 8th Arrondissement. The flat façade is cheek by jowl with the flanking apartment buildings and is distinguished chiefly by the different scale of its fenestration, its Art Deco detailing, and the bare hint of a marquee. The front of the building contains practice rooms and penthouse apartments; the 3,000-seat hall is located at the rear of the building, deep inside the city block. There was nothing unusual about this arrangement of lobby on the street, auditorium behind: Broadway theaters traditionally used a similar solution, as did the early movie palaces.

Integrating a concert hall into the urban fabric by hiding it goes back to the 19th century. In 1899, the distinguished architect Thomas Edward Collcutt, who was responsible for D'Oyly Carte's Royal English Opera House, designed Bechstein Hall in London's West End for the famous German piano maker C. Bechstein. The four-story Renaissance Revival façade, with its bay windows and central gable, has a similar scale to its neighbors. This is possible because the 545-seat hall is tucked into the rear of the lot, with service access from a back lane. Renamed Wigmore Hall, this concert venue remains one of the best small halls in Europe.

Urban theaters and opera houses have a long history, but the concert hall is a relative newcomer. Civic symphony orchestras were organized at the end of the 18th century, and about a hundred years later purpose-built concert halls started appearing: Leipzig's Gewandhaus, Vienna's Musikverein, and Amsterdam's Royal Concertgebouw. These large buildings were a distinctive presence, but their architects went to great lengths to integrate them into their urban surroundings. The halls followed building lines, hugged the sidewalk, avoided unseemly blank walls, and deployed an array of conventional architectural devices—arches, columns, pilasters, windows, balustrades—to soften the impact of the bulky auditoriums.

LEFT: PLINE; RIGHT: WADE ZIMMERMAN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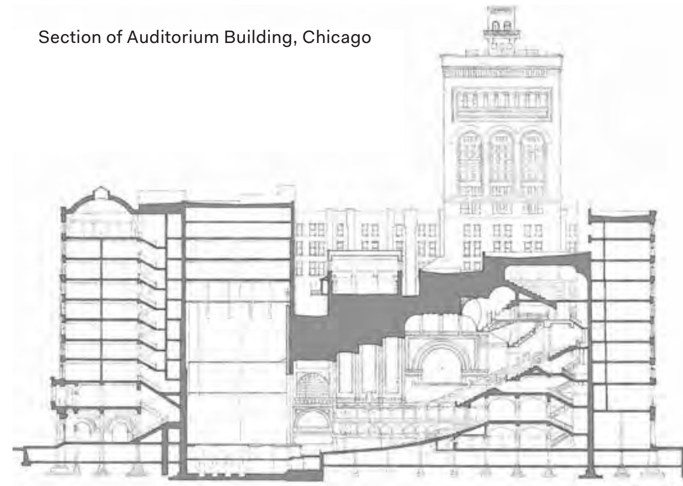
Section of Auditorium Building, Chicago



American halls of the 19th century were similarly integrated into the city. Chickering Hall in New York, built in 1875 by the Boston-based piano maker Chickering & Sons, stood on Fifth Avenue at West 18th Street. Designed by George B. Post and considered one of the architect's best works, the brick-and-brownstone pile contained showrooms on the ground floor and signaled the presence of its 1,450-seat hall with a set of tall arches, glazed on the front and blank on the side. It was impressive but not out of place among the mansions which then lined Fifth Avenue. Chickering was soon superseded by the much larger Carnegie Hall (whose largest auditorium has 2,800 seats), designed by William Burnet Tuthill in 1891. Like Chickering, Carnegie Hall was designed to completely fill its corner lot, fitting in rather than standing out.

Another way to successfully integrate a bulky building into the smaller-scale fabric of a city street was to wrap it in something else. That is what Dankmar Adler and Louis Sullivan did in 1889 when they designed Chicago's Auditorium Building. The 10-story structure occupied an entire city block. The huge hall, which was originally intended for opera, was buried behind a hotel and an office building.

Whitney Warren and Charles Wetmore adopted a similar strategy in 1925 when they designed Steinway Hall, another piano maker's hall. Across the street from Carnegie Hall, the narrow frontage on West 57th Street is given distinction by a three-story limestone base with a frieze containing portrait medallions of great pianist-composers including Beethoven, Chopin, and Liszt. The Steinway & Sons showrooms were on the ground floor (Steinway moved out in 2014); the 250-seat hall was on the second floor, and the upper nine floors were rented offices.

Combining a concert hall with commercial space, as was the case with both the Auditorium Building and Steinway Hall, is a strategy that might benefit financially strapped orchestras today. Instead of sinking money into iconic buildings, whose aim—not always successful—is to catch the attention of big donors and the public, it might be wiser to exploit prominent downtown locations by using air rights for income-generating uses.

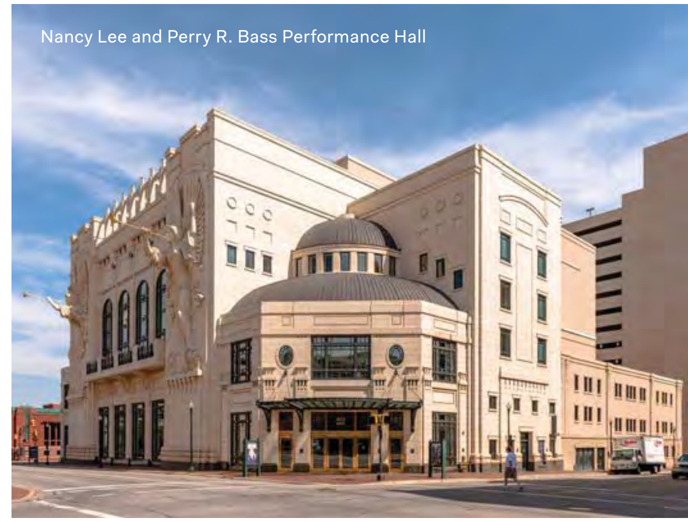
Form Following Function

The first generation of prominent postwar concert halls, such as Robert Matthew's Royal Festival Hall, in London (1951), Max Abramovitz's Philharmonic Hall at Lincoln Center (1962), and Hans Scharoun's Berliner Philharmonie (1963), set the pattern for future halls: freestanding object buildings surrounded by open space. The reason had less to do with the size of the hall—Chicago's 4,300-seat Auditorium is larger than all but a handful of modern halls—than with the desire to have form follow function. Because the most important functional component of a concert hall is the auditorium, that needed to be expressed on

Perhaps the chief plus is that the concert hall can become a part of everyday city life, rather than existing in splendid isolation on the architectural equivalent of a cultural pedestal.

the exterior. Most modern concert halls were windowless, so this formal strategy produced boxy or fan-shaped buildings with lots of blank walls. Later architects attempted to mitigate the deadening effect by adding colonnades (Lincoln Center), wrapping the hall in swoopy shapes (Disney Hall), or treating the surfaces (the Philharmonie is decorated with an Escher-like bird pattern). But a mammoth freestanding concert hall remains overwhelming at best, "menacing" at worst.

Recent examples of urban concert halls that are integrated into the urban fabric are few and far between. Benaroya Hall (1998), designed by LMN Architects, occupies a city


Nancy Lee and Perry R. Bass Performance Hall

block and is a low-key presence in downtown Seattle. Perhaps too low-key. After praising the acoustics and ambiance of the hall itself, *New York Times* music critic Bernard Holland characterized the exterior of the building as "functional to a fault," as if the architecture "didn't want to be noticed at all." The building has a lot of glass, but there is nothing here that communicates, or celebrates, making and listening to music.

No one could miss the musical reference in the Nancy Lee and Perry R. Bass Performance Hall, in Fort Worth, Texas: Two 48-foot-high heralding angels sculpted out of limestone adorn the façade. Because the building is shoehorned into one of the city's tiny (200-foot-square) blocks, the angels' gold-leafed trumpets extend over the sidewalk. The 2,500-seat hall fits snugly into the fine-grained grid of downtown Fort Worth; like an old-time downtown department store, it has its entrances at the corners. The highly modeled architectural style, unexpectedly influenced by the Viennese Secession, allows architect David M. Schwarz, AIA, to break down the scale of what might otherwise appear a lumpish building. The auditorium is shrouded on three sides by lobbies and dressing rooms, and it is only in the rear that the blank wall of the stage tower is apparent.

Making a concert hall effectively invisible has several advantages. Not only does hiding the hall solve the problem of how to fit a massive building into a dense urban fabric, a hidden auditorium can be designed with full consideration for acoustics and sight lines, knowing that the form will not have an impact on exterior appearance. Perhaps the chief plus is that the concert hall can become a part of everyday city life, rather than existing in splendid isolation on the architectural equivalent of a cultural pedestal. At a time when symphony orchestras seek to find a new and younger audience, that might be the biggest benefit of all.

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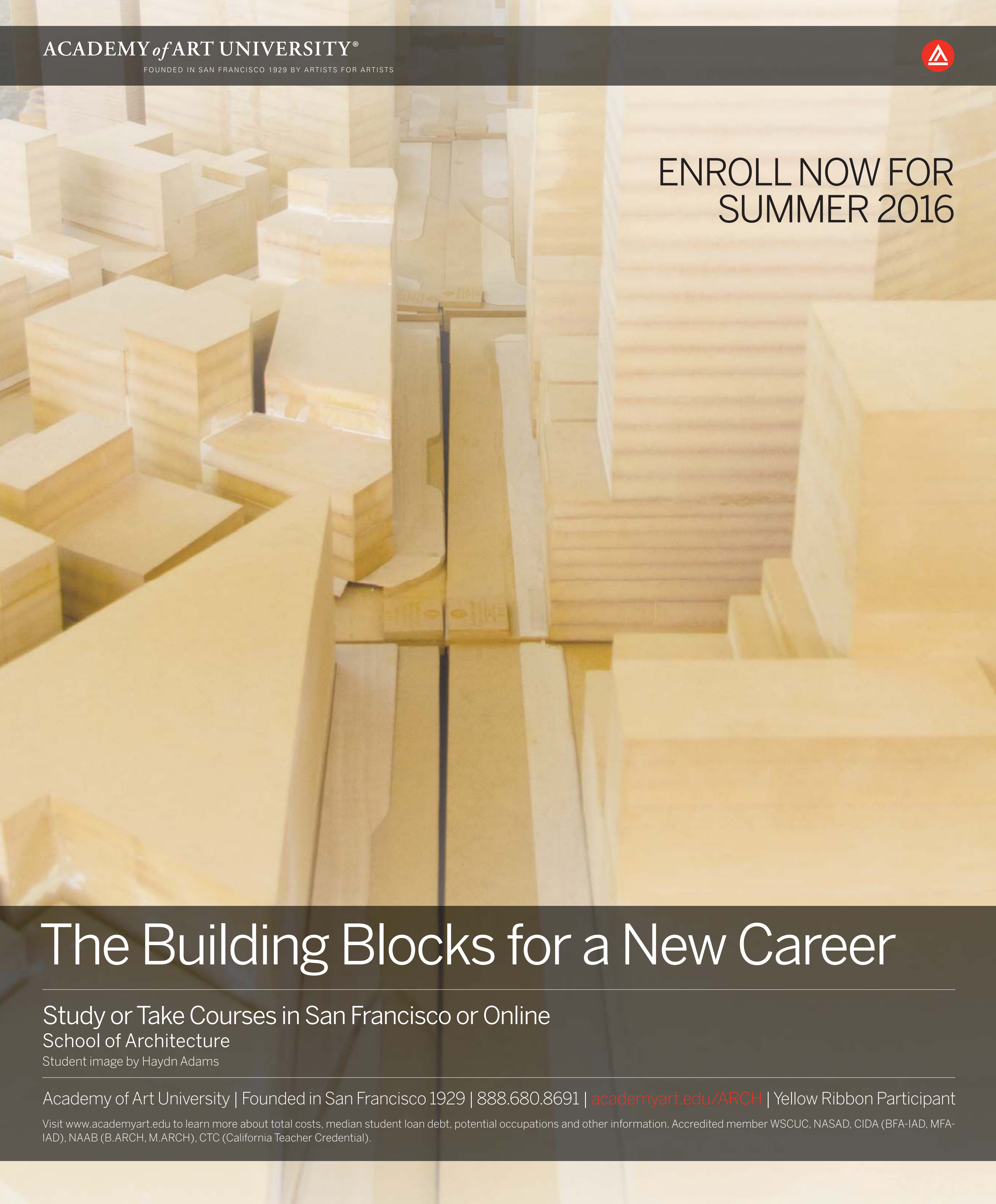
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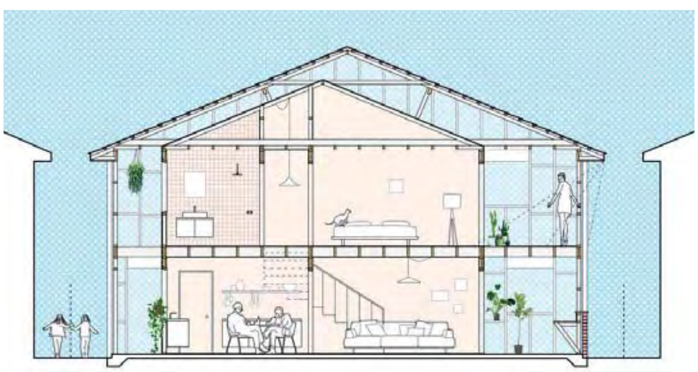
“The tone was contrarian from the start, flouting the usual urbanist doctrine of density and multi-modal transit for all.”

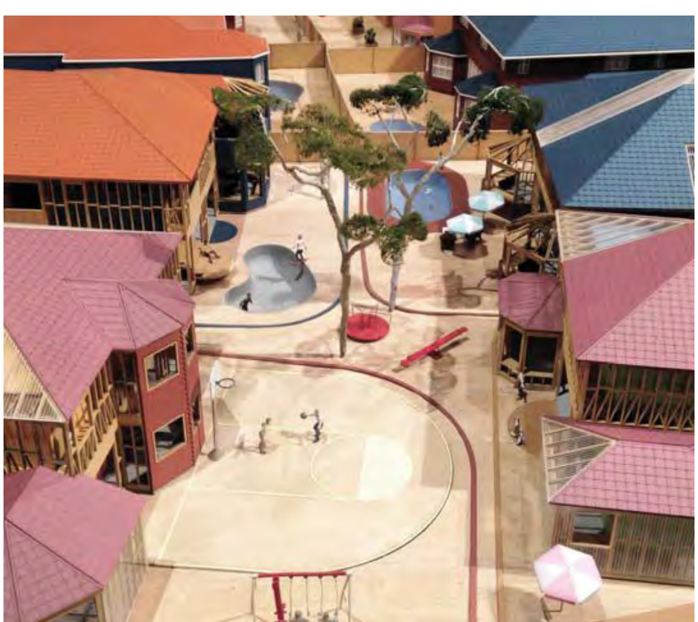
MIT on the “Future of Suburbia” by Amanda Kolson Hurley

At trendy urban coffee shops, the kind where Edison bulbs float above the counter and vintage chairs line the concrete floor, the prized artisanal beans are, more likely than not, roasted in some suburban facility before they're loaded on a truck and driven downtown. The iPhones that customers gaze at while sipping their macchiatos were likely assembled in the suburbs of Shenzhen. The avocados mashed on whole-grain toast were probably grown in exurban San Diego or Monterey in California, and were sitting, just a few days before, in a wholesaler's unit off the interstate. Whether we are aware of it or not, even the most self-consciously curated "urban" lives are staged and supplied by the jumbled realm of suburbia.

And yet the bias against suburbia remains strong among designers and critics, whether it manifests as tirades against sprawl or utter indifference. Unless they're wooed by an Apple or a Facebook, top-tier architects rarely work in the 'burbs. When Renzo Piano, HON. FAIA, announced that his studio was conducting long-term research on suburbia, the news was novel enough to be reported by NPR.



A section of Otherothers' Offset House



A model of Offset House at the Chicago Biennial

Enter the Center for Advanced Urbanism (CAU) at the Massachusetts Institute of Technology (MIT), which is determined to make designers think about the suburbs, and to think about them in a particular way. The center's biennial research theme is the "Future of Suburbia," and in late March/early April it hosted an exhibition and a conference by that name at the university's Media Lab. The culmination of the effort—which has involved a dozen MIT faculty and more than 100 experts from around the globe—will be *Infinite Suburbia,* a 1,200-page tome that Princeton Architectural Press will publish in fall 2017. All in all, CAU is making a concerted bid to reposition suburbia as a serious subject of design inquiry. It couldn't have come soon enough.

Suburbanization as Global Default

Two main challenges of framing critical discussions about suburbia are its diversity and its ubiquity. America's urban fringes include gridded streetcar suburbs, meandering golf-course subdivisions, trailer and RV parks, industrial estates, and "ethnoburbs." Whatever form suburbia may take, it has become the American default, with more than half of the country's population residing there. In other parts of the world, too, urbanization is now mostly suburbanization; the outskirts of cities like Beijing and Istanbul are undergoing tremendous growth. Stepping back to find a critical vantage point on this terrain isn't easy.

The "Future of Suburbia" conference started with a keynote speech by Robert Bruegmann, a professor emeritus of art history, architecture, and urban planning at the University of Illinois at Chicago, and wrapped up a day later after four wide-ranging panels. Attendees learned about new garden suburbs that will be grafted onto existing cities in the U.K.; a "ghost suburb" for testing new technologies in the Southwestern desert; and how the executives of North Carolina's Research Triangle Park are reimagining its normative office campuses.

David Neustein, co-founder of Sydney-based Otherothers, presented that firm's Offset House, a clever proposal for a partially deconstructed suburban home that was exhibited last year at the Chicago Architecture Biennial. Nick Roy, of MIT's Computer Science and Artificial Intelligence Laboratory,


PE SEAL PLATE

explained how drone infrastructure will change the suburban landscape. With 17 talks in not much more than 24 hours, the pace was galloping, and some of the lectures unavoidably felt rushed.

The tone was contrarian from the start, flouting the usual urbanist doctrine of density and multi-modal transit for all. In his keynote, Bruegmann reprised the key argument of his book *Sprawl: A Compact History* (University of Chicago Press, 2005): Suburban sprawl is not a bug in the urban machine but part of its standard operating procedure. Throughout history in every part of the world, cities have burst their bounds as their residents multiplied and dispersed. Bruegmann is especially good at laying bare the class snobbery that motivates many critiques of suburbia, going back at least to the early 20th century.

Reformers vs. Validators

A quick detour for context: Among the few designers who focus on the suburbs today, most fall into a camp that I'll call the Reformers. Led by the New Urbanists, this group believes that suburban development seriously imperils the climate, and that typical suburban living patterns are bad for public health, community spirit, and individual well-being. You can probably guess what the solution is: Make suburbs more like cities. *Suburban Nation,* by Andrés Duany, FAIA, Elizabeth Plater-Zyberk, FAIA, and Jeff Speck (North Point Press, 2001), is a manifesto in this mold, while *Retrofitting Suburbia* (Wiley, 2011), by Ellen Dunham-Jones and June Williamson, gathers practical case studies of sprawling zones that, like caterpillars into butterflies, have morphed into urban districts.

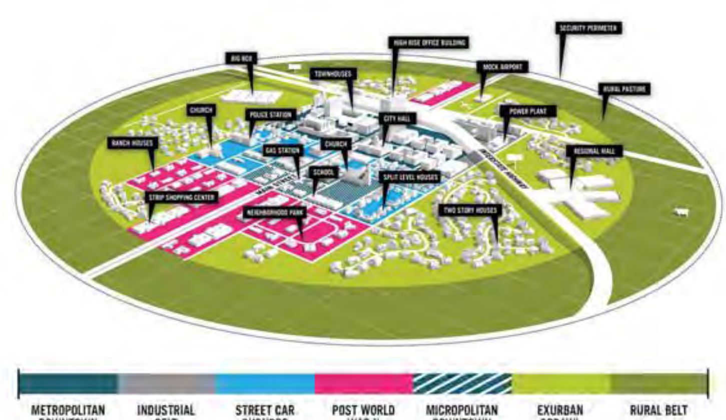
MIT's CAU, on the other hand, seems to be rallying its own troops around a very different agenda. Let's call them the Validators. They believe that suburbia is fundamentally OK. They maintain that when people have options, they will usually choose to live in a single-family home in the suburbs, and for intellectuals to resist this is classist and perverse. Validators point out (correctly) that the much-hyped urban revival we keep reading about is mostly limited to affluent white Gen Xers and Millennials. At the conference, economist Jed Kolko analyzed recent census data to show that on the whole, America continues to suburbanize.

Alan Berger, the landscape architect who co-directs CAU, and Joel Kotkin, an author and researcher at Chapman University in California, developed the conference program, and it showed. Kotkin, whose many pieces of journalism include "The Triumph of Suburbia" and "Rule, Suburbia," is the bugbear of pro-density urbanists. He dismisses the notion that

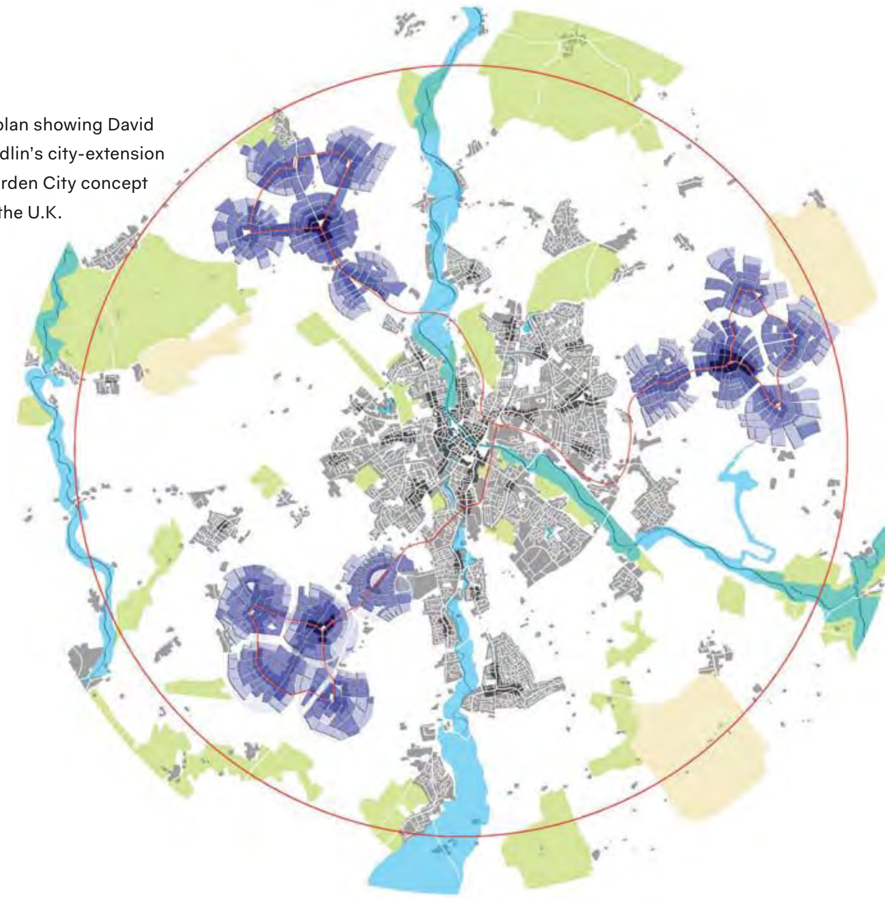
Terreform ONE's cricket farm-cum-emergency shelter

CAU is making a concerted bid to reposition suburbia as a serious subject of design inquiry. It couldn't have come soon enough.

