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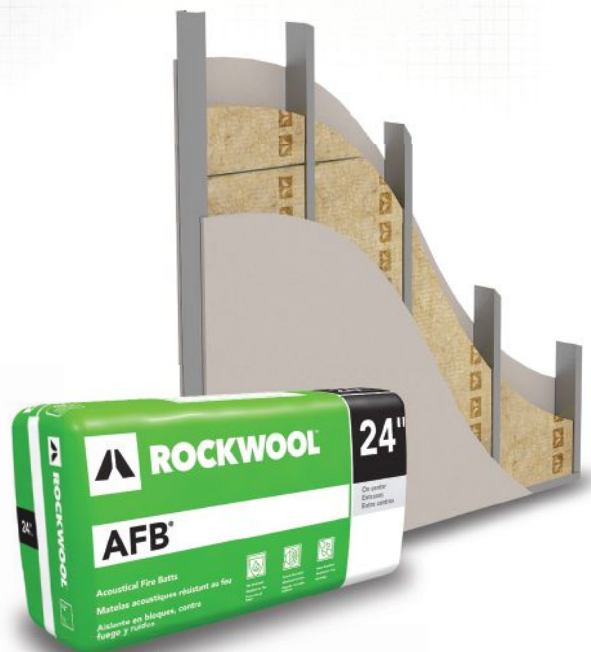
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Volume 111, number 06. September 2022.

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Below: Louisiana Children's Museum by Mithun; photo by Kevin Barraco, Smart Media.

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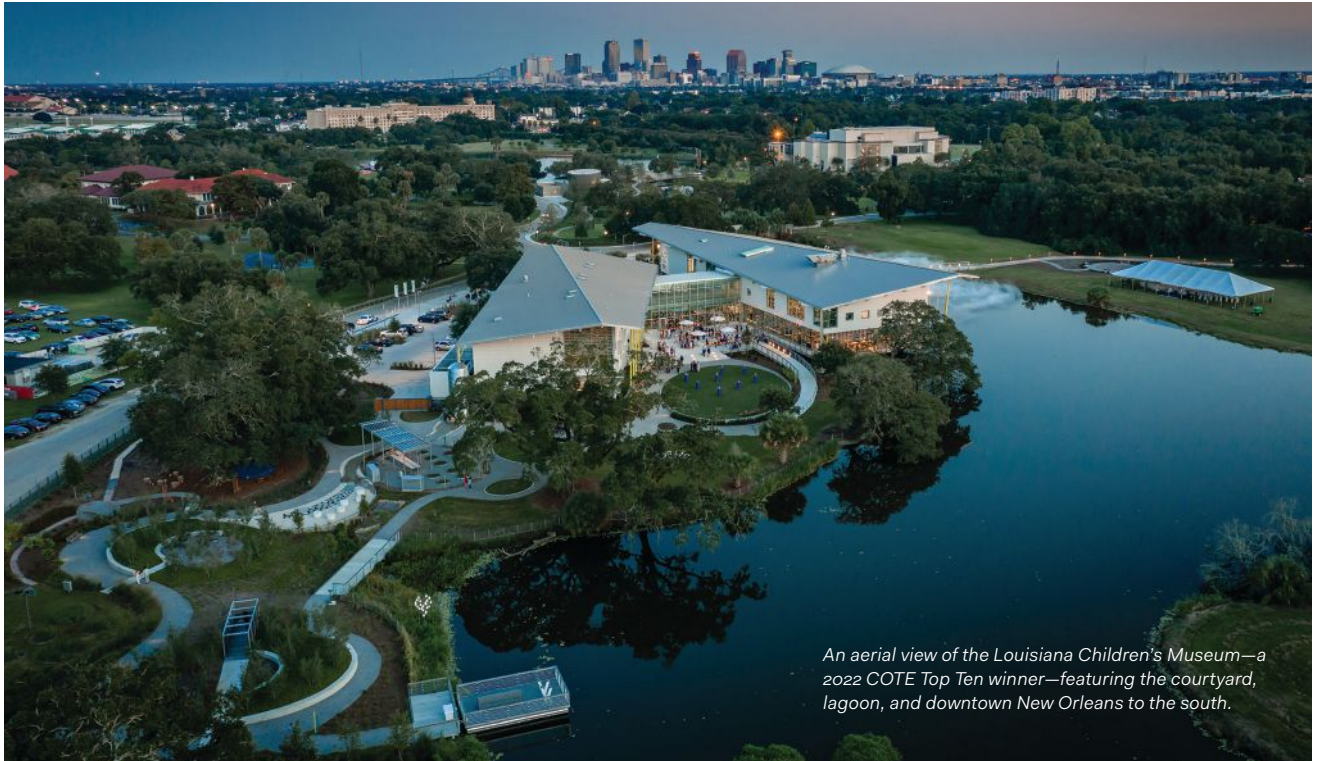
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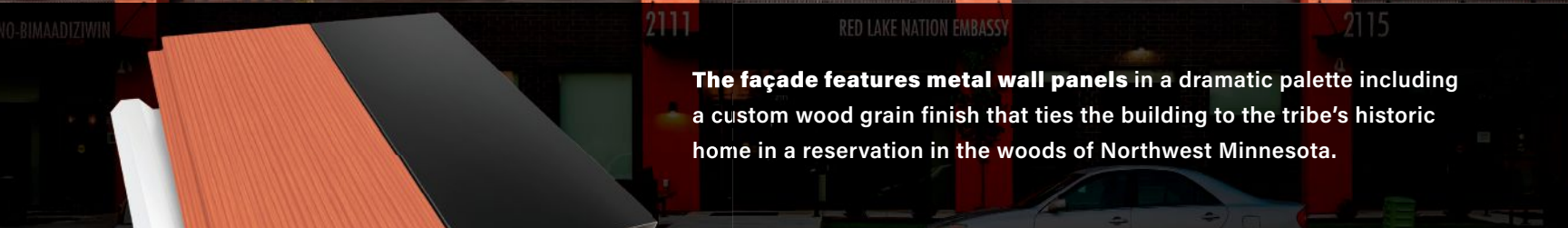
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An aerial view of the Louisiana Children's Museum—a 2022 COTE Top Ten winner—featuring the courtyard, lagoon, and downtown New Orleans to the south.