Perkins+Will's Center for Innovation Testing and Evaluation, a "ghost suburb" in New Mexico



TOP: MITCHELL JOACHIM/TERREFORM ONE; BOTTOM: PERKINS+WILL



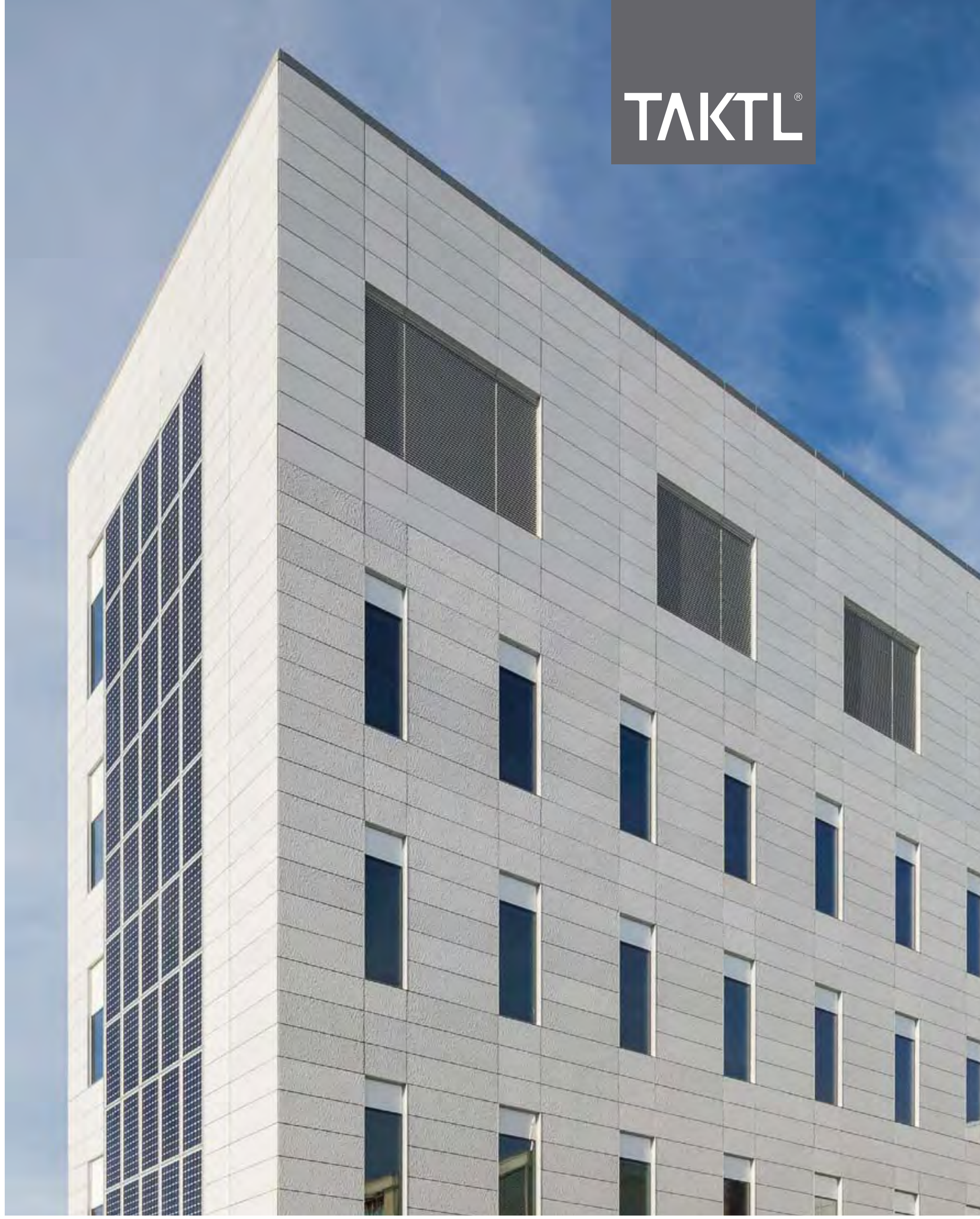
A plan showing David Rudlin's city-extension Garden City concept in the U.K.

DAVID RUDLIN/URBED

the American Dream could ever become owning a cozy condo downtown: "Fundamentally, people want single-family homes," he told the 200 or so attendees assembled in decidedly un-suburban Cambridge, Mass.

Although there was plenty of innovative thinking, there was little that might cast the underpinnings of suburbia in a negative light. For instance, Joan Nassauer, a professor of landscape architecture at the University of Michigan, gave an excellent talk on the potential for turning large suburban lawns into quasi-woodlands, or "rewilding" them. Yet no one discussed alternatives to thirsty grass lawns, even as California emerges from five consecutive years of drought.

Likewise, we heard presentations on the Hyperloop (the transportation system dreamed up by Elon Musk, now being tested in Nevada by Hyperloop Technologies) and on suburbia as a "motopia" (by Eran Ben-Joseph, who heads MIT's Department of Urban Studies and Planning), but not on cycling, walking, or public transit. We heard about the suburbs' diversity explosion (courtesy of Ali Modarres, the director of urban studies at the University of Washington Tacoma), but not about racial tensions in Ferguson, Mo., and McKinney, Texas—except when an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audience member complained about the omission. The role of policy and governance in shaping suburbia was also mostly sidestepped.

For a short conference devoted to a broad topic, this seemed fair enough, if a bit tone-deaf at times. CAU's vision involves enhancing the productivity of the suburban fabric we have rather than replacing it with one we don't—a vision that was set out clearly in the exhibit (now closed) in the Media Lab's lobby. There, a large, dynamically lit model showed a diffuse urban region with "waste belts," logistics hubs, and autonomous vehicle networks. Think equal parts Ebenezer Howard, Silicon Valley techno-utopianism, and the crunchier side of landscape architecture.

Suburbia and Climate Change

But this framework resulted in one major and (presumably) deliberate omission that was harder to accept. The environmental impact of suburban land use, particularly its role in climate change, was simply waved away. Bruegmann cited Australian findings that greenhouse-gas emissions per capita are higher downtown than on a city's outskirts, while Berger argued that high density doesn't solve environmental problems. End of story.

The notion that compact urban areas are better for the climate is subject to debate. In support of it,

> Berger wants to establish a new global theory of suburbanism, making it a legitimate and exciting field of academic research. That's great—and he has plenty of company.

though, is a decent body of research, including a 2010 paper in the *Journal of Urban Economics* finding that cities "generally have significantly lower emissions than suburban areas," as well as data showing that denser cities have lower emissions per capita than spread-out ones. Bruegmann ascribes this to affluence, not land use: People in dense developing-world cities like Mumbai consume less, and therefore use less energy. But plenty of affluent cities, like London and Paris, also have relatively low per-capita emissions.

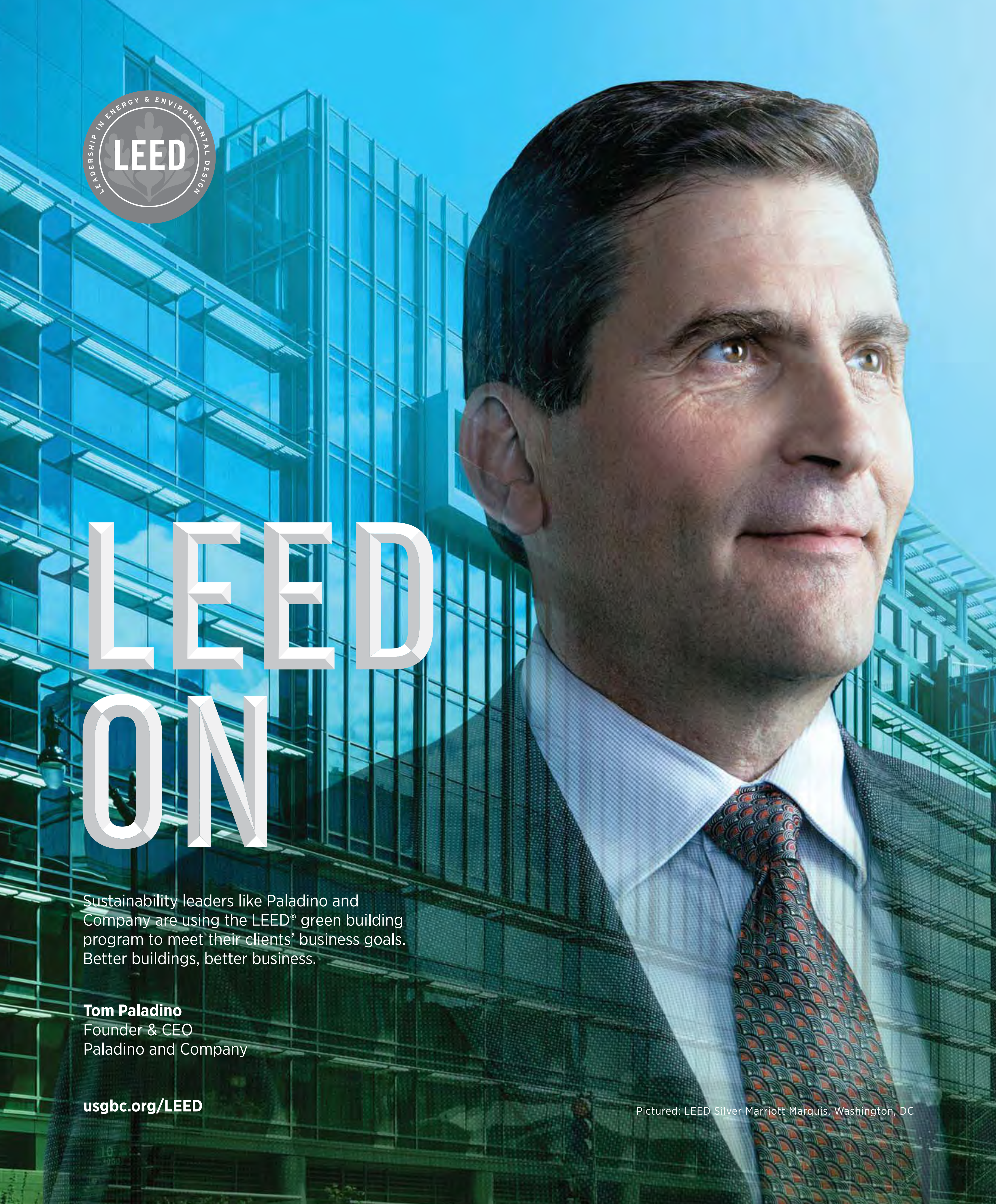
These tend to be cities where people inhabit smaller homes and drive less.

A 2014 University of California, Berkeley study found that urban density doesn't translate directly to low carbon emissions, but the three main drivers of carbon footprints are household income, vehicle ownership, and home size, "all of which are considerably higher in suburbs." If so, then better planning and design in suburbia could move the needle on two out of three variables to help mitigate climate change. That would be a huge opportunity (many would say an obligation). So why discount it? Surely one can be pro-suburb while recognizing the benefits of living smaller and driving less.

As a suburbanite myself, I know there's an urgent need to move beyond misconceptions about the suburbs. But throughout the event, Berger seemed defensive, worried about the discussion going off-script. He stressed that attendees should view suburbia through a "bioregional" lens first and foremost. He vetoed a question (OK, my question) about the density threshold at which Americans perceive a neighborhood to be "urban." Near the day's end, he noted that CAU researchers had tracked social media postings about the conference. "Most of them were positive," he said, glancing around the room. I couldn't tell if he was joking or not.

Berger wants to establish a new global theory of suburbanism, making it a legitimate and exciting field of academic research. That's great—and he has plenty of company. Outside of design schools, a whole field of suburban studies has recently sprung up, led by social-science researchers like Myron Orfield at the University of Minnesota and Roger Keil at Toronto's York University. There's even a National Center for Suburban Studies at Hofstra University in New York.

Somewhere between the social scientists, the Validators, and the Reformers, there is common ground where we can talk about improving the suburbs while respecting their real merits, and where we can be honest about the challenges they face without writing them off as either cultural backwaters or "the next slums." MIT's conference brought us a step closer, and no doubt *Infinite Suburbia* will bring us one or two more. But we're not there yet.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A Bold Statement
In Style

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JEFF ELKINS

The *Grandmother* print (1983), designed by this year's Gold Medal winners, Denise Scott Brown and Robert Venturi

GOLD MEDAL

DENISE SCOTT BROWN AND ROBERT VENTURI

Unyielding champions of a "nonstraightforward architecture"

JOE KRAMM/R & COMPANY

TEXT BY AMANDA KOLSON HURLEY

An outpouring of joy rippled through the design community when the AIA announced last December that Denise Scott Brown, HON. FAIA, and Robert Venturi, FAIA, would receive the 2016 Gold Medal. Everyone knew that Venturi and Scott Brown—Bob and Denise, to their legions of admirers—had produced more than enough work of historic importance over their decades-long partnership to merit the honor. But more than that, the award is significant in two respects: This is the first time a living woman has received the Gold Medal, and it's the first time that two individuals have received it together, following a rules change by the Institute in 2013.

Many architects have found poetic justice in the decision. The Pritzker Architecture Prize won by Venturi in 1991 went to him alone, and a campaign a few years ago to retroactively acknowledge Scott Brown's role did not succeed. Finally, it seems, Scott Brown is getting her due. The rules change also implies a growing recognition within architecture that great design is a collaborative enterprise rather than the product of a lone (almost invariably male) genius.

To capture the spirit of this singular partnership, ARCHITECT talked to colleagues, former students, and employees at Venturi Scott Brown and Associates (now VSBA). We asked designers and scholars how the pair influenced them and how, through their teaching, writing, and building—and their stubborn dedication—they changed the course of modern architecture.

Richard Weinstein, student of Scott Brown and Venturi at the University of Pennsylvania, professor emeritus and former dean of the University of California, Los Angeles Graduate School of Architecture and Urban Planning

My first studio at Penn was with Denise. It was an airport for Dallas. I remember it; I can even draw it for you. Denise said, "We accept no precedents; we're only interested in what an airport could be." So you had to rethink transportation, food service, lobby areas, how you get from the highway to the airport. You had to think of everything at the most fundamental level. To the extent that you could, you were encouraged to continue. That's the way they naturally taught. Bob was very gentle. Denise was much more challenging.

I visited Venturi's office, sat in on his juries. I remember seeing one of his houses in model form, with the chimney being this central, formal gesture around which the house was draped. The chimney was about three or four times higher than it had any reason to be, to the point of looking a little awkward, but at the same time very powerful, because you instantly grasped what the parti was. It didn't look like anything I'd ever seen out the train window. I knew something was up.

Robert A.M. Stern, FAIA, outgoing dean of the Yale School of Architecture, founder and senior partner of Robert A.M. Stern Architects

I remember being invited to the Las Vegas jury review at Yale, and I was completely floored, because the Bob I had known when I was a Yale student was a formalist in the extreme. I wasn't ready for Las Vegas. In fact, I'm still not ready for it. That was an amazing moment.

In 1972, there was a show that I had a little something to do with about Venturi and John Rauch's work, mounted at the Whitney Museum in that small gallery on the southeast corner. It was a brilliant show in the way it was installed, a lenticular-shaped island backlit with transparencies of photos and plans and signs and so forth. It was a shocker, especially in the Marcel Breuer building, especially at that moment.

My wife and I gave a party afterwards at our apartment. At a certain moment, Ricky Ulrich Franzen came up to me and said "Bob, you'd better get in the library"—a euphemistic name for the TV room—"Denise and Paul Rudolph are about to kill each other." They were having an amazing argument about the treatment of the Crawford Manor apartment house in New Haven in *Learning From Las Vegas*, contrasted of course with Guild House. I had to separate them. My wife and I then vowed never to have parties with architects again. It's too dangerous.

Jill Lerner, FAIA, principal at Kohn Pedersen Fox

When I was a student at Cornell in 1972, Denise Scott Brown was a visiting speaker—the first woman architect to be featured in the lecture series. She gave a talk on the groundbreaking *Learning From Las Vegas* to a skeptical audience, whose design orientation was at odds with her ideas. Despite the audience's reaction, she was resolute. She gave a clear presentation and remained unflappable. Forty years later, her lecture remains a benchmark in my education and career.

Stephen Kieran, FAIA, former employee, partner at KieranTimberlake

Back in the 1970s, Franklin Court in Philadelphia was unbelievably captivating for almost every young U.S. architect. It's a remarkable little piece of urbanism. Rather than reconstruct Benjamin Franklin's house, which Bob and Denise had carefully excavated the foundations of, their idea was to leave them and reveal the foundations through portals. I remember taking family and friends there, and everybody seemed to get it. History is history, and if you try to replicate and rebuild it in its entirety, it's something else anyway—it's something new. Somehow the frame, to me, is a way to celebrate rather than be irreverent about that past. The

Misc 91-92

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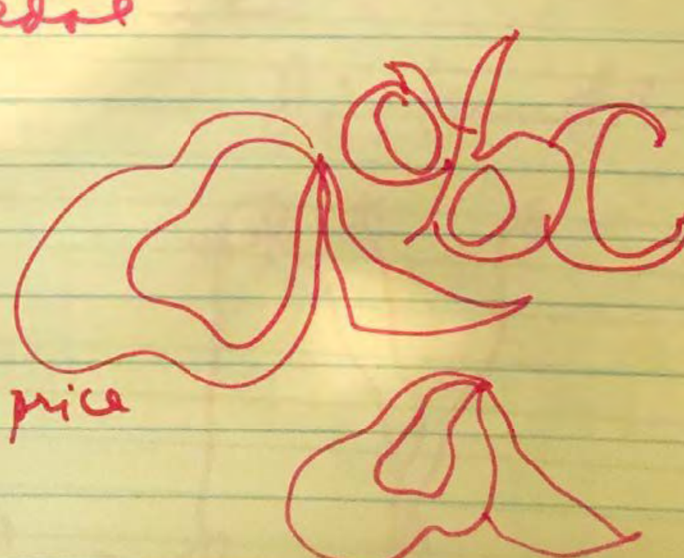


Be good
expect to pay the price

dialogue between the two, I just find very poignant.

The project I cut my teeth on under Bob and Denise was a plaza in Washington, D.C., called Western Plaza [now known as Freedom Plaza]. James Timberlake and I did get to do a huge amount of incredible stone detailing on it, with Bob sweating the details down to a quarter-inch. Probably the last thing I worked on was Gordon Wu Hall at Princeton. To me, that remains the high point. It took the theories articulated in *Complexity and Contradiction* and *Learning From Las Vegas* and built them.

David Stirk, dean of Butler College at Princeton University

I've been working in Gordon Wu Hall since 2004, basically living in it every day. I've come to appreciate how much thought went into the design of this building. It has this shape like a ship; the two ends are rounded. There are big glass windows on the ends which let in a tremendous amount of light. Denise talked about the fact that those windows were meant to evoke the windows of Gothic churches. But there was also an expectation that there would be plantings of trees around those ends of the building, and that is in fact what happened. There are these beautiful maple and oak trees. In the fall, the windows let in the sight of all the trees changing colors.

ARCHITECT spent a day exploring the archives of Denise Scott Brown and Robert Venturi at the University of Pennsylvania, uncovering intimate glimpses of how the partnership operated. A selection of the couple's notes, doodles, and correspondence appears on these pages.

Lee C. Bollinger, client, president of Columbia University

When you have the privilege of working with truly great architects and planners, many things happen. The process you undergo together is profoundly educational, in ways you never anticipate at the outset. There is an intimacy that creates a permanent bond.

This happened to me with Bob and Denise, and the large projects we worked on together at Dartmouth College and the University of Michigan. Bob and Denise are each originals; together they constitute a unique force in the world. Bob always wore shirts with button-down collars, but never buttoned. This little detail says everything. It is a concession to and love of the ordinary—nothing pretentious or bespoke—playful, and slightly rebellious, presented in such a way as to draw the viewer's attention to the text and subtext.

Jim Venturi, son, founder of urban transportation studio Rethink NYC and director of the forthcoming documentary *Learning From Bob and Denise*

I think the Gold Medal is enormously helpful in terms of educating people about an architecture that is second-glance architecture. You have to look at it a second or third time, and then you say, "Oh my God, that's fantastic." To say that they won the Gold Medal, it raises the value of the work, and therefore protects it in a greater way against demolition.

A lot of the things I was learning in yoga teacher training overlapped with things in their architecture. I was at this ashram; they taught a concept of unity in diversity. That really struck me as something that was very similar to the ideas behind *Complexity and Contradiction*. The idea of both/and versus either/or. It's given me a different perspective on their work.

My dad always talked about pilgrimages to see architecture. The language he uses is the language of religion. Bob's mother, Vanna, was very interested in Bertrand Russell and T.S. Eliot and William James and pragmatism. I see the "gentle manifesto" as a religious text. If you read it in that context, it has a kind of religiosity to it.

I'm as close to them as anyone, and I've studied their work, and I can't tell you exactly how something is formed. It's always different. Denise might throw out ideas, Bob might latch onto one. She's considered more of the planner, but Bob came up with the circulation plan for the Sainsbury Wing. Denise is considered more pop culture, but Bob did a perspective for an ice-cream store when he was an undergrad at Princeton.

Denise's role cannot be underestimated. She says there's a special place in heaven for artists who believe in social consciousness, and it's very small. She sees *Learning From Las Vegas* as a social-consciousness text.

Daniel McCoubrey, FAIA, president and principal of VSBA
It was a tremendous privilege to work with Bob and Denise for over 30 years. They worked together in very complementary ways; Bob with his intuitive design sense and embrace of architectural precedent, Denise with her intellectual rigor, objective eye, and embrace of social and cultural dimensions. Together, they articulated new ways of thinking about design that are inclusive, practical, non-prescriptive, and fundamentally humanistic.

While Bob typically directed architectural projects and Denise planning projects, each would contribute to the other's work and, as time went on, the level of mutual engagement increased. They immersed themselves in the nature of the problem, embracing research, shedding preconceptions. Whether it was desk crits or conference room pin-ups, Bob and Denise encouraged staff to explore options and voice opinions.

Stanley Tigerman, FAIA
I didn't understand their work in the beginning. Denise was not forthcoming and struck me as arrogant. Bob, on the other hand, was very gentle. Their Gold Medal will open the floodgate for the AIA to give it to more than one person. Tod Williams and Billie Tsien are types that should get it. Ric Scofidio and Liz Diller. That's a good thing.

God knows they've had a huge impact on architecture. I can't think of an architect alive who wasn't influenced by *Complexity and Contradiction*. It had a huge influence on me, there's no question about it. *Learning From Las Vegas*, I was not thrilled by. I understand it now. It was a turnoff for me originally. I was wrong. It was a very important book.

Elly Ward, director of Ordinary Architecture, former studio manager of FAT
I will never forget the moment in my first year at university when our lecturer presented *Learning From Las Vegas*. It was a pivotal moment in my architectural studies that transformed what was essentially a career move into an all-consuming, passionate vocation. Suddenly, I understood that architecture could be about everything and everyone, that distinctions between high and low culture were not hierarchical barriers, but component parts of the same incredible landscape.

Charles Holland, director of Ordinary Architecture, former director of FAT
I admire *Learning From Las Vegas* for its brilliantly clear-sighted methodology and for teaching architects to look at the world around them rather than judge it. And I read *Complexity and Contradiction* again and again for the subtlety of its insights on architecture.

In the U.K., their one building—the Sainsbury Wing extension to the National Gallery—was unfortunately swept up in a strange furor around Prince Charles' intervention on the previous scheme. It's only now really being seriously reappraised for its generous relationship to Trafalgar Square—Scott Brown describes it as part of the backdrop to events—the subtle radicalism of its façades, and the wit of its planning. I see it as a love letter to London, with its nods to Lutyens and Soane and the clubland classicism of Pall Mall.

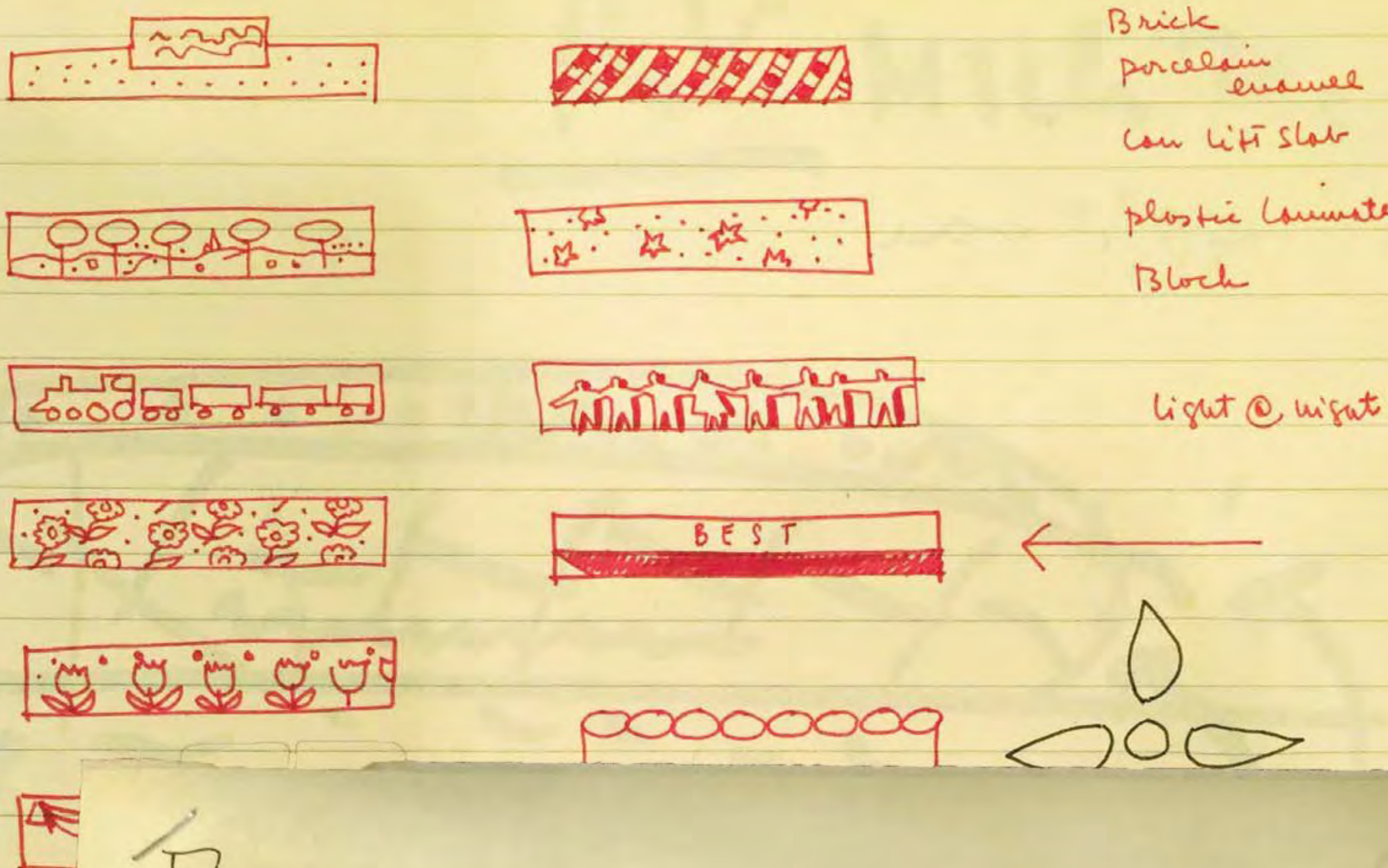
Paul Goldberger, HON. AIA, architecture critic at *Vanity Fair*
I first learned about Bob and Denise when I was a student of Vincent Scully at Yale, and not long after that, I somehow managed to snare a freelance assignment to write about them for *The New York Times Magazine*. Over several days of conversations at their office and at the large borrowed house in Paoli in which they were then living as they tended to Jimmy Venturi, then in a cradle, we talked architecture. We talked about their work and we talked about Las Vegas and we talked about Philadelphia and we talked about Rome, and I began to see how all of these things fit together, and I began to understand things about the American landscape and American urbanism that I had never understood before. And it became instantly clear that these people are not theorists or writers, but architects, and that all of their ideas were ways of feeding meaning into their work.

They never fully understood why their populism was not, in fact, popular, and have never been comfortable admitting that they were really mannerists, brilliant architects and thinkers who made twists on Modernism that gave it new life. They hated, understandably enough, the notion that many of their ideas were contorted into Postmodernism, an approach they never signed on to. They would never win an award for flexibility.

But what of it. I cannot think of two architects who have meant more to the architectural discourse of our time, and who also embody the idea, and the ideal, of partnership.

Interviews have been edited for clarity and length.

Best



8/22/01

Dear Ada Louise,

We know you can't stand Denise and me as architects/planners/writers any more and we all three know our views could not be more divergent concerning the current architecture scene -- we've been told recently of your description of our time in its richness and depth as the equivalent to that of the Renaissance (at a conference in Cleveland

disagree more

Personal

November 1, 1968

Mr. Vaughan M. Cannon
Young Electric Sign Company
2576 E. Charleston Blvd.
Las Vegas, Nevada 89104

Dear Vaughan,

Bob and I want to tell you how very very grateful we are to you for all your help. The students are back at Yale at work on a "sketch design" --- suggestions for what Las Vegas might be --- and getting into the long task of analyzing, editing and developing the results of their field work. We see them next week. We hear the films came out very well, especially helicopter movies of the Strip made in the last two days.

Unfortunately, we're broke. We still need $6,000. Anything you can do to rouse this or some of it from public or private sources in Las Vegas (we're writing the Mayor and Nathan Jacobson of the Strip Beautification Committee and the Nevada Resort Association) would be a great help.

Things went very well in Las Vegas. you will have gathered that a few of our students spent quite a few hours with your people, and, as I predicted, at least one would like to work for you. We had an amount of friendly publicity, and I made our peace with Gerry Appleby who, as you said, was nicer than she sounded.

But the opening of the Circus Circus was our great night; for everyone, and especially for me, since I got to go round with the designer, and also because I so much enjoyed our dinner and conversation. I used some of what you told me about sign size, location and color, to structure a part of the research which had been giving us all trouble. I think they came up with some interesting findings which we'd like to show you.

Mr. Vaughan M. Cannon, page 2.

In a more personal vein, Bob and I, having found our own late marriage a very rewarding one, highly recommend the married in preference to the single state. You are such a warm and giving person (as your actions toward us have shown) you could give great happiness. And a daughter, even as a college student and young woman, and despite having mixed feelings about a step mother, needs a female advisor and friend.

Bob is so sorry to have missed you. Can you tell us yet when you'll be coming east? The students have a great many questions they want to ask you, so we must try to get you up to New Haven. Also we'd like you to visit here in Philadelphia.

Meanwhile, thank you so very much again, for everything.

Best wishes,

Mrs. Robert Venturi

encl
DV/mg

Don't have time to be nice

17 LAS VEGAS SIGNS

Signs inflect toward the highway even more than buildings. The big sign—independent of the building and more or less sculptural or pictorial—inflects by its position, perpendicular to and at the edge of the highway, by its scale and sometimes by its shape. The sign of the Aladdin Casino seems to bow toward the highway through the inflection in its shape. It also is three dimensional and parts of it revolve. 110 The sign at the Dunes, is more chaste: it is only two dimensional and its back echoes its front, but it is an erection twenty-two stories high which pulsates at night. 111 The sign for the Mint Casino on Route 91 at Fremont Street inflects towards the Casino several blocks away. ¶ Signs in Las Vegas use mixed media—~~then~~ words, pictures, and sculpture—to persuade and inform. A sign is, contradictorily, for day and night. The same sign works as polychrome sculpture in the sun and as black silhouette against the sun; at night it is a source of ... day and

30

¶ The time is ripe for some with-it scholar to write his doctoral dissertation on signs. He would need literary as well as artistic acumen, since the same reasons that make signs pop art (the need for high speed communication with maximun meaning) makes them pop literature as well. For example, this one from Philadelphia. "O.R. Lumpkin. Body-builders. Fenders straightened. Wrecks our specialty." We take the dent out of accident We shall be analyzing and categorizing the signs of Las Vegas by content and form, by function (night and day) and location, as well as by size, color, structure and method of constructi

Venturi and Rauch, Archi

...bert Venturi A.I.A.
...n Rauch A.I.A.

333 South 16th Street Philadelphia, Pa. 19102 Pe

April 11, 1968

Mr. Philip Johnson
375 Park Avenue
New York, New York

Dear Philip:

In the Fall of '66 I gave a Commercial St problem at Yale. (Unfortunately you coul jury.) At that time I also visited Las V where we took photographs. That problem part of the research for our article, "Le Vegas," in last month's <u>Forum</u>. The artic another one in the current issue of the I of mine called "A Bill-ding-board," will published by Alfieri next Fall. Last Fal Yale, called "Civilizing the Underground,

THE LORDSHIP
OF THE
MANOR OF EAST SHEFFORD, BERKSHIRE
DESCENDENT FROM SIR HENRY ST. JOHN BOLINGBROKE
VISCOUNT OF ENGLAND
AD 1681 - 1751

"The Treaty of Peace" signed in Paris on September 3rd 1783 between Great Britain and the United States of America was signed by the Lord of the Manor of East Shefford and Benjamin Franklin (records of which are in the Smithsonian).

This Lordship of the Manor dates from AD 1086 and is listed in the Domesday Book

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Crossword
Edited by Eugene T. Maleska

ACROSS
1 Plump roasting fowl
6 Side dish
11 Vessel for making tea
13 Nigerian port
15 Nutty confection
16 The Crimson Tide
17 Elected
18 Surly, churly fellow
20 Great American statesman
21 Crucifix
22 Skived
24 Billy or Pete
25 Blunder
26 Enigmas
28 Mary Lincoln —— Todd
29 Autocrat
31 Actress Welch
33 Mouths
34 Paronomasia
35 Assuage
38 Prickly flower
41 Sports award
42 First U.S. spaceman
44 Cover
46 Abrade
48 Hall of Fame pitcher —— Wynn
49 Communiqué
50 Moved in a curve
52 Holden Caulfield's milieu
53 Quibble
54 Most unoriginal
56 Detail
58 Troublemakers
59 Entertained
60 Gathers
61 Honored, in a way


Welcome
Home
Denise

ARCHI-TECTURE FIRM AWARD

LMN Architects

A Seattle firm devoted to civic responsibility, sustainable development, and a healthy office culture

TEXT BY BRIAN LIBBY
PHOTOS BY TOM WURZER

When LMN Architects was founded in Seattle in 1979, Microsoft and Starbucks were young upstarts and architects still drew by hand. And while much has changed, there are a few striking similarities between then and now, at least for LMN. Born during the energy crisis of the late '70s, the firm embraced sustainable design from the start, and the commitment remains fundamental to its identity. And then, as now, the firm explores how civic buildings can have an outsize impact on the cultural identity of cities.

In recent years, LMN has won numerous AIA Institute Honor Awards for architecture, interior architecture, and regional and urban design, but its latest recognition, the Architecture Firm Award, speaks not just to the diversity and quality of its portfolio, or even to its pioneering commitment to sustainability, but also to the collaborative working environment that inspires its ideas. "What's so gratifying is that it's not an award for an individual or a project. It's an award about the firm: the history, the culture, the people, and the work," says partner Sam Miller, AIA. LMN's greatest pride is not its buildings, he says, but the process that creates them.

LMN was founded by George Loschky, FAIA, Jud Marquardt, FAIA, and John Nesholm, FAIA, all of whom came from the Seattle firm NBBJ with the intention of focusing on public projects. "They saw a significance in public life and public places," says partner Mark Reddington, FAIA, who has been with LMN for 29 years.

One of the firm's first major commissions was Benaroya Hall (1998), a performing arts center, which was followed soon after by the Washington State Convention Center expansion (2001), which features a monumental glazed archway over Pike Street that acts as a gateway into downtown. Marion Oliver McCaw Hall (2003) transformed the former midcentury modern Seattle Opera House (itself a transformation of the circa-1928 Beaux-Arts–style Civic Auditorium) into a glassy, light-filled space. Both Benaroya and McCaw were noteworthy for their transparency and outdoor spaces, which helped to foster a sense of activity even when there weren't any performances.

The Vancouver Convention Centre West (2009), included in the AIA Committee on the Environment's 2011 Top Ten Green Projects list, was a transformative fusion of civic building and ecology. The 1.2 million-square-foot structure is sited amid 6 acres of parkland, with a bird-habitat-friendly green roof and a series of underwater terraces for sea life. "It's a sophisticated approach to the building as an organism in a habitat," Miller says. "We apply that to all our projects."

The firm's more recent work includes the Tobin Center for the Performing Arts, in San Antonio, and the University of Washington in Seattle's Sound Transit light-rail station, which knits together rail, bus, and bike infrastructure with a two-level glass entrance, all while framing views of Lake Washington and the Cascade mountain range. LMN partner Stephen Van Dyck, AIA, says that the station represents "a huge untapped role for creative design thinking in large-scale civic infrastructure work."

Even as the scale of its projects has increased, LMN has retained a single office and studio for its 160 employees, so that "everyone is working on a project at the same time," says partner Wendy Pautz, AIA. "We like to think that we're big enough to do projects of scale and to have resources associated with that, like a big shop and seasoned veterans who know how to put a curtainwall together. But we're also small enough to feel like one office, one group, working towards a common goal. We're trying to find that sweet spot

ARCHITECT visited the LMN office and captured the snapshots of firm life seen on these pages.

Vanessa Abin; Julie Adams, Assoc. AIA; Yomi Adeyemi; JP Alvarez, Assoc. AIA; Nicholas Ames; Adam Amrhein; Kjell M. Anderson, AIA; Mark W. Arnold, AIA; Aaron M. Argyle; Pamela Artison; David Backs; Brad Benke, AIA; Gregory M. Bishop, Assoc. AIA; Tom Burgess, AIA; Hank Butitta; Andrew Carr; Jack Chaffin Jr., AIA; Evan Chakroff; John H.V. Chau, AIA; Jennifer Chen; Dean Clark, AIA; Tim Clark, AIA; Sara Clinch; Clint Cook, AIA; Linnea Cook, Assoc. AIA; Scott Crawford; Rob Curran; Leo da Costa, Assoc. AIA; Aubrey Davidson, AIA; Michael Day; Steven M. Del Fraino, AIA; Stephen De Mayo; Melissa Eby; Christopher Eidt, AIA; Tiffani Erdmanczyk; Christopher J. Eseman, AIA; Justin Farmer; Matthew Fisher, AIA; Howard Fitzpatrick, AIA; Jeffrey S. Floor, AIA; Susan Fore, AIA; Nicholas Freese; Thomas Gerard; Michelle Gonzalez; Jim Grady, AIA; Matthew Graham; Mette L. Greenshields, Assoc. AIA; Emily Hankins; Chrysti Harrison; Arthur C. Haug, AIA; Lauren Hepner, AIA; Anne Herrick, AIA; Jennifer O. Hing, AIA; Brianna Holan; Chelsea Holman; Howard T. Howlett, Assoc. AIA; Adam Hunter; Phuoc Huynh; Erik Indvik, AIA; Stephanie Ingram, AIA; Cameron Irwin; Euiseok Jeong, AIA; Amanda L. Johnson; Jay Johnson, Assoc. AIA; Richard M. Johnson, AIA; Eun Jun, AIA; Brooklin Kennedy; Julie (Hwa) Kim; Kristy Kimura; Kyle Kiser, Assoc. AIA; Mark La Venture, AIA; Chuoc Lam, AIA; Matt Lewis, AIA; John Lim, AIA; Mark Lo, Assoc. AIA; Gustavo A. López, AIA; Vanessa Ly, AIA; Curtis Ma; Adrian MacDonald; Jennifer Marckx; Chris L. Martin; Taylor Massey, Assoc. AIA; Dave Matthews, AIA; Evan McQuillen; Jessica Miller, AIA; Samuel M. Miller, AIA; Jennifer Milliron, Assoc. AIA; Plamena Milusheva; Graham Moore; Jamie Morin, AIA; John Mrozek, Assoc. AIA; Lori Naig; Miron Nawratil; Kathryn Nelson; John F. Nesholm, FAIA; Cindy Nguyen; Daniel Nguyen; Walt W. Niehoff Jr., AIA; Cate O'Toole; Kristin Pann; Christopher Patterson, AIA; Wendy L. Pautz, AIA; Erik Perka, Assoc. AIA; Michael A. Petersen, Assoc. AIA; John E. Petterson, AIA; Tim Pfeiffer; Osama M. Quotah, AIA; Mark Reddington, FAIA; Timothy M. Rice, AIA; Kate Rufe, Assoc. AIA; Liliane Sabra, Assoc. AIA; Aya Sakurai; Bryan Sanders; Bennett Sapin; Tyler Schaffer, Assoc. AIA; David R. Schneider, AIA; Jeremy Schoenfeld; Todd C. Schwisow, AIA; Martha Share; Ginnefer Sharpe; George Shaw, FAIA; Martin Sicotte; Mary Skinner; Mary Anne Smith, AIA; Robert A. Smith, AIA; James Sobczak; Lori C. Stadler; Kathy Stallings, AIA; Gear Story, Assoc. AIA; Jennifer Tamblin; Meg Taylor; Brian Tennyson, AIA; Greg A. Thompson; Pamela Trevithick, AIA; Sally Tsang, Assoc. AIA; Mark Tumiski, Assoc. AIA; Higinio Turrubiates; Stephen Van Dyck, AIA; Teena A. Videriksen, Assoc. AIA; Sarah Vilendrer; Rafael Viñoly-Menendez, AIA; Masako Wada; Seiji Watanabe, AIA; Jeff Weis, AIA; Jenni Whitney; Robert W. Widmeyer, AIA; Paulina Wilkowska; Samantha Wittig; Deborah Wolf; John Woloszyn, AIA; Jade Yang; Rushyan Yen, Assoc. AIA; Mona J. Zellers, Assoc. AIA


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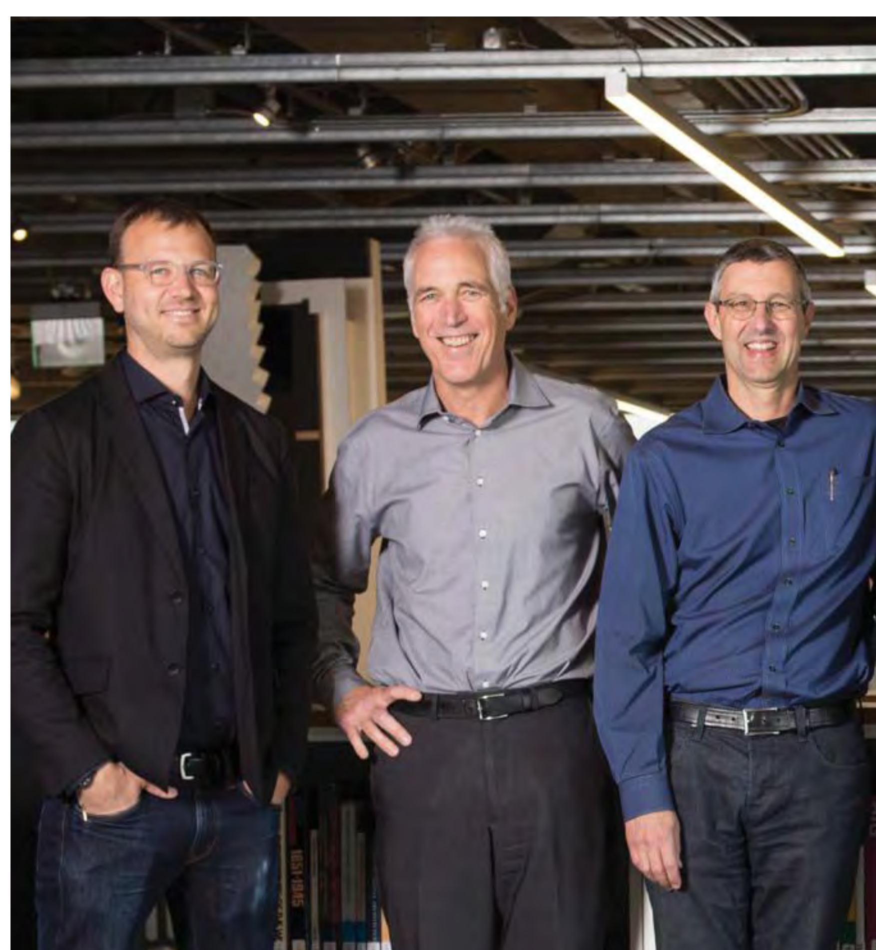
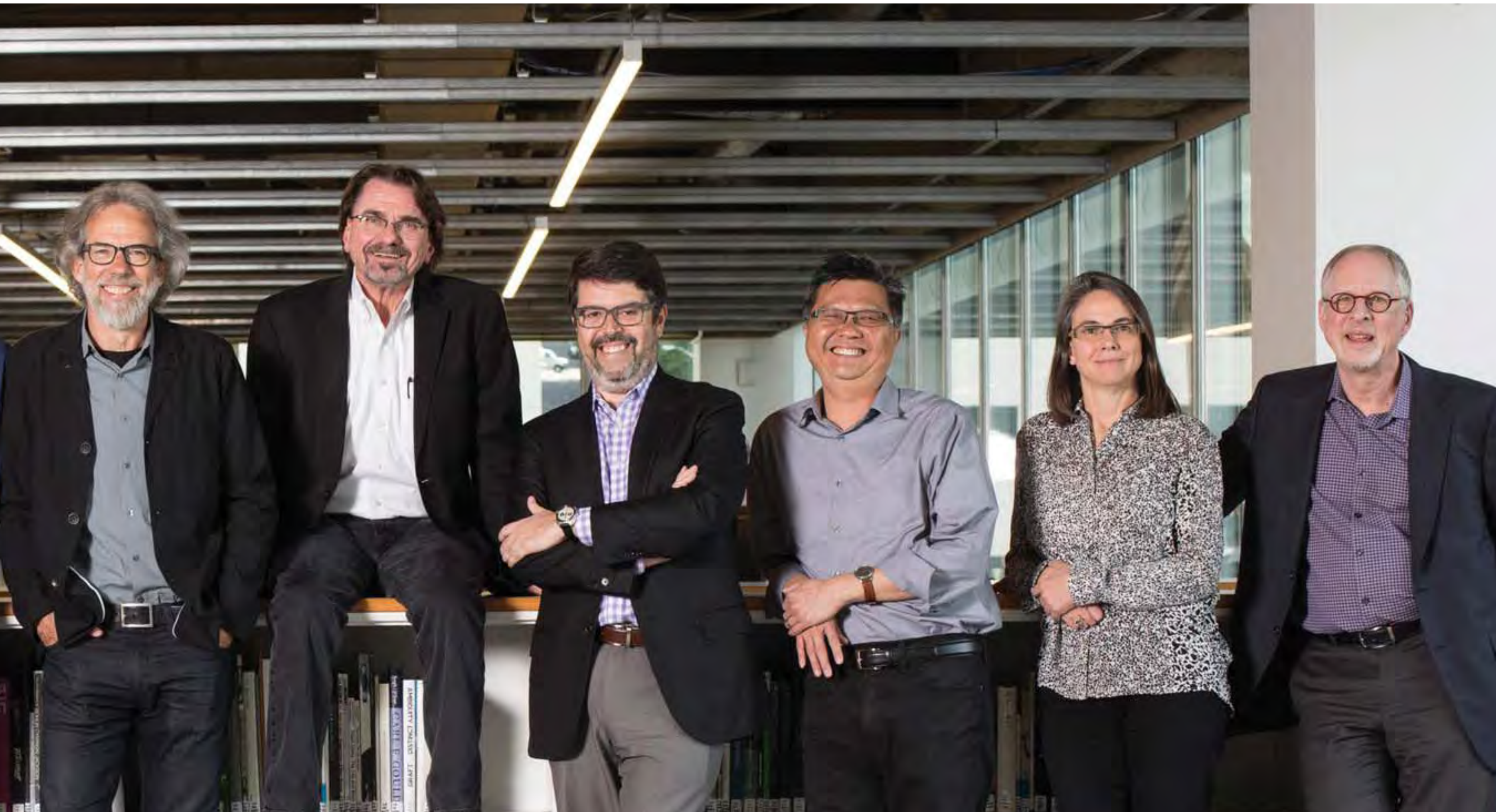


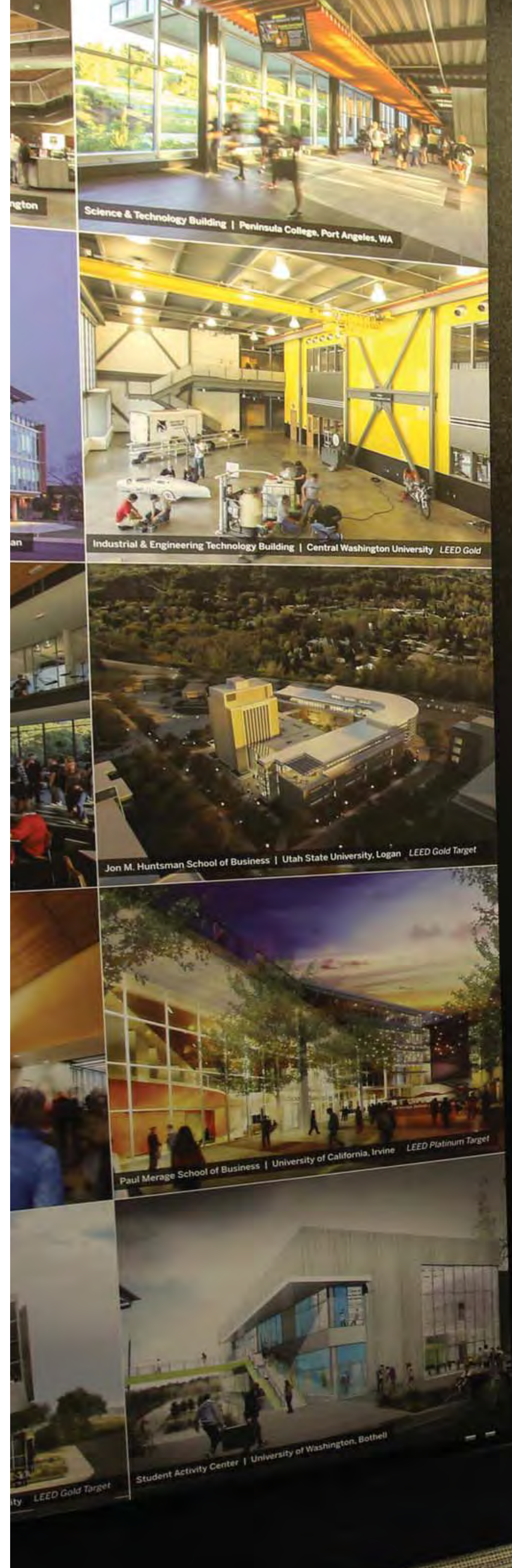


where we can kind of have it both ways."