Strength, Beauty, Heritage



2111

RED LAKE NATION EMBASSY

2115

The façade features metal wall panels in a dramatic palette including a custom wood grain finish that ties the building to the tribe's historic home in a reservation in the woods of Northwest Minnesota.

Mino-Bimaadiziwin Apartments, Minneapolis Installing contractor: Progressive Building Systems
Architect: Cuningham Group Architecture GC: Loeffler Construction & Consulting Photo: alanblakely.com

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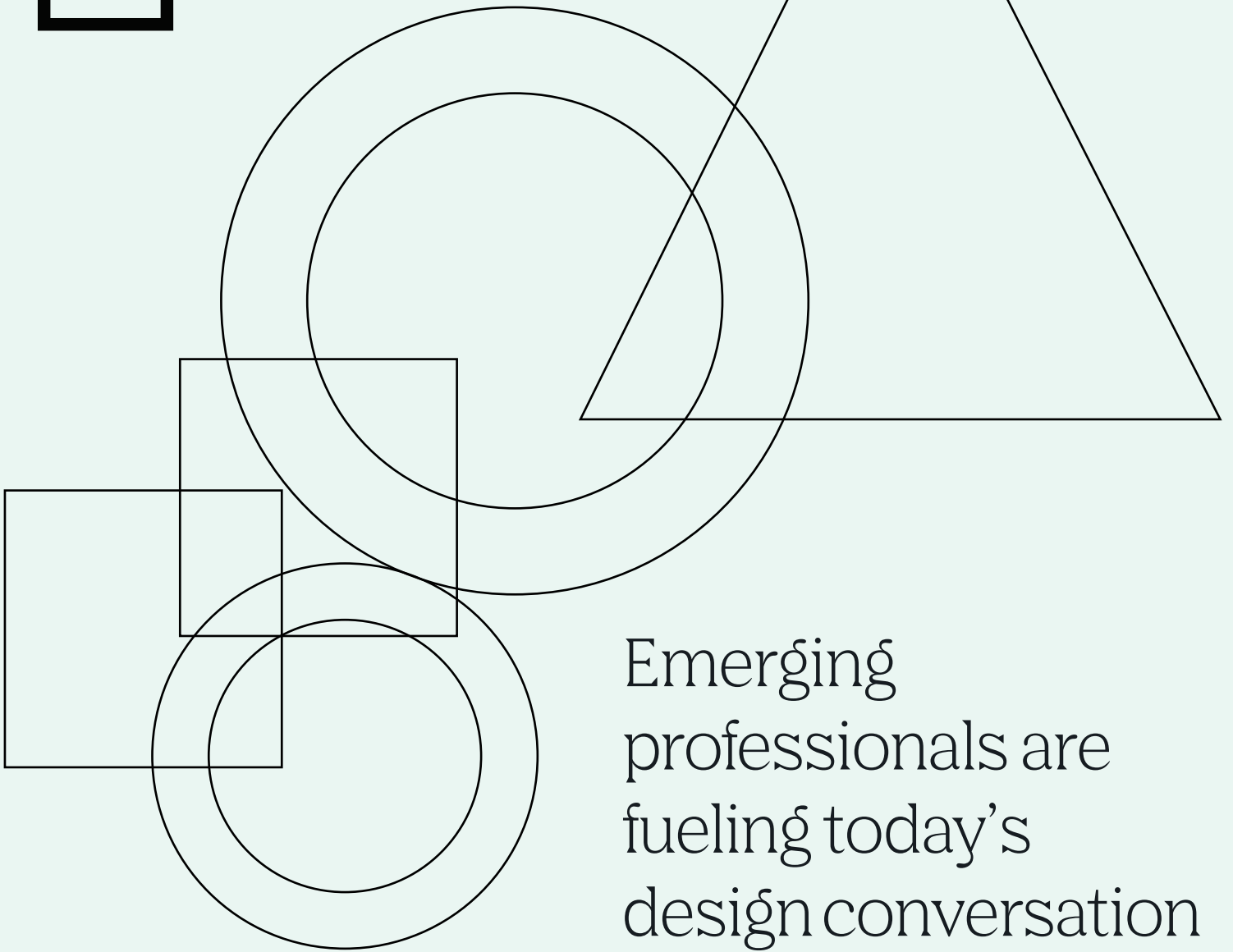
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Next Progressives: DAAM

EDITED BY ALEX V. CIPOLLE AND MADELEINE D'ANGELO



Firm leadership: Elyse Agnello, AIA, and Alex Shelly, AIA

Location: Chicago

Year founded: 2016

Education: *Agnello:* M.Arch, Harvard Graduate School of Design; P.G. Dip. with Distinction, The Architectural Association; B.S. in Architecture, University of Michigan. *Shelly:* M.Arch., Harvard Graduate School of Design; B.Arch., Lehigh University.

Experience: *Agnello:* Platform Manager; Guild Row; Adrian Smith + Gordon Gill Architecture; Crosstree Metal Fabrication; Kuth Ranieri Architects. *Shelly:* Kennedy & Violich Architecture; CJS Architects; L.R. Kimball; Mitchell Construction.

How founders met: GSD studio taught by Eric Höweler, FAIA.

Firm size: Two principals and one to three designers depending on project demands.

Firm mission: Our mission is all about an adaptive process. Each DAAM project is an adaptation—a fresh take on an existing concept, space, business model, or building—shaped by our intentionally iterative and dynamic design process that spans from idea all the way to physical reality. We aspire for each adaptation to have some tooth and be truly transformative—to valorize a neighborhood; breathe new life into an abandoned structure; create a new way of being together; or simply inspire a passerby.

First commission: Shell House renovation in Roxbury, N.Y.

Defining project: Guild Row in Chicago. It was our first project of medium scale and given our unique relationship [Agnello is a co-founder of Guild Row] to the client, we got to explore and test a lot of things in terms of process as well as aesthetics. It helped us define and evolve our thinking around adaption as a category of project akin to but different from adaptive reuse.