Younger hires can make an immediate impact through cross-mentoring. "We don't see it as a one-way street," Van Dyck explains. "Graduates are coming from school with an incredible array of skill sets that many of us who have been out of the academy for a while don't have. It's not just the seasoned 30-year professional distributing ideas about curtainwall detailing. It's also the 26-year-old intern sharing ideas about working through software platforms."

The firm also prioritizes community involvement, and not just pro bono design work, but advocacy. For example, LMN was a vocal proponent of removing the Alaskan Way Viaduct—an elevated highway along the Seattle waterfront that was damaged in a 2001 earthquake—in order to reconnect downtown with the waterfront and improve pedestrian access and public space. The firm also argued in favor of light rail and streetcars instead of expanding the city's monorail, which dates to the 1962 World's Fair, because the expansion would have blocked light from a major downtown avenue.

"We think carefully about what we believe is right and what we think's going to help the profession and the community," Reddington says. "That's all part of making a culture and a firm that we believe in."




Washington State Convention Center Expansion | Seattle, WA
Benaroya Hall | Seattle, WA
Duke Energy Convention Center | Cincinnati, OH
Marion Oliver McCaw Hall | Seattle, WA
Vancouver Convention Centre West | Vancouver, BC, Canada LEED Platinum
Conrad Prebys Music Center
Cleveland Convention Center & Global Center for Health Innovation
Spokane Convention Center Addition | Spokane, WA
Voxman School of Music
Bremerton Fourth Street Urban Design | Bremerton, WA
Port Angeles Waterfront Urban Design | Port Angeles, WA
Mercer Corridor Streetscape Design | Seattle, WA
University Station | Seattle, WA

TWENTY-FIVE YEAR AWARD

The Monterey Bay Aquarium

TEXT BY GIDEON FINK SHAPIRO
PHOTOS BY BRUCE DAMONTE

An understated landmark of biomimetic systems and resilient construction

The Monterey Bay Aquarium behaves like an architectural appendage of the Pacific Ocean, drawing in and then relinquishing every drop of its 2 million–gallon capacity from the bay that pummels its structural foundation. The rapid exchange of seawater, at a rate of up to 2,000 gallons per minute, sustains impressive exhibits, such as a 28-foot-tall kelp forest ecosystem populated by the likes of leopard sharks, rockfish, and color-changing octopuses native to Monterey Bay, Calif. Open-air decks and a tide pool allow for sweeping views of the coastal landscape, the occasional harbor seal or humpback whale, and even the birth of a wild sea otter on the rockwork earlier this spring.

This physical connection to the sea helps the aquarium attract 2 million visitors per year. But it also represents its greatest vulnerability. "The sea has never been friendly to man," Joseph Conrad wrote in his 1880 essay "Initiation," while working as a sailor. Nor is the sea kind to buildings. Salt, if unchecked, could corrode the aquarium's reinforced concrete structure and exhibit tanks, while the countless microscopic organisms inhabiting the water could clog its pipes and foul its reservoirs.

These challenges were not lost upon Chuck Davis, FAIA, founding principal of EHDD, the San Francisco–based firm that designed the aquarium back in the early 1980s. "We were talking about not only building over the water, but also running seawater all through the building," he recalls. Though he had seen the deteriorating conditions of older, existing aquariums, he and his team embraced the target life span set forth by project benefactor David Packard and the David and Lucile Packard Foundation: 50 years.

Now 32 years old, the Monterey Bay Aquarium has won the AIA Twenty-Five Year Award, an affirmation of its lasting success. It is on track to reach the half-century mark handily, with help from several expansions, renovations, and systems upgrades along the way, mostly overseen by EHDD. The design highlights both regional ecology and the no-frills architecture of Monterey's Cannery Row. It was "not conceived to be a look-at-me building," Davis says, but rather "a building that would fit and support its context."

A series of specialized construction techniques and building systems supports the aquarium's close communion with the sea. These include a corrosion-resistant, reinforced-concrete structure; a sophisticated water-circulation, or "life-support," system; and a heat-exchange system that leverages the abundance of seawater. All of this technology, much of it groundbreaking at the time, is a testament to the project's strong and collaborative team of consultants, Davis says.

The first challenge was installing the concrete foundation in an intertidal zone. Structural engineer Hal Davis (Chuck's older brother, who worked with San Francisco–based firm Rutherford + Chekene) says, "As soon as the tide went out, the contractor had to mobilize their equipment and personnel, pour the foundations, and then retreat before the tide came back in."

During low tide, workers would place hollow precast box "coffers," one for each pier, to provide watertight shafts in which to pour a 28-foot-square column grid. They sealed each box to the rocky, uneven sea floor with a concrete slurry, excavated the inside of each box with jackhammers, and then placed rebar and concrete inside the shafts. "We were putting in reinforcing and pouring concrete at 2 and 3 o'clock in the morning," Hal Davis says. Corrosion-resistant, fiber-reinforced polymer forms were used for the columns above the sea floor and left permanently in place to help protect the concrete. Precast girders and tees form the main deck (the aquarium's first floor) over the water. The second floor has a cast-in-place waffle slab.

The next challenge: fighting corrosion. Anything made of concrete—columns, decks, walls, exhibit tanks—could fail if salt reached its steel reinforcing. Hal Davis' strategy was straightforward: protect the rebar, use a low-porosity concrete, and "build it extremely well." EHDD also specified epoxy-coated steel rebar, a product that was then just a decade or so old. The impermeable green polymer sheath shields the ferrous metal from marine salts, just as it shields the rebar in highways from ice-melting salts. Construction workers also used PVC-coated tie wire, clipping and hammering the pigtails, or ends, to maintain the concrete's consistency. Furthermore, EHDD specified a more impermeable concrete mix, substituting flyash for 20 percent of the cement, and increased the clearance between the encapsulated rebar and the concrete surface by a few extra inches.

The contractor Rudolph and Sletten, based in Redwood City, Calif., water-tested all seven of the aquarium's original concrete tanks and two reservoirs using more than half a million gallons of fresh water to avoid the risk of saltwater infiltration through potential defects. Once the identified defects were remedied, the tanks were allowed to cure over several months to permit moisture vapor emission, and then were coated with Vandex, an impermeable mortar, for an extra layer of protection.

Post-occupancy testing has confirmed the

BOTTOM LEFT AND RIGHT: COURTESY EHDD

Above: A heat-recovery system reduces the energy needed to condition the different environments.

Far Left: Workers timed the installation of the concrete foundation with the tide.

Left: Epoxy-covered rebar is used throughout the aquarium, including the cast-in-place concrete floor slabs.

A view of Monterey Bay Aquarium's first floor, looking northwest toward the sea otter exhibit.


Sea Otters

effectiveness of the team's multipronged efforts, says EHDD director of quality control and construction administration John Christiansen. When concrete core samples taken from the 55,000-gallon sea otter tank were tested in the 1990s, "We found that the amount of chlorides in the concrete at the depth of the rebar would not reach a high enough level for about 85 years to even start corrosion of uncoated reinforcing," he says. Subsequent cores from the newer portion of the aquarium (also by EHDD) taken in 2010 suggest that it may take 500 years for salt to reach the depth of the rebar. At that point, finally, the epoxy rebar coating would serve as a last line of defense.

The building's plumbing system is as important as its structure. Monterey Bay was not the first aquarium to draw seawater from its doorstep, but even now, it remains among the largest and most technically advanced. Two 14-inch-diameter intake pipes extend approximately 980 feet from the bay to the pump house, at a depth of 55 feet. The pipes alternate in service every few months: one draws water while the other is left stagnant to reduce the oxygen and kill off the barnacles that have attached themselves to the inside of the pipe. Most intake water is then clarified by filtering it through a bed of sand, which also contains bacteria that convert ammonia (NH_3) from animal excretion, a toxin, into nitrate (NO_3), which is less toxic. However, the pumps driving water through the filters can inadvertently cause the super-saturation of nitrogen levels in the water, with the disastrous and deadly effect of giving animals the bends. So the next step is critical: sending the water through aeration, or de-embolization, towers to re-balance its dissolved gases.

Not all of the aquarium's water is treated, however, and this is part of what makes Monterey Bay special. A portion of the intake seawater is pulled, unfiltered, into a secondary system. This nutrient-rich seawater provides food, such as plankton, for filter-feeding organisms like sponges, and introduces biodiversity to the exhibits in the form of algae spores and invertebrate larvae. The aquarium uses more unfiltered water at night, when visual clarity is not necessary.

The seawater makes one final stop before the aquarium expels it back into the tide pool: the heat exchangers. Conceived by the mechanical engineers at the Syska Hennessy Group, the heat-recovery system allows the human- and marine-climate environments to operate more efficiently by addressing their complementary conditioning needs. For example, the Open Sea exhibit, stocked with tuna and sharks and sea turtles, usually requires heating, while the human-occupied rooms and corridors, warmed by lamps, sunlight, and bodies, often require cooling.

Water, Christiansen notes, is more efficient than air at transferring thermal energy, and the aquarium has no shortage of it. Outgoing seawater from the aquarium is pumped through heat exchangers in the basement. These add or subtract energy from the water in the building's four chillers—three 150-ton rotary electric models by Multistack (which replaced three older units in 2005) and a 200-ton Tecogen Tecochill natural gas engine-driven model from 1996. "Like a geothermal heat pump system, the system at Monterey uses both the hot and cold water from the chillers to heat and cool the building, and the seawater is basically how everything is balanced out," Christiansen says.

The heat exchange system offers a pleasing metaphor of interspecies harmony as well as energy savings. "To be able to have the human and animal support systems work together in a symbiotic relationship is a big thing for aquariums because, inherently, they're not energy-efficient buildings," says EHDD principal Marc L'Italien, who helped design Monterey Bay's 1996 addition. "The innovative nature of bringing these systems together to consume less energy was really forward-thinking in its day, and it's still forward-thinking today."

The infusion of raw seawater helps sustain the aquarium's popular exhibits, such as the 28-foot-tall kelp forest.

Honor Awards

Edward C. Kemper Award

Terrance J. Brown, FAIA

The Kemper Award is conferred by the AIA board of directors on an architect member for contributions to the profession through service to the Institute. Brown, a senior architect in the Albuquerque, N.M., office of Anchorage, Alaska–based WHPacific, is a special adviser to (and former chair of) the AIA National Disaster Assistance Committee. He co-authored an AIA handbook on disaster assistance and led the creation of a response system that helps the Institute, its components, and its members better prepare for disasters and respond to them alongside local, state, and federal officials.

Whitney M. Young Jr. Award

R. Steven Lewis, FAIA

The Whitney Young Award is conferred by the AIA board on an architect or architectural organization that contributes significantly to social change. Lewis is an associate vice president in the Los Angeles office of TRC, a global engineering firm. In 2009 and 2010, he served as president of the National Organization of Minority Architects (NOMA), which tackles racial issues within the architectural profession. He was the editor of *NOMA* magazine from 2006 to 2012. "Receiving this cherished award affirms the value in all I have done throughout my career to ensure that the architectural legacy of our time will include contributions from all segments of our society," Lewis told ARCHITECT.

Thomas Jefferson Awards for Public Architecture

Hans Butzer, AIA

Butzer is a director of the Oklahoma City practice Butzer Architects and Urbanism. His projects include the Oklahoma City National Memorial and the Oklahoma City SkyDance Bridge. Butzer "is a gifted and accomplished architect who has built his career in Oklahoma City by dedicating himself to improving the built landscape and enriching the fundamental civic dignity of the city," wrote the AIA in announcing the award.

Topaz Medallion for Excellence in Architectural Education

Douglas S. Kelbaugh, FAIA EMERITUS

Kelbaugh teaches graduate architecture, urban design, and sustainability studios at Taubman College of Architecture and Urban Planning at the University of Michigan, where he also served as dean from 1998 to 2008. In 1978, he founded the firm Kelbaugh + Lee in Princeton, N.J., whose passive-solar buildings contributed to zero-energy building research. "Kelbaugh is the quintessential teaching architect," wrote the AIA in announcing the award. He helped "shape a generation's thinking about the environmental aspects of architecture."

Associates Award

R. Denise Everson, ASSOC. AIA

Everson is a consultant with Connecticut Green Bank, a Rocky Hill, Conn.–based entity that provides loans to homeowners, businesses, and municipalities to fund energy-efficiency building improvements. Previously, she was the District of Columbia Housing Authority's sustainability liaison. In 2014, the website *Next City* named her one of 40 leaders under 40 influencing urban innovation.

Beau Frail, ASSOC. AIA

Frail is a project designer with Austin, Texas–based Michael Hsu Office of Architecture and has served as a teaching assistant and guest design critic at the University of Texas. A member of AIA Austin's DesignVoice committee, he has made significant contributions to its high school internship program.

Anna Jones, ASSOC. AIA

Jones works at Substance Architecture in Des Moines, Iowa, and is the associate editor of *IA Architect* magazine. She has served as chair of Iowa Women in Architecture. As the regional associate director for the Central States Emerging Professionals Committee, she spurred AIA involvement among young designers.

Joseph Mayo, ASSOC. AIA

At Mahlum Architects in Seattle, Mayo excels in light-wood frame construction. Timbercity, his exhibiton at AIA Seattle, featured wood-fabrication techniques that he studied in Canada and Europe. Mayo worked with Seattle officials to adopt tall cross-laminated timber (CLT) structures in the city's building code, which will enable the construction of the first multistory CLT building in the country.

Jared Edgar McKnight, ASSOC. AIA

At Wallace Roberts & Todd in Philadelphia, McKnight has worked on the adaptive reuse of the Hoover-Mason Trestle in Bethlehem, Pa., a railway converted into a pedestrian walkway. He is the associate director on AIA Philadelphia's board of directors and has occupied key roles in the AIA Philadelphia Design and AIA Pennsylvania Emerging Professionals Committees.

Ross Miller, ASSOC. AIA

Miller joined HDR Architecture in Omaha in 2010 and has contributed to such projects as AIA Nebraska's new offices and a cancer center. The associate director for AIA Omaha, Miller helped push for Rep. John Ashford (D-Neb.) to co-sponsor the National Design Services Act, which aims to help alleviate the debt burden of architecture school graduates.

Mary Anne Ocampo, ASSOC. AIA

An urban designer and principal at Sasaki Associates in Cambridge, Mass., Ocampo has worked on an impressive range of projects, including a master plan for a research and development district in Malaysia and a post-typhoon day care shelter in the Philippines. She is a lecturer in the Massachusetts Institute of Technology's School of Architecture and Planning.

Young Architects Award

Seth E. Anderson, AIA
Anderson is the principal architect and owner of Ascent Architecture and Interiors in Bend, Ore., a founding member of the Central Oregon Professional Architects' Network, and the director of Extra Metropolitan Affairs for AIA Southwest Oregon. "Seth has striven to create a positive and collaborative environment where architects and designers can continue to grow," wrote the AIA in announcing the award.

Mindy Aust, AIA
Aust is an associate at Substance Architecture in Des Moines, Iowa, and the president of AIA Iowa. "Through rigorous and recognized design and dedication with an emphasis on mentorship and community involvement, she brings both strategic vision and a willingness to roll up her sleeves and get to work," wrote the AIA in announcing the award.

Erin Carraher, AIA
Carraher is an assistant professor at the University of Utah's School of Architecture. "Working in the academic and built environments, which she finds mutually beneficial and enriching, Erin is a member of the vanguard that is changing the perception of a young architect's ideal model of practice," wrote the AIA in announcing the award.

Bob Ganser, AIA
Ganser recently joined MSR Design in Minneapolis as an architect. He is an adjunct faculty member of the University of Minnesota and co-founded Minneapolis-based CityDeskStudio. "As a designer, educator, and volunteer," wrote the AIA in announcing the award, "Bob has constructed a model of practice for all young architects to aspire to."

Amy Kalar, AIA
Kalar is a senior healthcare planner at RSP Architects in Minneapolis, an adjunct faculty member at St. Catherine University, and the creator of the blog ArchiMom. "Through a powerful combination of advocacy, innovative practice, and deep passion for issues facing women in architecture, Amy has made waves by leading the charge for cultural change," wrote the AIA in announcing the award.

Yu-Ngok Lo, AIA
Lo is the founder of YNL Architects, which has offices in Los Angeles and Hong Kong, a partner and director of interior design at NDO Design, and co-founder and president of the Center of American Architects for Chinese Nationals. "Yu-Ngok is highly dedicated to lending his time and expertise to help emerging professionals," wrote the AIA in announcing the award, "particularly Chinese students and architects."

Karen Lu, AIA
Lu is a senior associate at HGA Architects and Engineers in Minneapolis and a member of AIA Minnesota's Leadership Forum advisory committee. "Through her extraordinary analytical and design skills, Karen exemplifies a broader definition of public interest design," wrote the AIA in announcing the award.

Shelby Morris, AIA
Morris is an associate principal at the Beck Group in Atlanta and the Young Architects Forum Young Architect Regional Director for the South Atlantic. "His ability to function highly in the design/build environment has helped created more opportunities for his firm and the profession at large," wrote the AIA in announcing the award.

Carey Nagle, AIA
Nagle is an associate principal in BNIM's Des Moines, Iowa, office and a member of the Des Moines Urban Design Review Board. "With his accomplishments in high-performance design, leadership in the profession, and community engagement, Carey has led the design dialogue on numerous fronts," wrote the AIA in announcing the award.

Daniel J. Scheaffer, AIA
Scheaffer is a senior architect in the Charleston, S.C., office of LS3P and is an adjunct faculty member at Trident Technical College. "Eager to learn and share his expertise, Daniel's never-ending interest in discovery has made him a well-rounded professional who is integral to the success of his projects," wrote the AIA in announcing the award.

Carissa Shrock, AIA
Shrock, a senior associate at Moore Ruble Yudell Architects & Planners in Santa Monica, Calif., is a member and past chair of AIA Los Angeles' Academic Outreach Committee and a director on the chapter's board. She is "an extraordinary leader and mentor with a strong commitment to emerging professionals," wrote the AIA in announcing the award.

Stephanie Silkwood, AIA
Silkwood is an associate in the San Jose, Calif., office of RMW Architecture & Interiors. "Her ability to connect with her audience … while balancing a straight-forward and honest approach has led to her emergence as a leader," wrote the AIA in announcing the award.

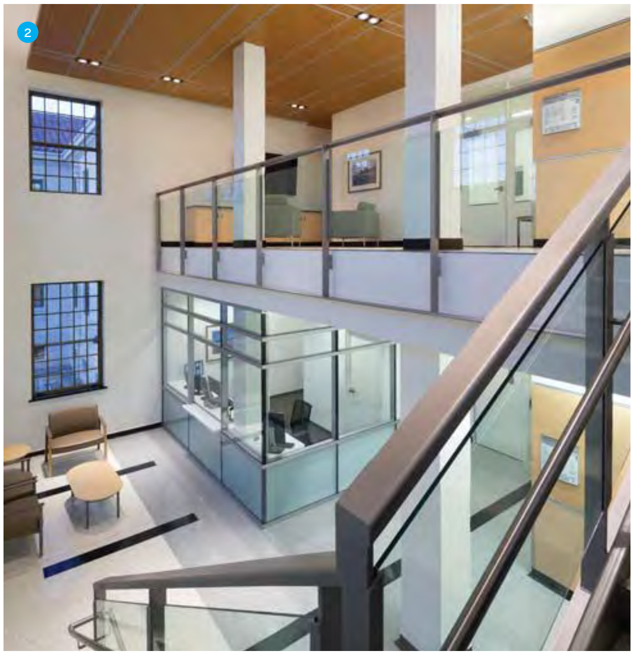
Institute Honors for Collaborative and Professional Achievement

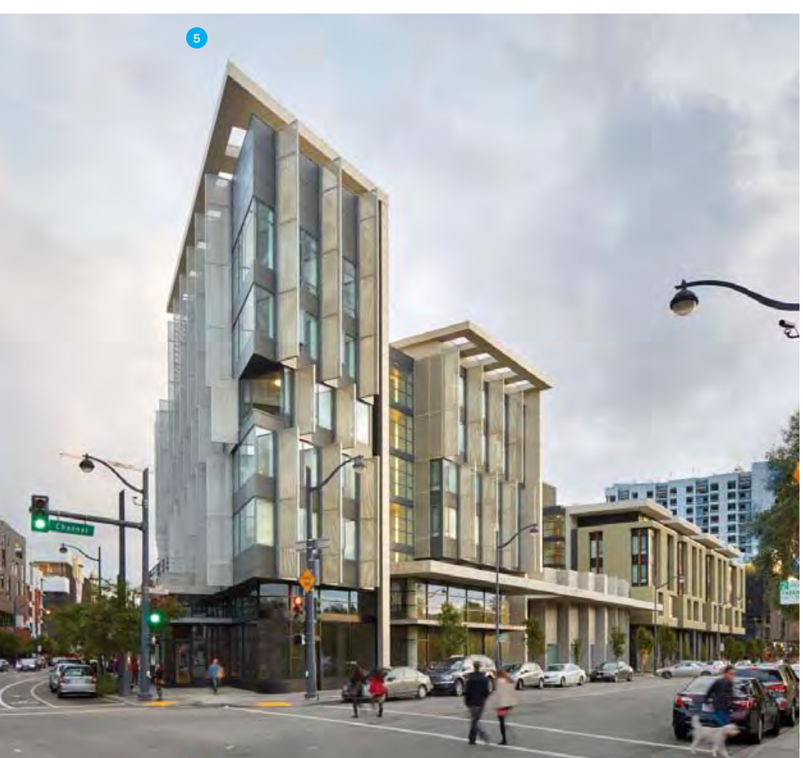
George Smart
Smart is an architectural historian and founder of North Carolina Modernist Houses (NCMH), a Durham, N.C., nonprofit that documents, preserves, and promotes modernist architecture. Since its 2007 launch, NCMH has built the largest open digital archive for modernist residential design and architects. NCMH's advocacy has helped save dozens of threatened structures. The nonprofit also hosts public home tours, an architecture movie series, an annual dinner for modernist designers, and a podcast.

Housing Awards

Judges
Jamie Blosser, AIA, Atkin Olshin Schade Architects (chair)
Ariella Cohen, Next City
Kevin Harris, FAIA, Kevin Harris Architect
David Lee, FAIA, Stull and Lee
Suman Sorg, FAIA, Sorg Architects (now part of DLR Group)

1: PAUL CROSBY; 2, 4: LAWRENCE ANDERSON/ESTO; 3: ROBERT BENSON;
5: BRUCE DAMONTE; 6: JEREMY BITTERMANN





Specialized Housing **1.** Whitetail Woods Regional Park Camper Cabins · Farmington, Minn. · HGA Architects and Engineers **2.** Homeless Veterans Transitional Housing, VA Campus · Los Angeles · Leo A Daly **3.** Commonwealth Honors College, University of Massachusetts · Amherst, Mass. · William Rawn Associates, Architects **Multifamily Living** **4.** Cloverdale749 · Los Angeles · Lorcan O'Herlihy Architects **5.** 1180 Fourth Street · San Francisco · Mithun, initiated as WRT/Solomon E.T.C. **One/Two Family Custom Housing** **6.** Newberg Residence · Newberg, Ore. · Cutler Anderson Architects

One/Two Family Custom Housing
1. Independence Pass Residence · Aspen, Colo. · Bohlin Cywinski Jackson **2.** Oak Ridge House · Jackson, Miss. · Duvall Decker Architects **3.** Hog Pen Creek Residence · Austin, Texas · Lake|Flato Architects **4.** Island Residence · Honolulu · Bohlin Cywinski Jackson

1, 4: NIC LEHOUX; 2: TIMOTHY HURSLEY; 3: CASEY DUNN

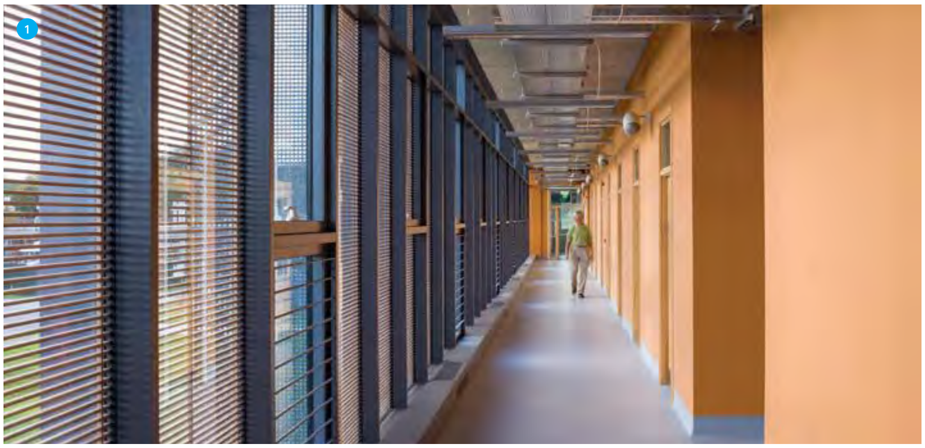
COTE Top Ten

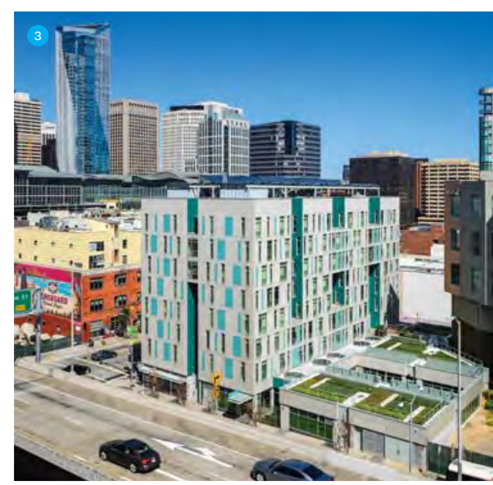
Judges

Larry Strain, FAIA, Siegel & Strain Architects
Luke Leung, Skidmore, Owings & Merrill
Judith Heerwagen, U.S. General Services Administration
Margaret Montgomery, FAIA, NBBJ
Anne Fougeron, FAIA, Fougeron Architecture

1. Center for Sustainable Landscapes · Pittsburgh · The Design Alliance Architects **2.** Exploratorium at Pier 15 · San Francisco · EHDD **3.** University of Wyoming Visual Arts Facility · Laramie, Wyo. · Hacker with Malone Belton Able **4.** Jacobs Institute for Design Innovation · Berkeley, Calif · Leddy Maytum Stacy Architects **5.** H-E-B at Mueller · Austin, Texas · Lake|Flato Architects with H-E-B Design + Construction and Selser Schaefer Architects **6.** West Branch of the Berkeley Public Library · Berkeley, Calif. · Harley Ellis Devereaux **7.** Dixon Water Foundation Josey Pavilion · Decatur, Texas · Lake|Flato Architects

1: WALTER TIEN/THE DESIGN ALLIANCE ARCHITECTS; 2: BRUCE DAMONTE; 3: LARA SWIMMER; 4: TIM GRIFFITH; 5: DROR BALDINGER, AIA; 6: KYLE JEFFERS; 7: CASEY DUNN





1. Biosciences Research Building · Galway, Ireland · Payette with Reddy Architecture and Urbanism **2.** J. Craig Venter Institute · La Jolla, Calif. · ZGF Architects **3.** Rene Cazenave Apartments · San Francisco · Leddy Maytum Stacy Architects with Saida + Sullivan Design Partners

4. COTE Top Ten Plus · Edith Green–Wendell Wyatt Federal Building · Portland, Ore. · SERA Architects with Cutler Anderson Architects

1: WARREN JAGGER; 2: NICK MERRICK/HEDRICH BLESSING; 3: TIM GRIFFITH; 4: NIC LEHOUX

Compliance without Compromise

The Rise of Next Generation Water Features in Hospitals

An indoor water feature is a calming, soothing way for individuals to connect with nature in a visually-appealing fashion.

The architect and design community has long understood how a water wall, water soffit, reflection pool, rain curtain, or bubble wall lifts spirits and offers a welcome respite in a busy public area.

Especially in a hospital.

Water's restorative qualities are the perfect antidote to the so-called "white coat syndrome" that afflicts some hospital visitors. Water's power to relieve anxiety makes it a powerful addition to any hospital's welcome experience.

Yet, water features have recently come under question. The facility standards-setting body of the health care industry, the Facility Guidelines Institute (FGI), published guidelines in 2014 that forbid the use of unsealed indoor water features in hospitals. The guidelines, published in the *Guidelines for Design and Construction of Hospitals and Outpatient Facilities*, grew out of a well-documented but isolated incident in 2010. Eight patients of a southeastern Wisconsin hospital came down (and recovered) from Legionnaire's disease traced to a poorly-maintained decorative fountain in the hospital's lobby.

The architect and design (A&D) community was quick to comply with the new 2014 FGI guidelines. However, FGI officials expressly left the door open to sealed, enclosed indoor water features.

A Silver Bullet?

The nation's leading water feature company and chief design innovator, Bluworld of Water, based in Orlando, Fla., understood the FGI's stance and the A&D community's response. "A properly designed and maintained water feature, even an open-air one, poses no public health threat," says Bluworld president Sean Drummond. "However, we completely side with the industry's over-abundance of caution regarding open-air indoor water features."

Yet the design imperative remains, especially for hospitals. How does an architect specify an appealing FGI-compliant water feature? What are the design and budget options? Fortunately, a de facto water feature standard has emerged today that observes best practice without sacrificing design integrity.

It's called Blu-Guard from Bluworld and there's nothing like it.

Compliance without Compromise

Blu-Guard is a next generation water feature solution that eliminates pathogenic concerns while offering A&D professionals nearly unlimited design freedom.

"Blu-Guard is a completely sealed, encapsulated water feature. It meets all regulatory recommendations because it's not an open-air water feature. There is no aerosol effect," Drummond observes.

It's also completely maintenance free. There's no cleaning. No draining. Nothing for maintenance to do.

Proven Performance

Today leading medical centers in Florida, Utah, Georgia, and many others across the nation charm and delight visitors with stylish new, FGI-compliant Blu-Guard systems.

The patients and visitors to St. Rita's Health Partners in Lima, Ohio "just rave about" the Blu-Guard water feature that greets them in the lobby, reports St. Rita's director of radiation oncology and cancer support services, Julie Rowland.

"Our Blu-Guard system has the appearance of an open-air water wall." Rowland says. "It's been up and running for more than six months with no maintenance needs of any kind. Blu-Guard exceeds our expectations in every way. We couldn't be more pleased."

Medical center architects, interior designers, owners, and facility managers looking for a maintenance-free water feature fully compliant with FGI guidelines now have a proven option to investigate. ■

Left: Heartland Health Sky Cafe | Saint Joseph, MO
Above: St.Rita's Health Partners | Lima, OH

For more information:

Website **bluworldusa.com**
Phone **407.426.7674**
Email Us **info@bluworldusa.com**
twitter.com/bluworldofwater

Institute Honor Awards

ARCHI- TECTURE

Judges

Josiah Stevenson, FAIA, Leers Weinzapfel Associates (chair)
José Alvarez, AIA, Eskew+Dumez+Ripple
Brad Cloepfil, AIA, Allied Works Architecture
Roberto de Leon, AIA, De Leon & Primmer Architecture Workshop
Julie Eizenberg, FAIA, Koning Eizenberg Architecture
Julie Engh, ASSOC. AIA, Highland Associates
Elizabeth Hallas, AIA, Anderson Hallas Architects
Danielle Jones, AIAS Representative
Christian Zimmerman, Prospect Park Alliance

TEXT BY IAN VOLNER

Case Inlet Retreat
Lakebay, Wash.
MW|Works Architecture+Design

The Pacific Northwest's long tradition of a highly specific, localized variety of Modernism (stretching from Pietro Belluschi straight on through to Jim Olson, FAIA, and Tom Kundig, FAIA) has been one of America's most significant contributions to global architecture—an outstanding example of what Kenneth Frampton, ASSOC. AIA, would call "critical regionalism." That tradition is being carried forward with aplomb by Seattle-based MW|Works Architecture+Design, whose Case Inlet Retreat has all the hallmarks of the phenomenon: Located on a 20-acre plot on the southern shore of Washington State's Puget Sound, the building's interior highlights natural wood finishes (including rough-hewn cedar bathroom walls) and features glass enclosures around the main living volume, maximizing views. The kitchen and adjoining patio share an ipe deck that further strengthens the connection between inside and out, and it's all topped by a concrete slab that projects over the house's western edge and functions as an upper-level terrace, reached via a delicate steel staircase, that affords sweeping views of the sound and the surrounding forest. The fixtures and furniture—from the outdoor grilling block, to the living room cabinetry, to the concrete kitchen counters—all rhyme in material, scale, and detailing with the house itself, making it a complete design environment that doesn't seem forced or fussy. All in all, a remarkable example of the area's favored stylistic mode, qualified with an urbane minimalism that seems entirely MW's own.

PHOTOS BY JEREMY BITTERMANN

> *Full credits for all projects begin on page 314.*

CHS Field
St. Paul, Minn.
Snow Kreilich Architects, Ryan A+E, AECOM

PHOTO BY PAUL CROSBY

As if Minneapolis-based Snow Kreilich Architects' design for CHS Field weren't cool enough on its own merits, just think: The independent-league baseball team that plays there, the St. Paul Saints, is partly owned by actor Bill Murray; the facility occupies a former Gillette razor factory; and it set a record last year for the world's largest ever pillow fight, featuring some 6,000-plus combatants. To contain all this hipness, the design team (which also included AECOM as sports architect and contractor/architect-of-record Ryan A+E) have made the building an

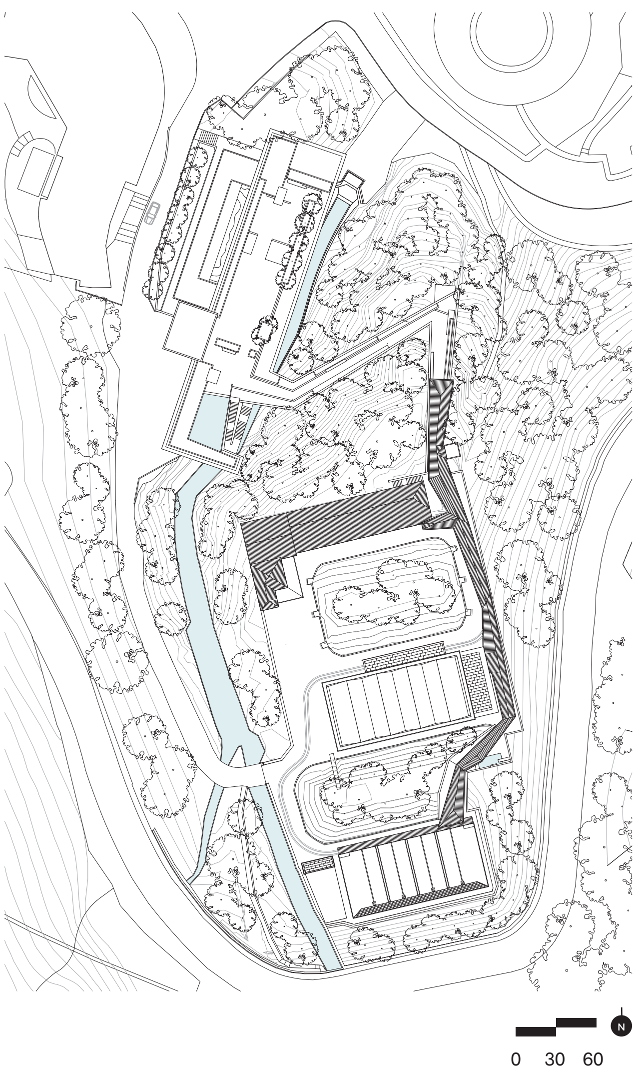
integral part of the artsy St. Paul, Minn., enclave of Lowerton. The surrounding concourse is tied into the neighborhood's bike trail, dog owners can watch games gratis from a nearby municipal dog run, and the entrance plaza doubles as a connection to a farmers market directly opposite, whose customers have access to the stadium's bathrooms through streetside entrances. The whole complex, in fact—with its low roofs, its wooden ceilings over the stands, its glass-enclosed boxes in elegant steel frames—seems surprisingly domestic, welcoming, and open to the city around it. It's an approach that harks back to the grand tradition of early 20th century ballparks like Boston's Fenway Park and Chicago's Wrigley Field, but in a decidedly modernist idiom that eschews historicist tropes like the grand arches or fake bunting that have been trending in stadium design since the '90s. And as an instance of adaptive reuse, it's practically sui generis, avoiding the demolitions and displacements (to say nothing of the sometimes outrageous cost overruns, usually at public expense) that are practically synonymous with big-time sports stadiums.

> This project was featured in the August 2015 issue of *ARCHITECT*.

Asia Society Center
Hong Kong
Tod Williams Billie Tsien Architects | Partners

Over the last 40 years, Tod Williams, FAIA, and Billie Tsien, AIA, have built a reputation in the field as gifted improvisers—devotees of a lively and versatile model of practice that starts fresh every time and distills each brief to its conceptual essence. For the Asia Society in Hong Kong, the New York–based pair faced a unique challenge: Ranging along a hillside in the heart of the city, the long-disused site included three historic buildings formerly used by the colonial British military, as well as a riverbed and an additional early 20th century building that lay beyond. To navigate this hilly site and fully renovate and convert the existing structures to hold new offices, a theater, and an art gallery, Williams and Tsien needed to develop a scheme that is about procession through the site and the spaces that sit upon it. Anchoring the design is a new 11,000-square-foot pavilion, clad in slabs of dark green stone, with amenities that include a restaurant and visitor center. To connect the structures and bridge a ravine on site, the designers added a double-decker pedestrian walkway configured in a jagged V, surrounded by lush vegetation and dramatically illuminated at night. More impactful, the roof of the new pavilion is topped with a landscaped garden, an idyllic spot with expansive views that also forms a picturesque prospect for all the buildings looking down on it. The Asia Society's mission—to promote regional culture and encourage international understanding—called for a building that was simultaneously forward-thinking and deeply rooted to its place. Williams and Tsien's solution—with its emphasis on building as a physical connector between, and pathway to, disparate spaces—is the perfect response. Another notch in the belt for two of the leading lights of global architecture.

PHOTOS BY MICHAEL MORAN/OTTO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AMMO

Mariposa Land Port of Entry
Nogales, Ariz.
Jones Studio

For all of the critics who've claimed, falsely, that the infrastructure investments of the Obama administration's much-debated 2009 stimulus produced nothing of merit, the Mariposa Land Port of Entry, in Nogales, Ariz., is a stinging rebuke. Phoenix firm Jones Studio has created a piece of bureaucratic machinery that manages to transcend the contentious politics of trade and immigration—not by ignoring them, but by making them the jumping-off point for a poetic reconsideration of national boundaries. With its slatted Cor-Ten steel canopies, elegantly terraced landscaping, and multiple courtyards, staircases, and covered walkways, the complex seems to speak a language of integration and connection, suggesting, in the words of Arizona poet laureate Alberto Ríos, a source of inspiration for firm principal Eddie Jones, AIA, "The border is what joins us/Not what separates us." It also, incidentally, manages to be a remarkably effective point of entry for thousands of vehicles driving into the United States, as well as thousands more driving southward into Mexico. Mariposa is one of the United States' busiest land ports, and the site's previous structure was over three decades old by the time it was finally replaced. Its successor is a high-tech marvel that features solar-powered hot-water heating and a complex system of stormwater collection that's helped the building score a LEED Gold rating, boosted by such simple, low-tech features as those Cor-Ten slats, which add natural shading to reduce glare on the exterior windows. In its long, flat silhouette and ruddy complexion, there's even a hint of Frank Lloyd Wright's Taliesin West, making this project a lot more (as the saying goes) than good enough for government work.

PHOTO BY BILL TIMMERMAN

> *This project was featured in the October 2014 issue of ARCHITECT.*


CERRADO
16'-6" CLEARANCE

U.S. Land Port of Entry Van Buren, Maine Snow Kreilich Architects, Robert Siegel Architects

PHOTO BY PAUL CROSBY

Yet another instance—among many—of the underpublicized public works projects completed under the American Recovery and Reinvestment Act, the U.S. Land Port of Entry at Van Buren, Maine, sits astride America's border with the Canadian province of New Brunswick. Although less contentious than its southern counterpart, the U.S.'s northern frontier is no less logistically complex and economically vital, and the project by the team of Snow Kreilich Architects of Minneapolis and Robert Siegel Architects of New York navigated the attendant challenges with

> *This project was featured in the February 2011 and December 2013 issues of* ARCHITECT.

aplomb: Located on 21 acres, the building is clad in a combination of aluminum and patterned glass, and its interior is enlivened by corridors of an almost Kubrickian orange.

Security is naturally a primary concern at the facility, but the ensemble's gently undulating landscape, rhythmically alternating façade, and subtly shifted massing lends it a quality of delicacy that softens the hard edges of its tough-minded program. Carefully crafted berms, for example, both direct stormwater to bioswales and prevent vehicles from leaving proscribed, and monitored, routes. A credit not just to President Barack Obama's stimulus plan but to the U.S. General Services Administration's Design Excellence Program, the project shows how far both were prepared to go to select smaller firms from all around the country—most not previously known for large public projects. The effect, in Van Buren and elsewhere, has been not only increased visibility for up-and-coming designers, but a dramatic improvement in the quality and diversity of the federal government's building projects over the last eight years.

Perot Museum of Nature and Science
Dallas
Morphosis Architects

PHOTOS BY IWAN BAAN

In the Perot Museum of Nature and Science, Thom Mayne, FAIA, may at last have found the ultimate client for his idiosyncratic brand of hyper-Modernism. Devoted to spreading public awareness of the natural world, the museum uses cutting-edge technology and multimedia exhibitions to bring a little excitement to potentially stodgy disciplines like physics, biology, and chemistry. Appropriately, the building created by Mayne's Santa Monica, Calif.–based firm, Morphosis Architects—a gleaming white cube pierced with irregular apertures and striations—seems like a giant

billboard for the future conspicuously perched atop a landscaped bluff just north of downtown Dallas.

The building's façade is composed of roughly 700 individually molded concrete panels, their ridged contours suggestive of a geological formation; the majority is opaque to provide a black-box environment for the exhibit halls inside, but the southwestern side is punctuated by a slash of a glass-enclosed escalator. Visitors arrive at a lower-level entryway, which is connected to a planted forecourt and topped by a sloping terrace covered in rocks, cacti, and dry grass—a model, in miniature, of the native Texas ecosystem.

Inside, visitors can explore a 300-seat digital movie theater, a museum store, 14 stories of exhibition space that include a children's museum, and a dedicated space for traveling exhibitions; there are also offices and auxiliary facilities for museum staff. Mayne and company have always been dedicated to a belief that design is a place to try out possible futures, and in this project—devoted to the exploring, inventive spirit of science—Morphosis' material and tectonic daring seem to speak more clearly than ever before.


um of Nature and Science

St. Patrick's Cathedral
New York
Murphy Burnham & Buttrick Architects

Anyone walking past New York's landmark St. Patrick's Cathedral cannot help but wonder at the way it has suddenly taken on an almost luminous gleam—a startling shift from its former gunmetal gray, closer to the typical hue of Manhattan's granite office towers. The church's new look can be credited to New York's Murphy Burnham & Buttrick Architects, the firm that oversaw a massive renovation over the course of the last three years. Originally the work of pioneering Gothic revivalist James Renwick Jr., the building has long served as an iconic backdrop for statesmen and popes (including the current one, who reopened it last fall) since its completion in 1888, but it has also suffered all of the attendant stresses, overuse, and exposure to the urban elements. Decorative columns were riven with cracks; mechanical elements had become outdated; and, of course, the city had done its exhaust-choked best to darken the façade. All of this called for a comprehensive restoration, the building's first since the 1940s, that would eventually draw in nearly 200 specialists and outside consultants at a total cost of $177 million. On the exterior, micro-abrasion techniques cleaned the façade, smoothed concrete patches, and repointed ornamental details; inside, the plastered ceiling was repainted a pristine white, and new fire-safety systems were installed that blend almost invisibly with the existing interior. In total, more than 30,000 individual repairs were undertaken, each one meticulously checked against Renwick's original design, transforming a building that seemed so familiar to so many into something no one had seen for a century and more.