Another important project: LYTE Collective in Chicago. Both an adaptive reuse and a reinvention of transitional living programs for homeless youth, the project allowed us to think expansively with our client to develop the building's program and then subsequently

its unique organizational logic and atypical domestic spatial qualities.

What inspired you to start the firm? We both went to grad school with the intention of having our own practice someday. We both entered the GSD with a wide array of experience in the industry working at firms large and small as well as for construction and fabrication companies. We were a few years older than many of our peers. Our varied experience inspired us to dream up a practice where each project could be a hands-on prototype wherein we could challenge the way architecture comes to be. The practice itself aspires to become a critique of the “how” as much as the “what.”

How would you describe the personality of your practice? We roll with the motto: Work hard, do good, and be nice to people. We are very serious about quality design but try not to take ourselves too seriously in the process of making it.

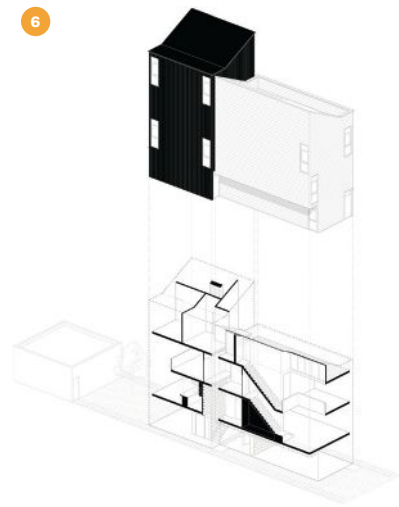
Design tool of choice: The section—most of our projects are adaptations of existing structures with incongruent conditions. We like to leverage those challenging moments to create signature design moments, be it texture transitions or unexpected spatial sequences à la Guild Row's entry fence and front stoop. Alex's favorite tools are his Moleskine sketchbook, 3D printer, and utility knife. Elyse would be lost without her tiny iPhone and 6-inch steel scale.

Next Progressives:
DAAM



1–2. Located in the Catskill Mountains in Roxbury, N.Y., the Shell House—now a private retreat and the site of the Shell House Arts artist residency program—is a remodeling of a 1996 structure by architect Seymour Rutkin with consultation from the Monolithic Dome Institute. For the project, DAAM worked with the structure's unique oblate ellipsoid geometry and created an open kitchen scheme that mirrors the dome's curving forms through sinuous island counter units and tile patterns. **3.** Currently under construction, the Triangle House in Chicago is an irregularly shaped addition that includes salvaged glass block and new brick perforations on the principal façade. **4.** The Rail Yard Lofts in Green Bay, Wis., transform a former warehouse into a multifamily project that DAAM describes as “pushed and pulled in both plan and section to allow for light and views to permeate the existing monolithic form of the warehouse.” **5–7.** Under development in Chicago, Starter Home is DAAM's ongoing investigation into models of affordable living. Drawing from the city's iconic two-flat apartments, the prototype offers two units—one three-level and one four in a front-back orientation—and is “shifted in both plan and section to provide direct access to the street and shared carport.” **8–10.** Guild Row in Chicago is an adaptive-reuse project transforming former manufacturing sites into a flexible campus for a local social club. DAAM's architectural interventions include a member lounge, teaching kitchen, courtyard, and more.







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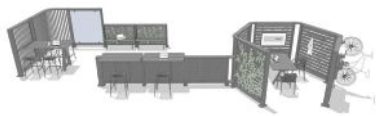


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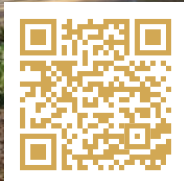
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THE SILVER BULLET OF RESILIENT CONSTRUCTION

Architect Leigh Overland knows what it takes to stand up to Mother Nature's worst.

Famed architectural scholar Vincent J. Scully once observed architecture is a “a continuing dialogue between the generations.”

If so, what message are we leaving the next generation? One of resilience and resolve? Or indifference to the mounting evidence of climate change?

There's no mistaking where Leigh Overland stands. The proof: His personal residence and a dozen more in various stages of design, development, and construction that exemplify sustainability in the Connecticut-New York metro area.