PHOTO BY WHITNEY COX

WMS Boathouse at Clark Park Chicago Studio Gang Architects

PHOTOS BY STEVE HALL/HEDRICH BLESSING

The Chicago River was key to the development of its namesake city, forming part of the network of waterways that connected the Mississippi River to the Great Lakes and eventually linked America's rural West and commercial East. That also made it a heavily trafficked commercial corridor and, consequently, a heavily polluted one. It's a legacy the city is now struggling to address with a major redevelopment plan that includes the WMS Boathouse at Clark Park. Local fixture Jeanne Gang, FAIA, along with her multidisciplinary collaborators at Studio Gang

Architects, has given the city a major new hub from which the long term remediation of the historic riverfront can spread.

The first of four such boathouses (the last is slated for completion this year), the WMS complex includes two structures—one for renting canoes and kayaks, the other for indoor exercise equipment. Faced in a zinc-and-slate façade system, touched with details in Douglas fir, and sporting an irregularly gabled roofline, the ensemble seems both rustic and sophisticated, a citified, 21st-century update on the kind of public facilities common in American parks around the turn of the previous century. Most important, the building operates not only as a social magnet but serves as an infrastructural node in the revival of the Chicago River, redirecting stormwater runoff down into a carefully engineered substrate that allows it to pass slowly through detoxifying layers of gravel and soil before it filters back into the river. An outstanding instance of Gang's innate sense of stylistic panache, the project also demonstrates her dedication to putting architecture at the service of her hometown.


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Henderson-Hopkins School
Baltimore
Rogers Partners

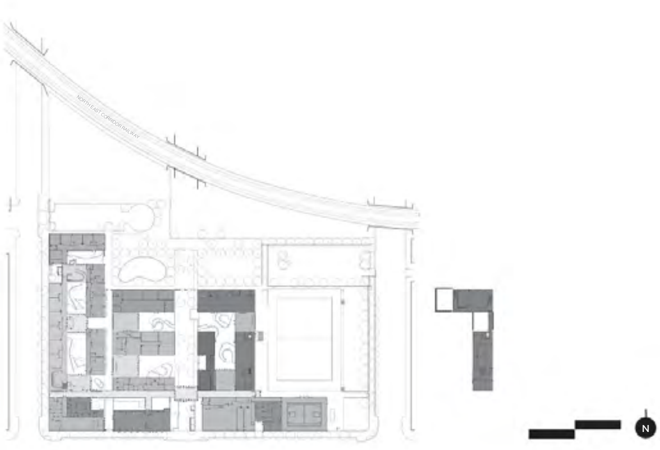
PHOTOS BY ALBERT VECERKA/ESTO

Once a major hub for Baltimore's Czech-American community that used to go by the name Little Bohemia, the neighborhood now named Middle East is these days a predominantly African-American area of aging brick rowhouses—the kind of streetscape familiar from television shows like David Simon's *The Wire* and *Homicide: Life on the Street*, both of which were inspired by, and filmed in, the area. Despite the fact that 45 percent of the population lives below the poverty line, public investment in the area has been lacking—as indeed it has been throughout the city—which makes

> *This project was featured in the December 2014 issue of* ARCHITECT.

the construction of the first new public school in Baltimore in 30 years a major event. New York–based Rogers Partners' scheme for the Henderson-Hopkins School encompasses a 7-acre campus and comprises a full-spectrum educational environment for 700-plus children from preschool through eighth grade.

Occupying five red precast concrete–clad pavilions, the ensemble creates a village-like atmosphere that adheres to the surrounding street grid and community scale and acts as a natural extension of the urban fabric. It's complemented by a sequence of separate spaces refashioned from pre-existing rowhouses that host an early childcare center, a library, a gym, and other community facilities. At the heart of the complex, a central mall acts as a public space for neighbors and an outdoor classroom for the students, completing the union of school and city, educational atmosphere and urban amenity. For Middle East, a neighborhood desperately in need of both, the Rogers Partners team came through, providing local residents not just with a place for learning, but a catalyst for collective renewal.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Pterodactyl
Culver City, Calif.
Eric Owen Moss Architects

PHOTO BY TOM BONNER

For nearly 30 years, Eric Owen Moss, FAIA, has been building not just a portfolio of buildings, but a whole city-within-a-city: the Hayden Tract in Culver City, Calif., where he and clients Frederick and Laurie Samitaur Smith have rolled out more than 20 projects to date, many of them office spaces occupied by tech firms and startups. As visually astonishing as many of these buildings—such as the Samitaur Tower, Stealth, Slash and Backslash, the Cactus Tower, and the Waffle—are, Pterodactyl, completed in 2015, still manages to stand out.

> This project was featured in the May 2015 issue of *ARCHITECT*.

Perched atop a lower-level parking structure, the building is a jumble of fractured boxes that jut out at diverse angles, like a child's origami paper game in process. Inside, the building actually has a conventionally orthogonal first floor, while the angled roofs on the upper levels afford a variety of differently configured spaces, including quiet corners and annexes for private meetings. In a neighborhood of mostly low- and mid-rise structures, the lofted upper stories are favored for their cool breezes and panoramic views across the long, flat expanse of central Los Angeles. An exemplar of Moss' singular brand of urban poetics, Pterodactyl perfectly demonstrates the way his buildings in the Hayden Tract reconfigure their post-industrial environment, creating a new order even in the act of disruption. Coupled with his longtime association with the program at the Southern California Institute of Architecture (of which he is a co-founder and the former dean), Moss' living experiment in Culver City confirms his status as perhaps the most essential, and the most authentic, of the West Coast's masters of contemporary design.

American Enterprise Group
Des Moines, Iowa
BNIM

The American Republic Insurance Building in Des Moines, Iowa, is the kind of dignified modernist office block that's often taken for granted in smaller American cities. This one in particular, however, is a true diamond in the rough: Designed by legendary Skidmore, Owings & Merrill principal Gordon Bunshaft, the project was completed in 1965, a key moment in the architect's career between his landmark Beinecke Rare Book & Manuscript Library at Yale University and his Marine Midland Building in New York. The structure's 2016 sprucing-up by the Des Moines office of BNIM has finally given American Republic—now the national headquarters of the American Enterprise Group—the attention it deserves.

Updating the building for the needs of today's office workers, the renovation team managed to duplicate the refined simplicity of the building's eight-story interior while completely transforming its entire M/E/P profile to meet up-to-date performance standards. A new open-office plan gives it a more contemporary feel and efficient layout, but also perfectly complements the 90-foot clear span devised by Bunshaft, eliminating the visual clutter of walled partitions. Further transparency is provided by new sliding glass office doors, and the exterior windows have been replaced with better insulated high-performance glass that still matches the historical feel of the originals. A substantial art collection, amassed by the client over the last 50 years, was carefully removed during the complete gut-reno, cataloged and stored and then reinstalled to stunning effect under a new and improved lighting scheme. Two years in the making, BNIM's retrofit has reduced the building's energy consumption by two-thirds, making this midcentury masterpiece a model of 21st century functionality.

PHOTOS BY NICK MERRICK/HEDRICH BLESSING

Institute Honor Awards

REGIONAL & URBAN DESIGN

Judges

Robert Herman, FAIA, EDA Architects (chair)
Christine Dunn, AIA, Sasaki Associates
Nelda Martinez, Mayor, City of Corpus Christi
Joel Tomei, FAIA, Joel Tomei, Architect
Christine Vina, AIA, VIA Metropolitan Transit

TEXT BY DEANE MADSEN

Smithsonian Institution South Campus Master Plan Washington, D.C. Bjarke Ingels Group (BIG)

Amid the grand buildings that line Washington, D.C.'s National Mall, it's all too easy to miss the entrances to the Arthur M. Sackler Gallery and the National Museum of African Art: a pair of pavilions framing the Enid A. Haupt Garden behind James Renwick Jr.'s red sandstone Castle. To fix this and other problems, the Smithsonian Institution launched an RFQ in 2012. The result is a new master plan for the Smithsonian's South Campus from Bjarke Ingels Group (BIG).

The grandest element of BIG's scheme is a new pavilion south of the Castle. The pavilion will replace the twin entrances to the Sackler Gallery and African art museum and help unify the two institutions, which exist largely below grade. An occupiable, street-level green roof will replace the existing garden. The green roof's northern corners reach skyward as entrances to draw the attention of visitors on the Mall and to frame views of the Castle from the south. The perimeter of the green roof will be lined with skylights to help illuminate subterranean galleries.

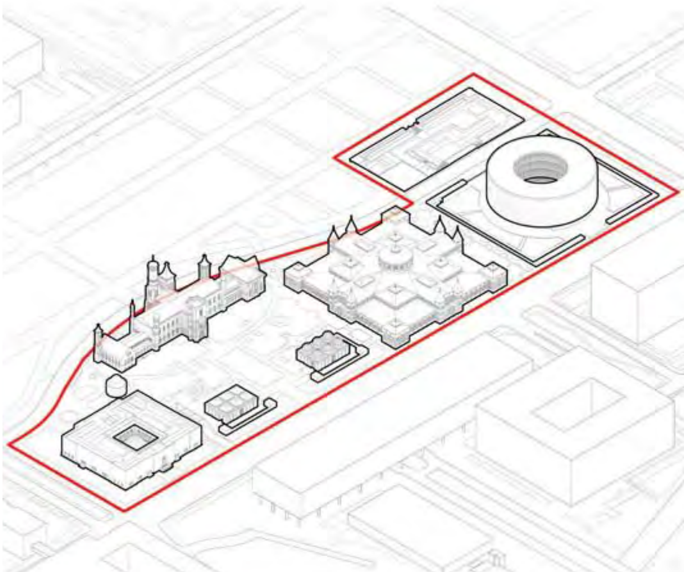
Less visible, but still vital, improvements to the South Campus will include expanded staff offices, a new shared loading dock, and seismic and mechanical systems upgrades. The plan also calls for a new underground avenue to connect the Freer Gallery of Art through the new pavilion to the Arts and Industries Building and the Hirshhorn Museum and Sculpture Garden to the east. The Castle's Great Hall will be restored as well.

The South Campus Plan still requires the approval of the National Capital Planning Commission; it will be implemented incrementally over a 10- to 20-year period, hopefully beginning this year. All told, the effort will create a more unified sector of the Smithsonian and the National Mall—as connected as it is conspicuous.

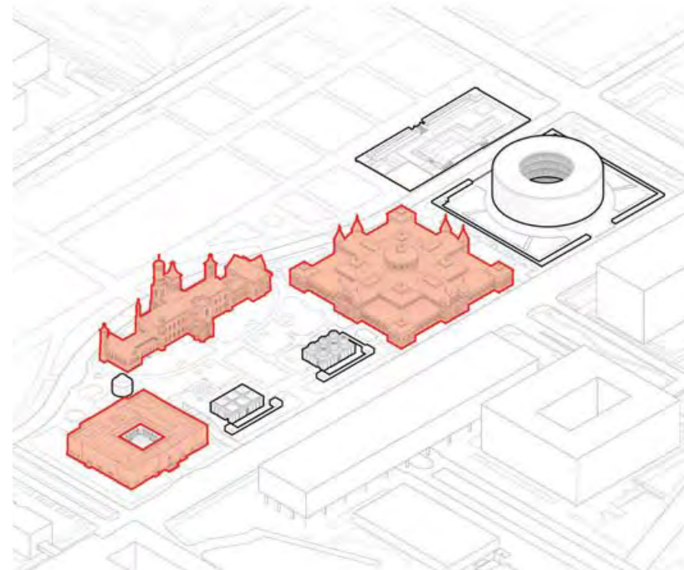
> *Full credits for all projects begin on page 314.*

COURTESY BIG

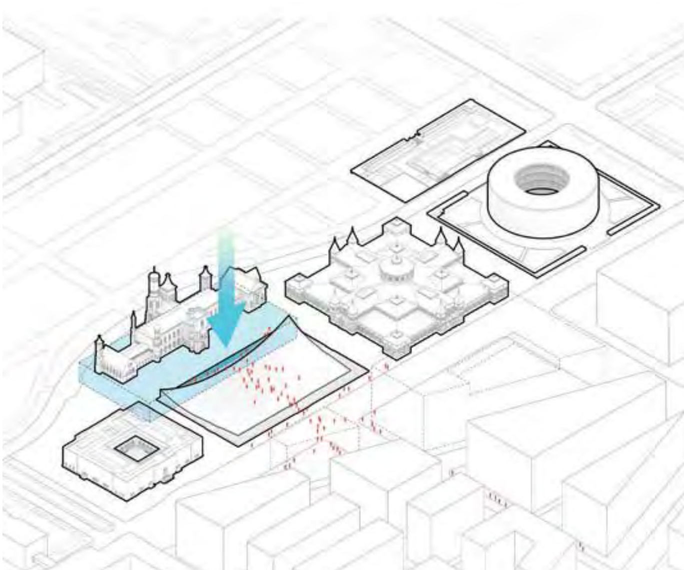

Arthur M. Sackler



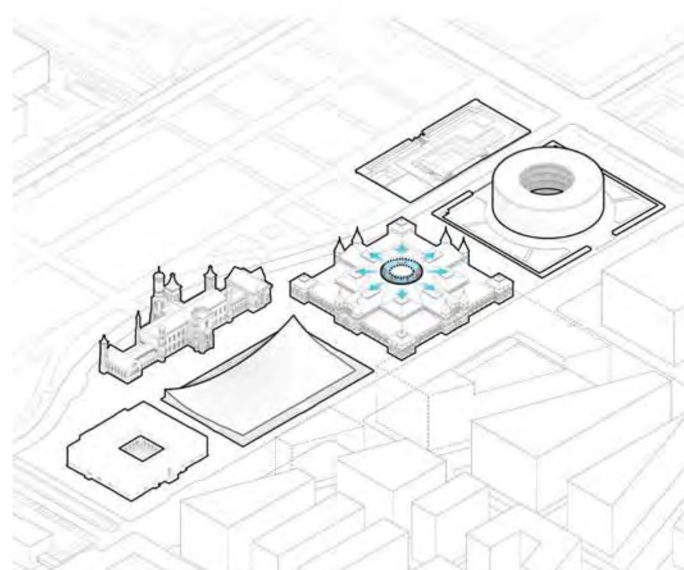
Smithsonian Institution's South Campus



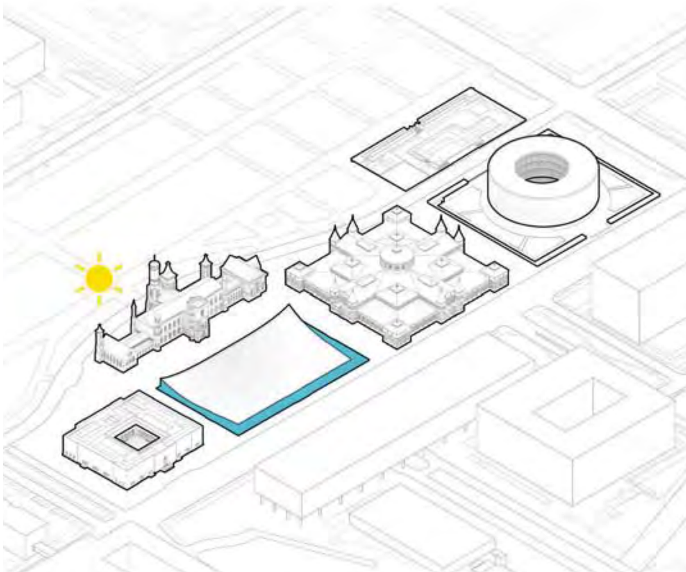
Protected landmark structures within South Campus



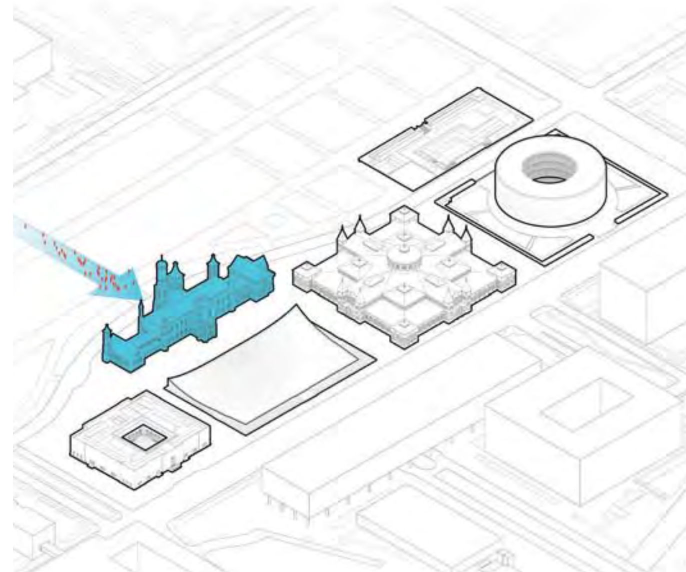
Proposed regrading of Enid A. Haupt Garden



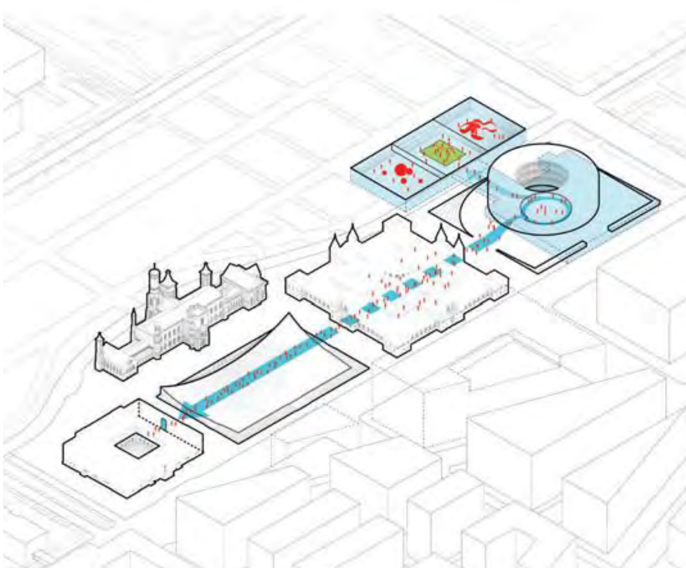
Proposed viewing platform at Arts and Industries Building



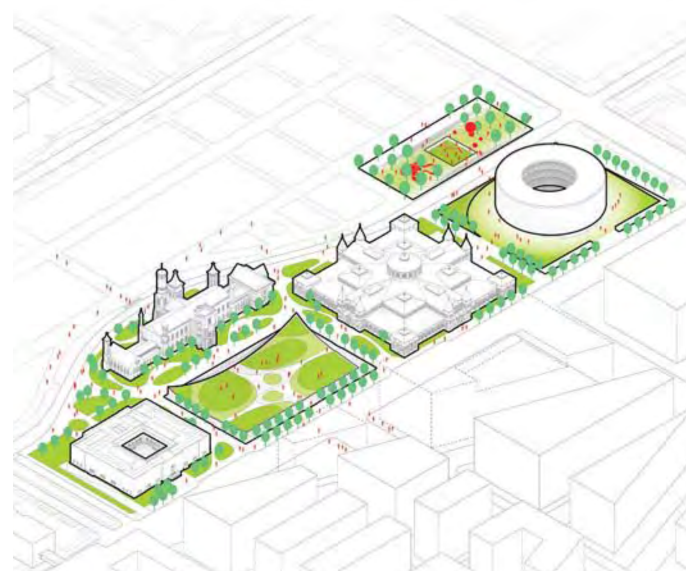
Improved daylight and visibility



Castle as entrance to Smithsonian South Campus collection



Enhancements to interdepartmental connectivity



New and restored South Campus gardens

Fayetteville 2030: Food City Scenario
Fayetteville, Ark.
University of Arkansas Community Design Center

Conventional city planning does little to favor urban agriculture, but a 2013 study by the University of Arkansas Community Design Center (UACDC) titled "Fayetteville 2030: Food City Scenario" aims to change that. Fayetteville is Arkansas' third-largest city, and although it expects sustained growth over the next 15 years, it already faces child hunger rates that are nearly double the national average. The study proposes that by integrating agricultural production into the city's fabric as it expands, Fayetteville could reduce that hunger rate while encouraging backyard gardens to expand into a local food ecology.

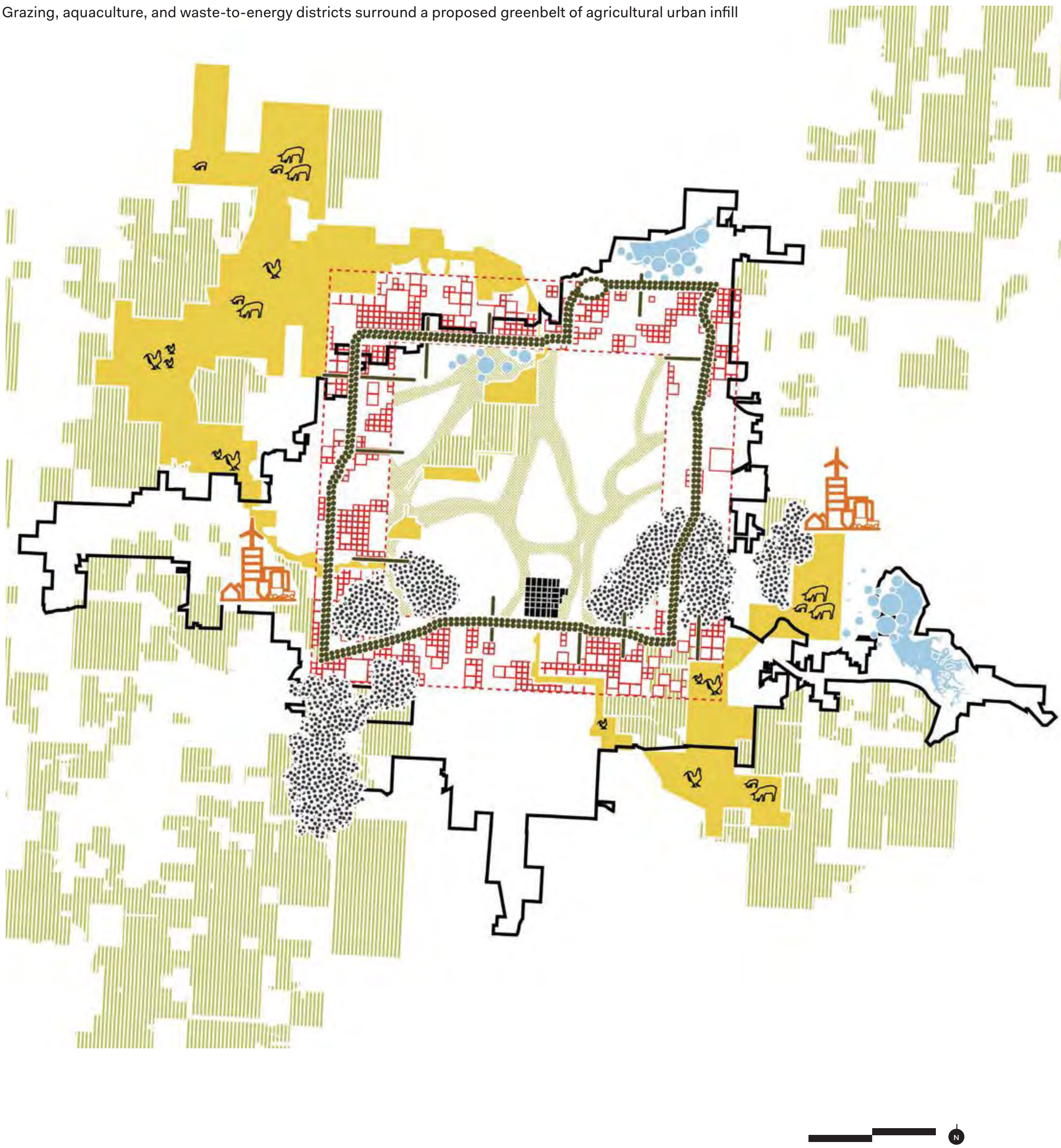
Focusing on a scale somewhere between a windowbox garden and a vast Midwestern wheat field, "Food City Scenario" proposes that zoning for midsize food-production facilities be factored into Fayetteville's current City Plan 2030 strategy. By encouraging Development-Supported Agriculture (DSA) and Gardened Right-of-Way streets, which feature fruit and nut trees planted in front yards and along sidewalks, sites for urban harvesting would become as ubiquitous as traffic infrastructure and would provide easier access to food for the populace.

UACDC recognizes the need for funding to support its concepts and proposes a toolkit of 22 urban interventions that could stimulate both agricultural and financial production, including DSA and restaurant farms—where the farm-to-table eatery concept exists on a single lot. Instead of relying on grocery store produce, residents could forage in landscaped woodlands and would formulate what the study calls "growing guilds" to manage them. These and other strategies in "Food City Scenario" are scalable and potentially replicable in other cities, but would start at home by enabling Fayetteville to plan a more resource-efficient community.

COURTESY UACDC

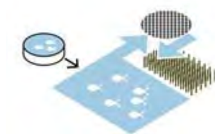
> *This project was featured in the February 2014 issue of* ARCHITECT.

Grazing, aquaculture, and waste-to-energy districts surround a proposed greenbelt of agricultural urban infill



The 22 Urban Interventions

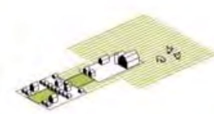
Allotment garden



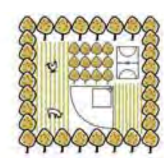
Aquaculture facility

Community garden

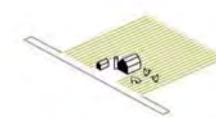
Composting network



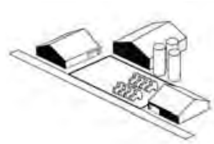
Development-Supported Agriculture (DSA)



Edible park



Farm



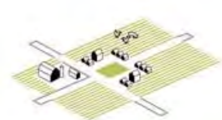
Food hub

Forest garden

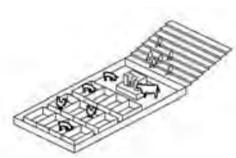
Garden block

Greenhouse

Gardened Right-of-Way (GROW) street

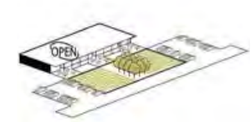


Hamlet

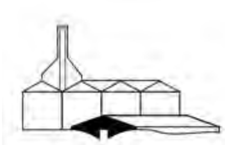


Livestock exchange/arena

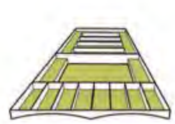
Pocket neighborhood



Restaurant farm

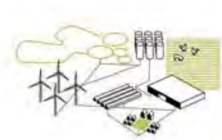


Storage

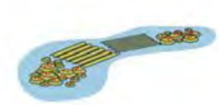


Thermal garden wall

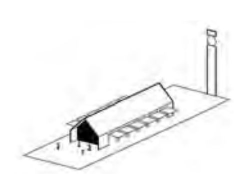
Vertical farm



Waste-to-energy district



Wetland farming



Winter farmers market

Institute Honor Awards

INTERIOR ARCHI- TECTURE

Judges

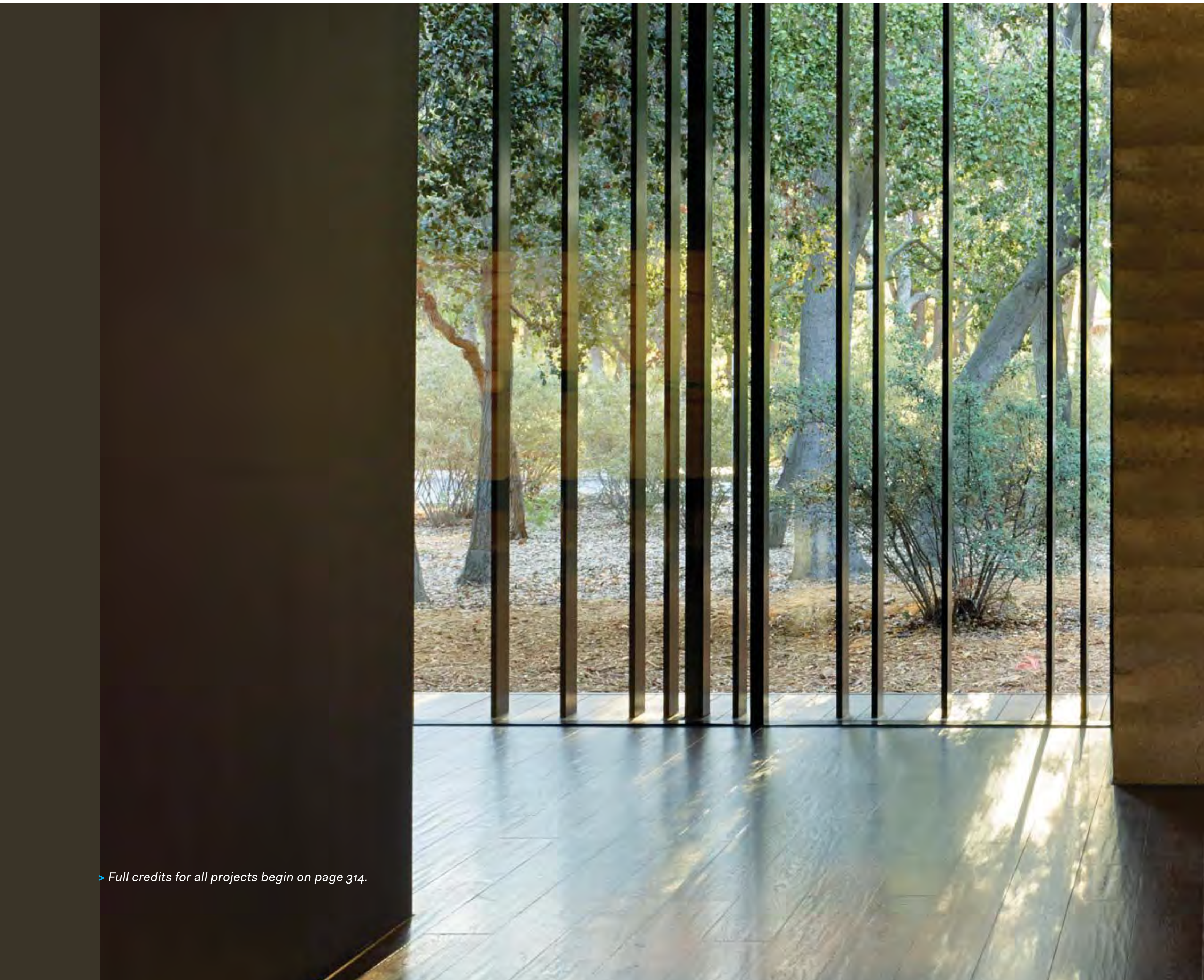
Rand Elliott, FAIA, Elliott + Associates Architects (chair)
Ruth Baleiko, AIA, The Miller Hull Partnership
Barbara Bestor, AIA, Bestor Architecture
James Slade, AIA, Slade Architecture
Lisa Smeltzer, State of Louisiana Facility Planning & Control

TEXT BY KATIE GERFEN

Windhover Contemplative Center
Stanford, Calif.
Aidlin Darling Design

PHOTOS BY MATTHEW MILLMAN

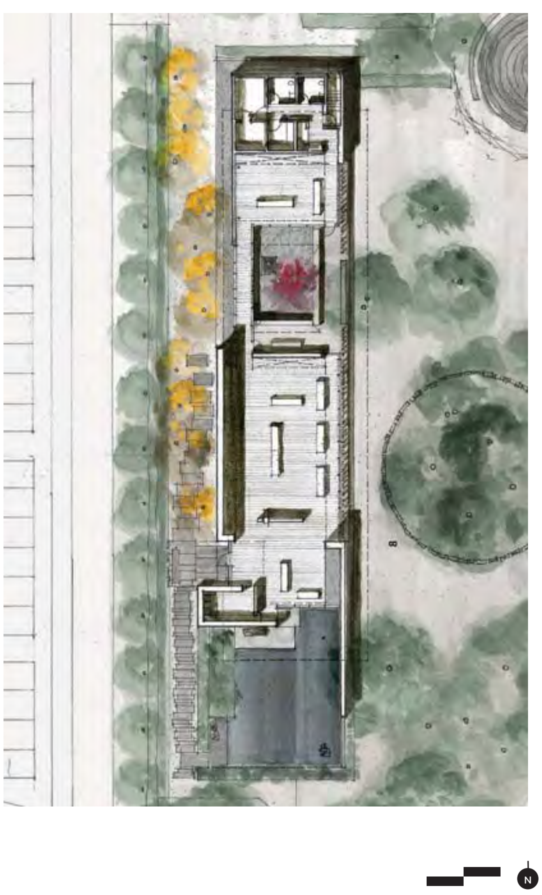
College has always been stressful, and studies show it's only getting worse: The UCLA Higher Education Research Institute recently found that first-year students' sense of emotional well-being is at the lowest point since 1985; in a separate study, stress was identified as a top cause of concern for more than half of students who sought out mental health resources on campuses. At Stanford University, administrators decided to tackle the problem before it becomes just that, bringing on San Francisco–based Aidlin Darling



> *Full credits for all projects begin on page 314.*

Design to create the 4,000-square-foot Windhover Contemplative Center in the middle of the bucolic Silicon Valley campus.

Inspired by, and designed to showcase, the "Windhover" painting series by artist Nathan Oliviera, the rammed-earth structure creates a nondenominational sanctuary for relaxation and silent contemplation. The quiet compression of low-ceilinged, low-lit galleries gives way to the release of a tree-lined courtyard, a reflecting pool, a ginkgo and bamboo grove, and a labyrinth. At Windhover, Aidlin Darling brings to bear the same commingled understanding of the human spirit and command of elemental materials—the rammed-earth walls are complemented by glass, Cor-Ten steel, and stone—that the firm has brought to bear in such projects as San Francisco's Bar Agricole and a yoga retreat in the Sonoma Valley. Now the students, faculty, and staff of Stanford have a place to escape the daily rigors of university life and ease the stress that affects so many, so adversely.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Georgetown University School of Continuing Studies
Washington, D.C.
Studios Architecture

For urban universities, expansion can be a tricky proposition. Tabula rasa sites are few and far between, and while location is king when acquiring a new building, chances are that if the existing structure doesn't require a complete tear-down, it needs a substantial overhaul. Such was the case when Georgetown University acquired space for its Center for Continuing Studies in an existing downtown Washington, D.C., building. It was the right location at the right time: Construction is booming in the area, and the university got an early perch in what's becoming a new hub for Class A space. But the structure itself was a former television studio with dark rooms and blank walls—hardly ideal for an educational facility in an era when the benefits of light and view are well-documented.

So Georgetown brought in the experts from Studios Architecture, who have crafted envy-inducing interiors in purpose-built facilities such as the Frank Gehry, FAIA–designed IAC Building in New York, and have transformed existing spaces such as the former International Toy Center at 200 Fifth Avenue. Studios centered Georgetown's facility around a glittering new atrium lined in white perforated-metal panels. The bright, four-story volume, which includes two below-grade levels, brings daylight deep into the floor plate, where breakout study and meeting spaces are tucked under wood ceilings broken up by linear light troughs that rival any cutting-edge office interior. The former television studio itself was reconfigured as a 140-seat auditorium with a white faceted ceiling. Location may have been a driver, but Studios' redesign of the interior will prepare future titans of industry for any high-end office environment.

PHOTO BY BRUCE DAMONTE

The Strand, American Conservatory Theater
San Francisco
Skidmore, Owings & Merrill

Long before San Francisco's Mid-Market neighborhood was given its current development-happy sobriquet to lure high-tech companies, the Strand Theater was a fixture there. The building played host, for most of the last century, to various sorts of entertainment. It opened as a silent-movie house, became an anchor of the city's Cinema Row in the 1950s (replete with a Las Vegas–style marquee), and ended its run as a venue for adult films before being raided by the city in the early aughts and falling into disuse. But throughout the building's dramatic career, its infrastructure remained intact, and in 2015, an enlightened renovation by Skidmore, Owings & Merrill (SOM) welcomed audiences of a different type: those seeking out live theater.

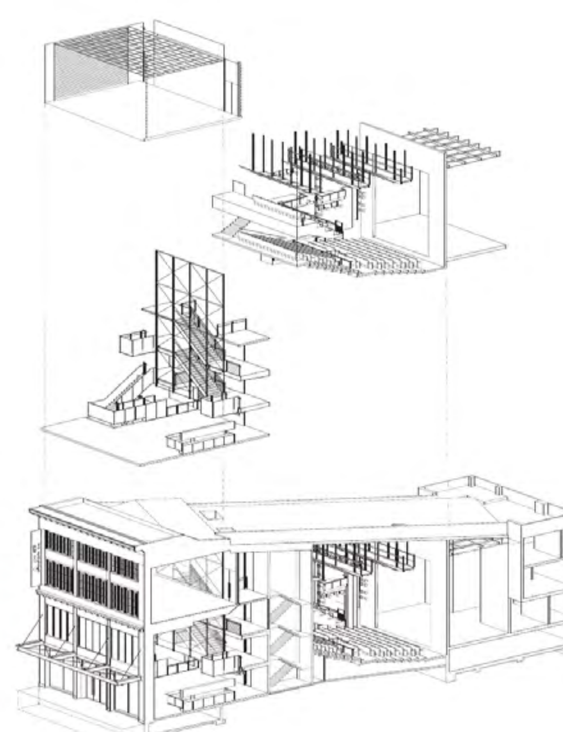
As the new home of the American Conservatory Theater, the Strand has been restored with a vivid red street façade; inside, wherever possible, signs of the old building remain, including traces of the old floor plates left exposed on the refinished walls, and the outline of the original grand onyx staircase on the lobby floor. A two-story LED screen in the lobby recalls the building's cinematic past, and letters from the old marquee were salvaged and hung above the lobby café.

A new 285-seat live theater venue has been inserted into the old plaster-walled auditorium, and new sound and lighting systems were installed to highlight the action on the proscenium stage. (A second, 120-seat black-box theater sits atop the main one, along with an education space.) So while remnants of the past remain, SOM reworked them in contemporary ways; this was very much a renovation, not a slavish preservation. Nor should it have been: The new Strand reinvigorates San Francisco's live-theater scene and a stretch of Market Street that will serve as a hub for a whole new generation of thrill-seekers.

PHOTOS BY BRUCE DAMONTE


EXIT


A.C.T.
AMERICAN
CONSERVATORY
THEATER
THE TONI REMBE THEATER
THE RUEFF
THE OSHER LOBBY




ANY
TIME

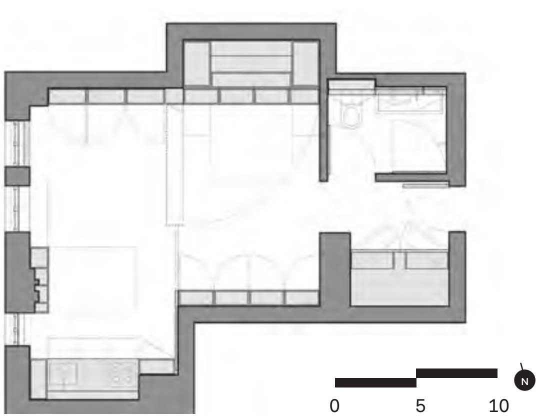

AMERICAN CONSERVATORY THEATER
STRAND
MONSTRESS
AH, WILDERNESS
DOLLAR
FOOD & BEVERAGES • PARTY SUPPLIES

Pivot Apartment
New York
Architecture Workshop

The size of the average single-family home in the U.S. is on the rise again, post-recession, ticking upward to 2,678 feet in 2015. But homes in cities run smaller, and homes in New York City run smaller still—in fact, the smallest legal apartment there is a mere 400 square feet. The Pivot Apartment is located in a coveted prewar building, but it squeaks by at that minimum size. To make the most of their not-so-big space, the owners brought in Brooklyn-based Architecture Workshop. Now the apartment can be reconfigured for any number of uses, smartly making a little space do a lot of work. The main agent of this change? A movable wall that swings open from a hinged point to reveal hidden functionality. The wall contains drawers, cabinets, and closets, providing all the storage the owners could need without the square-footage-eating addition of extra furniture. It even conceals a bespoke Murphy bed.

Light-colored finishes and recessed lighting make the space seem larger than its diminutive footprint, and Architecture Workshop's sensible and inventive additions enable the small space to be as versatile as any multiroom abode. Planning to host a dinner party for 10? Close the wall, raise the drop leaves on the dining table, and the room becomes a spacious entertaining space. Craving some privacy? Open the wall, pull out a sliding pocket door from across the way, and the room splits into a living room and a bedroom. Want to wake up to morning light in the inboard bedroom? There's even a hack for that: Shutters behind a recessed shelf in the pivoting wall open to admit light from the living area windows. The architects say they took their inspiration from a Swiss Army knife, but whatever the source, Architecture Workshop demonstrates with Pivot that creative design can provide the proper setting (or tool, for that matter) for any occasion.

PHOTOS BY ROBERT GARNEAU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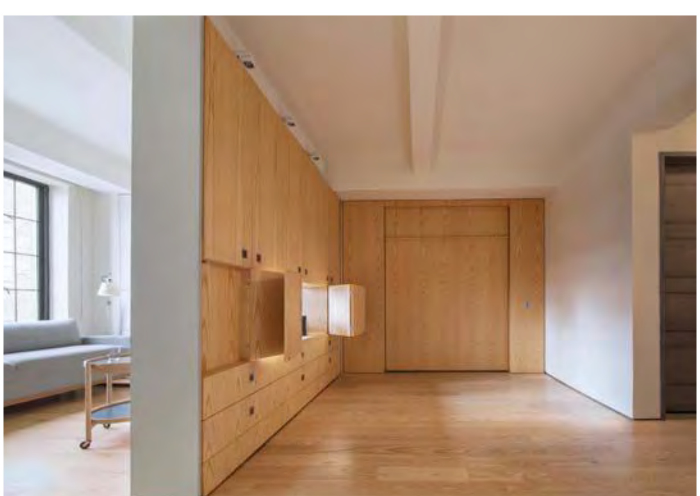

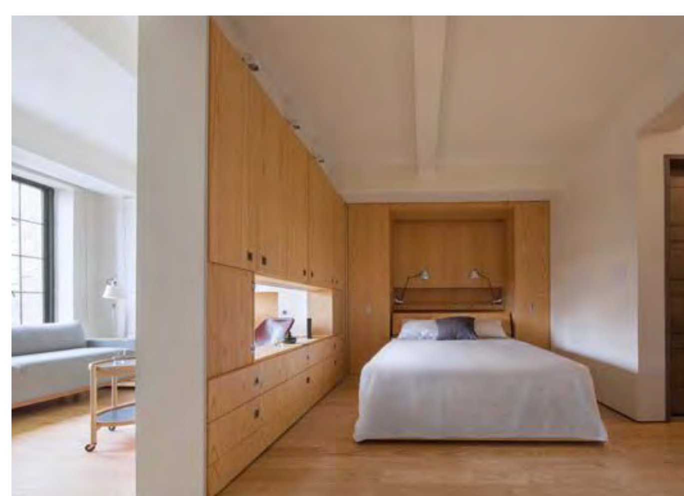

Milton Academy Pritzker Science Center
Milton, Mass.
William Rawn Associates, Architects

Milton Academy's history as a premier college preparatory school dates back to 1798, making it older than the battery, the electric light bulb, and the state of Ohio; in fact, the school predates all but 16 U.S. states. But part of celebrating and fostering such a rich history is knowing when to embrace change, whether it's adopting a new motto, changing curricula, or hiring William Rawn, FAIA's Boston-based firm to update your aging science facilities.

For years, the labs on this bucolic campus had been relegated to windowless, bunker-like buildings on the periphery. Hiring Rawn to design a new freestanding structure in the middle of campus meant embracing the firm's well-established expertise in creating spaces that knit a well-appointed connective fabric between surrounding historic and contemporary structures. To check the firm's bona fides, the school needed to look no further than such celebrated projects as the Cambridge Public Library or the Berklee College of Music, in nearby downtown Boston.

At Milton, Rawn created an antidote to the bunker-like lab facilities: a three-story curtainwall that admits daylight and glass-walled classrooms along curving walkways that promote views between discipline areas and encourage collaboration. An added benefit is that the building itself serves as laboratory, with a dashboard that displays real-time energy and water use, as well as educational information on other sustainable features, including bioswales, a green roof, and solar panels. The new building improves classroom and learning conditions and brings new life to an institution that understands celebrating a long legacy means staying ahead of the curve.