Leigh Overland, AIA, is an award-winning residential and light commercial architect dedicated to resilient design principles. His building concepts are a masterclass in environmental toughness, informed by a 40-plus year career. Today that sensibility is characterized by five basic homebuilding components:

1. Rooftop structural insulated (SIP) panels for extreme insulation without rafters
2. Interior metal-stud walls fabricated to exceed commercial grade standard
3. Factory-made floors with in-floor radiant heat and cooling
4. Triple-pane door and windows throughout

However, it's the fifth component that is the resilient heart of an Overland home.

RESILIENCE CHAMP

That centerpiece component is insulated concrete form (ICF), a cast-in-place exterior wall system that uses Lego-like steel-reinforced foam blocks to create envelopes of extreme resilience.

“If a prospective client asks about ICF, I explain why the system is impervious to fire, wind, water, rot, and pests. I've never had a client say, ‘No, I'd rather have a building that will catch on fire or blow away in a storm and costs a lot to heat and cool. ICF is a very easy sell,” Overland explains.

To top it off, ICF also costs less to build with.



MORE AFFORDABLE

“Several years ago, I'd say it penciled-out about the same as stick-built,” Overland says. “The savings were reflected in reduced energy costs, insurance premiums, maintenance, and such. Now it's about 5% less than stick-built. The system requires far fewer subcontractors to install. The entire home is framed in just several days.”

Other big discounts come from a substantially downsized HVAC system. ICF mass “acts like an R-44 wall,” Overland says.

As for design flexibility, the architect doesn't have any reservations about his ability to meet the owner's requirements and budget. His ICF portfolio is a testament to homestyle diversity. In fact, Overland's first ICF residential project was an homage to a Scottish castle.

SILVER BULLET?

With so much going for ICF—resilience, cost, and designability—it's fair to ask Overland why ICF isn't more broadly discussed as the silver bullet for resilient construction.

The award-winning designer likens the situation to the one faced by Henry Ford, who said, “If I had asked people what they wanted, they would have said faster horses.” In Overland's view, it's up to architects to step up and show clients resilient and sustainable alternatives to traditional homebuilding.

A CALL TO LEAD

The good news is that resolve comes with a prize. “ICF would differentiate the architect and builder as it now differentiates me. We want to deliver a better product. A lot of what I heard at the AIA convention in Chicago this summer stressed resilience. Yes, the seas are rising. Storms are worse.

“What are we leaving our children with? It really is a conversation between generations. It's time to design for the future.” ■

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CarbonPositive: Design Strategies That Work

TEXT BY EDWARD MAZRIA, FAIA

Between now and 2030, the global population is projected to grow by more than 500 million people. Just meeting the needs of this population increase will necessitate adding approximately 188 million housing units, 2.2 million primary schools, 2.7 million secondary schools, hospitals to accommodate 1.7 million beds, and associated facilities and infrastructure.

How we plan, design, construct, renovate, and repurpose the global built environment over the next decade to meet these needs may determine the fate and well-being of life on the planet. We must deliver an architecture and development pattern that mitigates carbon; supports adaptation; and ties to local conditions, human health, ecological restoration, and energy and water availability and security. This is the message we are taking to COP27 in Sharm El-Sheikh, Egypt, this fall.

Building Resiliency

Resilient strategies are used globally, many contemporary, others derived from vernacular architecture's strong relationship to climate and natural processes. Many of these techniques—some key ones follow—have been aggregated into a set of accessible guidelines at various scales that can be implemented immediately. More options are available through Architect 2030's open-access 2030 Palette database.

Urban infill and retrofit. Infill, repurposing, and redeveloping

areas and buildings within walking distance to transit and district centers reduces sprawl, infrastructure, and growth pressure on rural areas and open space.

Transit-oriented development.

Establishing TODs within $\frac{1}{4}$ to $\frac{1}{2}$ mile walking distance of transit with a mix of housing and commercial areas encourages walking and bicycling, while reducing infrastructure costs and emissions.

Habitat corridors. Mapped and protected habitat corridors preserve the ability of species to migrate successfully while enhancing the integrity of sensitive ecosystems.