PHOTOS BY ROBERT BENSON


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EXIT
EXIT


PRITZKER SCIENCE CENTER

Project Credits

Twenty-Five Year Award

Monterey Bay Aquarium, page 214
Project: Monterey Bay Aquarium, Monterey, Calif.
Architect: EHDD, San Francisco
Acoustic Consultant: Charles M. Salter Associates
Construction Manager: Rudolph and Sletten
Civil/Geotechnical/Structural/Life Support Systems Engineer: Rutherford + Chekene
M/E/P Engineer: Syska Hennessy Group
Exhibit Design: MBA Exhibit Design
Project Management: Rhodes/Dahl
Size: 205,669 square feet (original project)
Cost: $55 million (1984 dollars)

Institute Honor Awards: Architecture

Case Inlet Retreat, page 234
Project: Case Inlet Retreat, Lakebay, Wash.
Client: Harry and Claudia Bray
Architect: MW|Works Architecture+Design, Seattle · Eric Walter, Steve Mongillo, AIA (principals); Suzanne Stefan
Structural Engineer: PCS Structural Solutions
General Contractor: Alford Homes
Size: 2,600 square feet
Cost: Withheld

CHS Field, page 238
Project: CHS Field, St. Paul, Minn.
Client/Owner: City of St. Paul; St. Paul Saints
Design Architect/Interior Designer: Snow Kreilich Architects, Minneapolis · Julie Snow, FAIA, Matthew Kreilich, AIA (design principals); Andrew Dull, Assoc. AIA (project lead designer); Tyson McElvain, AIA (project architect/project manager); Cameron Bence, Assoc. AIA, Michael Heller, Assoc. AIA, Kai Salmela, Matt Rain, Jim Larson, AIA (project team)
Architect of Record/Civil Engineer/ Landscape Architect of Record: Ryan A+E, Minneapolis · Mike Ryan, AIA (principal-in-charge); Logan Gerken, AIA (project lead designer, project manager); Eric Morin, AIA (project architect); Ayman Arafa, AIA, Sebastian Marquez, Tony Solberg, AIA (project team)
Sports Architect: AECOM, Kansas City, Mo. · Jon Niemuth, AIA (director of AECOM Sports, Americas); Dan Sullivan, AIA (project manager); Eric Johnston (project architect); Joshua Klooster, Jason Dalton (designers)
Mechanical Engineer: Schadegg Mechanical
Structural Engineer: Ericksen Roed & Associates
Electrical Engineer: Hunt Electric
Stormwater Design/Engineering: Solution Blue
Energy Modeling: The Weidt Group
Construction Manager/General Contractor: Ryan Cos.
Design Landscape Architect: Bob Close Studio
Lighting Designer: Henderson Engineers
Size: 347,000 square feet (total), 63,414 square feet (enclosed)
Cost: $63 million

Asia Society Center, page 240
Project: Asia Society Hong Kong Center, Hong Kong
Owner: Asia Society Hong Kong
Design Architect: Tod Williams Billie Tsien Architects | Partners, New York · Tod Williams, FAIA, Billie Tsien, AIA (principals); William Vincent, Robin Blodgett, Johnny Cho, David Later, Aurelie Paradiso, Miriam Petersen, John Skiller, Elisa Testa, Jennifer Turner (project team)
Owner's Rep: Patrick Chung & Associates
Associate Architect (Core and Shell): AGC Design, Hong Kong
Associate Architect (Interiors): Associated Architects, Hong Kong
Structural Engineers: Severud Associates; Arup
Mechanical Engineers: Altieri Sebor Wieber; J. Roger Preston Co.
Civil/Geotechnical Engineer: Arup
Restoration/Preservation Consultant: Architectural Resources Group; Ivan C.C. Ho
Landscape Consultant: ADI Limited
Theater Consultant: Fisher Dachs Associates
Lighting Consultant: Arup
Curtainwall Consultant: Axis Group Limited
Water Feature Consultant: Dan Euser Waterarchitecture
Stone Consultant: Walker Zanger
Acoustical: Acoustic Dimensions
Specifications: Construction Specifications
Estimator: Langdon & Seah
General Contractor (Core & Shell): Hip Hing Construction Co.
General Contractor (Interiors): Yearfull Contracting
Size: 65,000 gross square feet
Cost: Withheld

Mariposa Land Port of Entry, page 248
Project: Mariposa Land Port of Entry, Nogales, Ariz.
Client: U.S. General Services Administration
Architect: Jones Studio, Phoenix · Neal Jones, AIA (principal-in-charge); Eddie Jones, AIA (principal designer); Brian Farling (lead designer); Jacob Benyi (project director); Melissa Farling, FAIA, Maria Salenger, AIA, Joanna Noonan, Rob Viergutz, Bill Osborne, J. Barry Moffitt, AIA, Tom Conner, Kevin Jones, Brian Lee, Ashley Kenneally, Brett Marinoff, Nick Nevels, David Takeuchi, Amit Upadhye, Eric Weber (project team)
Civil/Transportation/Security Engineering and Surveying: Stantec
Mechanical Engineer: Associated Mechanical Engineers
Structural Engineer: Bakkum Noelke Consulting Structural Engineers
Electrical Engineer/Lighting Design: Woodward Engineering
Geotechnical Engineer: Western Technologies
Construction Manager: Vanir Construction Management (phase 1); Heery International (phase 2-4b)
General Contractor: Hensel Phelps
Landscape Architect: Chris Winters & Associates; ARC Studios
Wayfinding: Stantec; Jones Studio
LEED Consultant: Green Ideas
Fire Protection: EJ Engineering Group; Stantec
Artists: Matthew Moore ("Passage"); Kimsooja ("An Album: Sewing into Borderlines")
Size: 115,722 square feet (building); 130,840 square feet (canopy)
Cost: $187 million

U.S. Land Port of Entry, page 250
Project: U.S. Land Port of Entry, Van Buren, Maine
Client: U.S. General Services Administration
Design Architect (Design Team): Snow Kreilich Architects, Minneapolis · Julie Snow, FAIA (principal-in-charge/project lead designer); Matthew Kreilich, AIA (project lead designer); Tyson McElvain, AIA (project manager); Mary Springer, AIA (project architect); Pauv Thouk, AIA, Mike Heller, Assoc. AIA, Ryan O'Malley, Tamara Wibowo, Dan Winden, Kai Haller (project team)
Energy Modeling and Mechanical/Electrical Engineer (Design Team): Sebesta Blomberg
Structural Engineer (Design Team): Meyer Borgman Johnson
Civil Engineer (Design Team): Jacobs Engineering Group
Landscape Architect (Design Team): Coen


You're not dreaming.
It's just your imagination...
made into reality.
University of Tampa's Thomas Expansion - Tampa, FL
Architects: BECK Architecture/Kreher Architects Incorporated
Contractors: Hanlon Acoustical (Ceilings) / ISEC Tampa (Walls)
Products: Aluratone - Acoustical Wood Veneered Panels
Curvalon - Custom Shaped Wood Veneered Panels
Flat Wood Veneered Panels
All products made in the U.S.A. • We export!
Manufacturing the finest suspended wood
ceilings, acoustical wood wall systems,
engineered canopy ceiling systems
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+ Partners
Architect of Record (Design/Build Team): Robert Siegel Architects, Katonah, N.Y. · Robert Siegel, AIA (principal-in-charge); Brad Burns, AIA (project architect); Mark Blumberg, Caren Faye, Julien Leysenne, Eduardo Ramos, Scott Schwarzwalder, Wayne Walker (project team)
Energy Modeling (Design/Build Team): Steven Winter Associates (LEED Consultant)
Structural Engineer (Design/Build Team): Anastos Engineering Associates
Civil/Mechanical/Electrical Engineering (Design/Build Team): Arup
Construction Manager (Design/Build Team): J&J Contractors
Landscape Architect (Design/Build Team): Sasaki Associates
Size: 46,000 square feet
Cost: $33 million

Perot Museum of Nature and Science, page 252

Project: Perot Museum of Nature and Science, Dallas, Texas
Client: Hillwood Development (owner's representative)
Architect: Morphosis Architects, Culver City, Calif. · Thom Mayne, FAIA (design director); Kim Groves (project principal); Brandon Welling (project manager); Arne Emerson (project architect); Aleksander Tamm-Seitz (project designer); Natalia Traverso Caruana, Paul Choi, Kerenza Harris, Sal Hidalgo, Andrea Manning, Aaron Ragan, Scott Severson, Martin Summers, Jennifer Workman (project team); Katsuya Arai, Jesus Banuelos, Andrew Batay-Csorba, Marco Becucci, Chris Bennett, Anne Marie Burke, Amaranta Campos, John Carpenter, Min-Cheng Chang, Emily Cheng, Kyle Coburn, Jon Cummings, Laura Decurgez, Yusef Dennis, Alex Deutschman, Chris Eskew, Alex Fritz, Andrew Gaudette, Mauricio Gomez, Brock Hinze, Yasushi Ishida, Jai Kumaran, Edmund Ming Yip Kwong, Matt Lake, Jeremy Magner, Hugo Martinez, John McAllister, Jason Minor, Borja Muguiro, Sophia Passberger, Anna Protasevich, Kateryna Rogynskya, Scott Smith, Satoru Sugihara, Ben Toam, Elizabeth Wendell, Michelle Young (project assistants); Josh Sprinkling (visualization)
Associate Architect: GFF
Structural Engineer: Datum Engineers
Consulting Structural Engineer: John A. Martin & Associates
M/E/P Engineer: Buro Happold
Civil Engineer: URS Corp.
Landscape Architecture/Site Sustainability: Talley Associates
Sustainability Consultant: GFF
Cost Estimator: Davis Langdon
Façade Consultant: JA Weir Associates
Geotechnical Engineer: Terracon
Lighting Designer: Office for Visual Interaction
Acoustics Consultant: Jaffe Holden
Audiovisual/IT Consultant: WJHW
Code Consultant: Jim W Sealy Architects
Specifications Consultant: Inspec
Vertical Transportation Consultant: Barbre Consulting
Technology and BIM Consultant: Synthesis
Waterproofing Consultant: Apollo BBC
Accessibility Consultant: Access By Design
Security Consultant: Jaffe Holden
Architectural Visualization Consultant: Kilograph
General Contractor: Balfour Beatty Construction
Size: 180,000 square feet
Cost: Withheld

St. Patrick's Cathedral, page 256

Project: St. Patrick's Cathedral, New York
Client/Owner: Trustees of Saint Patrick's Cathedral
Owner's Representative: Zubatkin Owner Representation
Architect: Murphy Burnham & Buttrick Architects, New York · Jeffrey Murphy, FAIA (partner-in-charge); Harold Buttrick, FAIA, Mary Burnham, AIA (partners); Rolando Kraeher, AIA (project manager); Dawid Pol, AIA (architect); Sarah Rosenblatt, Megan Rispoli (preservation architects)
Construction Manager: Structure Tone
Restoration Consultant: Building Conservation Associates
M/E/P Consultant: Landmark Facilities Group
Structural Engineer: Silman Associates
Stained Glass Preservationist: Jean Phifer, FAIA
Stained Glass and Window Restoration: Botti Studio of Architectural Arts
Door Restoration Consultant: Mary Kay Judy
Code Consultant: William Dailey
Landscape Architecture: Robin Key Landscape Architecture
Lighting Consultant: Fisher Marantz Stone
Elevator Consultant: Van Deusen & Associates
Cost Consultant: Christopher Slocum
Security Consultant: Ducibella Venter & Santore
M/E/P Acoustics: Cerami & Associates
AV Consultants: Jaffe Holden; Abel Cine Tech
Geotechnical Engineer & Surveyors: Langan Engineering; GB Geotechnics USA
Stained Glass Consultants: Drew Anderson; Keith Barley
M/E/P Commissioning: Aramark
Fire Prevention Consultant: Arup Fire Northeast Energy Services
Construction Specifications: Aaron Pine
Glass Consultants: Eckersley O'Callaghan; Heintges
Geothermal Consultant: PW Grosser Consulting
Size: 140,000 square feet
Cost: $177 million

WMS Boathouse at Clark Park, page 258

Project: WMS Boathouse at Clark Park, Chicago
Client/Owner: Chicago Park District
Architect: Studio Gang Architects, Chicago · Jeanne Gang, FAIA, Mark Schendel, AIA (partners); William Emmick, AIA (project architect); John Castro, Juan de la Mora, Jay Hoffman, Wei-Ju Lai, Angela Peckham, Christopher Vant Hoff, Michan Walker, Todd Zima (team members)
M/E/P Engineer/Lighting Designer: dbHMS
Structural Engineer: Matrix Engineering Group
Civil Engineer: Spaceco
Riverfront Civil Engineer: AECOM
General Contractor: Schaefges Brothers
Landscape Architect: Terry Guen Design Associates
Roofing Contractor: M Cannon Roofing
Slate and Zinc Contractor: Mortenson Roofing Co.
Plywood Contractor: Wendell Builders
Size: 22,620 square feet
Cost: $8.8 million

Henderson-Hopkins School, page 264

Project: Henderson-Hopkins School, Baltimore
Client: East Baltimore Community School (owner); East Baltimore Development; Johns Hopkins University School of Education
Architect: Rogers Partners, New York · Robert M. Rogers, FAIA (partner/principal-in-charge); Vincent Lee (associate partner/design leader); Timothy Fryatt (associate/project architect for construction administration); Kip Katich (project architect)
Structural Engineer: Faisant Associates
M/E/P+FP Engineer: Global Engineering Solutions
Geotechnical Engineer: Eba Engineering
Civil Engineer: Phoenix Engineering
Landscape: Floura Teeter Landscape Architects
Lighting Designer: Flux Studio
Acoustical Consultant: Spexsys
Sustainability Consultant: Terra Logos: Eco Architecture
Food Service Consultant: Cini-Little International
Theater Consultant: Fisher Dachs Associates
Graphics: Salestrom Design
Furniture: Gensler
General Contractor: The Whiting-Turner Contracting Co.
Size: 125,000 gross square feet (buildings); 156,000 gross square feet (outside spaces)
Cost: $53 million (total); $42 million (construction)

Pterodactyl, page 270

Project: Pterodactyl, Culver City, Calif.
Client: Frederick and Laurie Samitaur Smith

Architect: Eric Owen Moss Architects, Culver City, Calif. · Eric Owen Moss, FAIA (principal); Dolan Daggett, Raul Garcia, Zarmine Nigohos, Kyoung Kim, Vanessa Jauregui, Karen Shueh, Scott Nkao, John Bencher, Eugene Glekel, Yi-Hsiu Yeh, Corinna Gebert, Holly Deichmann (project team)
Mechanical Engineer: Fruchtman & Associates
Structural Engineer: Nast Enterprises
Electrical Engineer: Silver, Roth & Associates
General Contractor: Samitaur Constructs
Furniture/Accessories: Gensler
Size: 16,663 gross square feet
Cost: Withheld

American Enterprise Group, page 272
Project: American Enterprise Group, Des Moines, Iowa
Client/Owner: American Enterprise Group
Architect/Interior Designer/Sustainability: BNIM, Des Moines, Iowa · Rod Kruse, FAIA, Kevin Nordmeyer, AIA (principals); Carey Nagle, AIA (associate principal); Paul Kempton, AIA, Levi Robb, ASSOC. AIA, Kayla Ohrt, ASSOC. AIA, Dana Sorensen, ASSOC. AIA, Jeff Shaffer, ASSOC. AIA, Lana Zoet, ASSOC. AIA, Phil Bona, AIA
Mechanical Engineer/Electrical Engineer/ Lighting Designer: Design Engineers
Structural Engineer: Charles Saul Engineering
Civil Engineer: Snyder & Associates
General Contractor: Ryan Cos.
Owner Representative/Historic Preservation: Christensen Development
Architectural Historian: Jennifer James Communication
Code Consultant: FP+C Consultants
Building Energy Consultant: The Weidt Group
Acoustical and A/V Consultant: The Sextant Group
Electrical Contractor: Baker Electric
M/E/P Contractor: Baker Group
Commissioning Consultant: SystemWorks
Historic Concrete Restoration Consultant: Structural Engineering Associates
Furniture Vendor: Saxton
Fire Protection: Viking Automatic Sprinkler Co.
Elevator Vendor: Schindler Elevator
Kitchen Consultant: Boelter Cos.
Construction Photographer: Multivista Systems
Size: 153,400 gross square feet
Cost: Withheld

Institute Honor Awards: Regional and Urban Design

Smithsonian Institution South Campus Master Plan, page 282
Project: Smithsonian Institution South Campus Master Plan, Washington D.C.
Client/Owner: Smithsonian Institution
Architect: Bjarke Ingels Group (BIG), New York · Bjarke Ingels (founding partner/ partner-in-charge); Thomas Christoffersen, Kai-Uwe Bergmann, AIA (partners/ partners-in-charge); Aran Coakley, AIA (senior architect/project manager); Sean Franklin (designer/project leader); Daniel Kidd (associate/architect/project architect); Aaron Hales, Alana Goldweit, Alexandre Hamlyn, Annette Miller, Cadence Bayley, Choongyho Lee, Chris Falla, Daisy Zhong, Daniele Pronesti, Doug Stechschulte, Gabriel Hernandez Solano, Janice Rim, Jennifer Shen, Jeremy Alain Siegel, Julian Andres Ocampo Salazar, Lina Bondarenko, Ola Hariri, Otilia Pupezeanu, Suemin Jeon, Tammy Teng, Wells Barber, Wesley Chiang, Ziad Shehab, AIA (project team)
Materials Management: Kleinfelder
Mechanical/Electrical Engineer: GHT Ltd.
Structural Engineer: Silman Associates
Civil Engineer: Wiles Mensch Corp.
Geotechnical Engineer: Atelier Ten (sustainability)
Landscape Architect: Surfacedesign
Historic Preservation: EHT Traceries
NEPA Compliance: Stantec
Food Services: FDS Design Studio
Fire/Life Safety: GHD
Cost Estimation: VJ Associates
Size: 1.16 million square feet
Cost: Withheld

Fayetteville 2030: Food City Scenario, page 286
Project: Fayetteville 2030: Food City Scenario, Fayetteville, Ark.
Client: City of Fayetteville—Matthew Petty (alderman and community organizer)
Architect: University of Arkansas Community Design Center (UACDC), Fayetteville, Ark. · Stephen Luoni, ASSOC. AIA (director); Jeffrey Huber, AIA (assistant director); Cory Amos, Meredith Hendricks, David Jimenez, Allison Lee Thurmond Quinlan, AIA, Matt S. Hoffman, ASSOC. AIA, Tanzil Idmam Shafique, ASSOC. AIA (project designers); Linda Komlos (administrative analyst)
UACDC Students: Jonathan Elmore, Jacob Larison, Kimberly Murray, Ryne Pruitt, Richard Adam Stowe, Patrick Templelton, Leniqueca Welcome, Geronimo Debeza-Rodriquez, Jacob Drew Short, Timothy Patterson, Rachel Raben, Sarah Evans Jones, Paul Mosley
University of Arkansas Department of Biological and Agricultural Engineering (BAEG) and Office for Sustainability: Marty Matlock (executive director)
BAEG Students: Nick Stoddart, Ben Putman, Lori Silva, Aaron Thomason, Barb Lombardi, John Beyers, Katie Whitbeck, Paige Heller, Jaime Gile, Nick Lombardo, Mike Crouse
University of Arkansas Dale Bumpers College of Agricultural, Food and Life Sciences: Ruben Morawicki
University of Arkansas School of Law and Masters of Law Program in Agricultural and Food Law: Susan Schneider
Size: 35,000 acres
Cost: Withheld

Institute Honor Awards: Interior Architecture

Windhover Contemplative Center, page 292
Project: Windhover Contemplative Center, Stanford, Calif.
Client/Owner: Stanford University
Architect/Interior Designer: Aidlin Darling Design, San Francisco · Joshua Aidlin (principal-in-charge); David Darling, AIA (principal); Roslyn Cole, AIA (project manager); Kent Chiang, AIA (project architect); Melinda Turner, Michael Pierry, Jeff LaBoskey (project team)
Mechanical Engineer: Air Systems
Structural/Geotechnical Engineer: Rutherford + Chekene
Electrical Engineer: Elcor Electric
Civil Engineer: BKF Engineers
General Contractor: SC Builders
Landscape Architect: Andrea Cochran Landscape Architecture
Lighting Designer: Auerbach Glasow French
Acoustical: Charles M. Salter Associates
Size: 4,000 square feet
Cost: Withheld

Georgetown University School of Continuing Studies, page 298
Project: Georgetown University School of Continuing Studies, Washington, D.C.
Client/Owner: Georgetown University (interior)/Brookfield Office Properties (core & shell)
Architect/Interior Designer: Studios Architecture, Washington, D.C. · Todd DeGarmo, FAIA, Brian Pilot, AIA, Erin Carlisle, AIA, Michael Doyle, Emily Schneider, Ben Kracke, AIA, Hiroshi Jacobs, AIA, Lee Sewell, Maria Pacheco, Melissa Funkey
Mechanical/Electrical Engineer: GHT; Girard Engineering
Structural Engineer: Thornton Tomasetti
Civil Engineer: Wiles Mensch Corp.
Construction Manager/General Contractor: Davis Construction
Landscape Architect: Lee and Associates

Lighting Designer: MCLA Architectural Lighting Design
Graphics: Design 360
Cost Consultant: TBD Consultants
Acoustic/Security/IT: Shen Milsom & Wilke
Woodwork Contractor: CW Keller & Associates
Size: 100,000 square feet
Cost: Withheld

The Strand, American Conservatory Theater, page 300

Project: The Strand, American Conservatory Theater, San Francisco
Client/Owner: American Conservatory Theater
Architect/Structural Engineer/ Environmental Graphics/Interior Architect: Skidmore, Owings & Merrill, San Francisco · Michael Duncan, FAIA (design director); Gene Schnair, FAIA (managing partner); Mark Sarkisian (structural and seismic engineering partner); Maurice Hamilton, (senior technical designer); Gayle Tsern Strang, AIA (project manager); Neville Mathias (senior structural engineer); Aaron Jensen, AIA (senior design architect); Lonny Israel (graphic design studio lead)
General Contractor: Plant Construction Co.
Development/Project Manager and Financing Consultant: Equity Community Builders
Historic Certification/Preservation: Page & Turnbull
Theater Consultation: The Shalleck Collaborative
Lighting Design: PritchardPeck Lighting
Acoustics, Security, Telecom: Charles M. Salter Associates
Civil Engineering: BKF Engineers
M/E/P Design, Code Analysis, Life/Fire Safety: WSP | Parsons Brinckerhoff
Mechanical Design Build Engineers: Anderson Rowe & Buckley
Electrical Design/Build Engineers: Decker Electric Co.
Plumbing: Pribuss Engineering
LEED: Rick Unvarsky Consulting Services
Size: 20,000 square feet
Cost: $16 million

Pivot Apartment, page 306

Project: Pivot Apartment, New York
Client/Owner: Paul and Billie Andersson
Architect: Architecture Workshop, New York · Robert Garneau (partner)
General Contractor: Alb-Bros Construction Corp.
Size: 400 square feet
Cost: $250,000

Milton Academy Pritzker Science Center, page 310

Project: Pritzker Science Center, Milton, Mass.
Client/Owner: Milton Academy
Architect: William Rawn Associates, Architects, Boston · William L. Rawn, FAIA, Douglas C. Johnston, FAIA (principals for design); Samuel M. Lasky, AIA (associate principal for design); Andrew Jonic, AIA (project architect); Mark Scott, AIA
Interior Designer: Lab [3.2]
Structural Engineer: LeMessurier
Civil/M/E/P/FP Engineer: Rist-Frost-Shumway Engineering
Geotechnical Engineer: McPhail Associates
Landscape Consultant: Stephen Stimson Associates
Lighting Consultant: Horton Lees Brogden Lighting Design
Acoustical Consultant: Acentech
Code Consultant: R.W. Sullivan Engineering
Cost Estimator: Faithful+Gould
Exterior Envelope Consultant: Simpson Gumpertz & Heger
General Contractor: Shawmut Design and Construction
Size: 40,000 gross square feet
Cost: Withheld

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Editorial: Introducing the Studio Prize

Millennials have held our attention for so long that it might seem hard to look past them. Yet the cohort that follows, Generation Z, is poised to supplant Millennials in numbers and, quite possibly, in influence. Gen Z now accounts for about a quarter of the total U.S. population, and the oldest turn 21 this year. These kids—who increasingly *aren't* kids—have already started college. Soon, they'll be entering graduate architecture programs and internships, as bona fide contributors to the discipline.

So what can we expect of Gen Z? Answering that question is one motivation for ARCHITECT's new award program, the Studio Prize, which celebrates excellence in studio curricula and in the student work that results. Think of it as a kind of crystal ball, offering glimpses of architecture's future.

Like the Millennials before them, there's no end of data or speculation about Gen Z. Market researchers are hungrily profiling the group, which by 2020 will account for 40 percent of consumers. The generational archetype has a super-short attention span (8 seconds, on average); worries about money (having grown up during the Great Recession); and rejects conventions of race, career, faith, sexuality, and gender (74 percent support equal rights for transgender people).

More to our point, the numbers indicate that they are entrepreneurial (72 percent want to start a business) and care about the environment (76 percent are concerned about humanity's impact on the planet). They habitually communicate with images (e.g., Instagram, Snapchat) and symbols (emoticons, emojis); they think in four dimensions (gaming, 360-degree video); and, of course, they are true digital natives, having never really known a world without social media, streaming media, and smartphones.

Given these characteristics, it's fascinating to imagine the kind of architecture Gen Z will create. The Studio Prize provides a platform for their ideas. Given that studio courses are collaborative, multigenerational efforts, the Studio Prize also is designed to recognize their professors and schools, to spread best practices from university to university, and to propel innovations from the academy into practice.

Here's how it will work: ARCHITECT invites faculty and administrators at NAAB-accredited programs to submit studio courses for judging. The entries must include the project brief, underlying research, and representative examples of student work. Once the jury has convened and made its decisions, ARCHITECT will feature the winners in the September 2016 issue, online, and in social media.

As an added incentive, the program's sponsor, Sloan, is generously making available $20,000 in prize money. The jury will bestow the money, at its discretion, to students whose work appears as part of the submissions for winning studio courses. There will be an additional $5,000 purse for the Studio Prize's Sloan Award, which recognizes those studios with a focus on sustainability and water conservation.

The inaugural Studio Prize jury comprises Jeanne Gang, FAIA, Jimenez Lai, and Bernard Tschumi, FAIA. The entry deadline is June 17, the registration fee $45. If you teach a studio, submit it at studioprize.com. If you don't teach, please help spread the word. The future will be here before we know it.

@NedCramer

STEPHEN VOSS

> For more information about the Studio Prize, and to enter, please visit studioprize.com.