Heat-island mitigation.

Increasing the solar reflectance, tree canopy, and vegetative cover in urban areas cools outdoor temperatures while reducing air pollution and energy consumption.

Water catchment and storage.

Catchment systems store rainwater and can provide a clean, free water source when treated and disinfected.

Cool roofs. In hot climates or seasons, a light-colored roof that reflects sunlight and emits heat efficiently will remain cooler and reduce heat transferred into a building.

Direct-gain passive heating.

In cold climates, equator-facing solar glazing coupled with adequate thermal mass will heat a space in winter over a 24-hour period.

Solar shading. During warm summer months, overhangs block direct sunlight from equator-facing

solar glazing, reducing indoor cooling loads.

Side daylighting. Exterior wall glazing provides interior task-daylighting levels at a depth of 1.5 to 2 times the height of the opening. Adding a light shelf can increase the daylight depth to 2.5 times the height of the opening.

Night-vent cooling. In dry climates with cool nighttime temperatures, use cool night air to flush heat from a space and cool interior walls and floors, keeping a space cool during the daytime.

Designing with wood.

Specify reclaimed wood or wood from well-managed forests that encourage protecting habitats and water quality; local harvesting; air-drying lumber; and not harvesting lumber from old-growth forests.

Designing with steel. Design for material efficiency to reduce the amount of steel. Specify steel from electric arc furnaces to reduce steel emissions, because EAFs use high levels of recycled material and can be powered by renewables.

We have the design and planning strategies to effectively address the climate crisis. We must accelerate their application to ensure a habitable planet.

Edward Mazria, FAIA, is founder and CEO of the nonprofit Architecture 2030 and an internationally recognized architect, author, researcher, and educator.





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Inside Out:

Nurturing Beauty and Community in Assisted Living

EDITED BY ARCHITECT STAFF

The Project:

The Sheridan at Severna Park, Severna Park, Md.

The Client:

Senior Lifestyle, an owner, operator, and developer of senior living communities in the United States, with Kaufman Jacobs, a real estate development and investment company.

Guiding principles for the project:

Taking inspiration from the community's roots as a stop along the Baltimore Annapolis Railroad, the design embraced regional heritage in a modern way. We approached the assisted living and memory-care community project with balance in mind—dynamic and serene, inspired and approachable. Each design decision prioritized comfort and safety, casual sophistication, and appeal to residents and their networks of families and friends.



Harken Interiors is a Chicago-based interior design studio with a focus on luxury senior living, hospitality, and mixed-use residential markets. Founded in 2015 by Jaclyn Moser and Chris Sommers, Harken Interiors derives its name from hearken, meaning to listen, and aims to uncover, develop, and deliver immersive client narratives through built space.

CLAIRE GRUBER



Create a Setting for Well-being

Socializing has been proven to be one of the leading ways seniors can strengthen their mental health and lean into other healthy behaviors like physical activity. In the Great Room, the game tables, multipurpose bar, connected terrace, and communal lounges provide diverse settings for connecting with fellow residents, friends, and family. The fresh backdrop encourages family to visit—it's comfortable, prideful, and positive. Easy sightlines to the adjacent library and semi-adjacent entertainment suite, activity room, and mailroom welcome residents into programming spaces for enhanced group experiences.



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Provide Invisible Assistance for Maintenance and Functionality

The Alta finish by Applied Textiles ensures residents can enjoy fabrics with a soft hand and diverse texture, while providing repellency, cleanability, and a liquid barrier. This technology helped us avoid institutional palettes, and expand sourcing, ease maintenance, and create a tactile experience that feels intimate, not medical.



Encourage Independence and Deliver Security

We are interested in the critical functional requirements that support residents in maneuvering through the space and their lives confidently, such as a chair armrest that allows residents to push their full body weight out of the seat and color placement that defines where one plane or object ends and another begins. A denser foam, higher seat, and shallower depth in a lounge chair doesn't only mean an easier entry and exit; it can also mean comfort and confidence to sit with a friend.

Our firm consulted with Samuelson Furniture to create silhouettes that we felt were missing from the senior-living furniture market: modern curves, tailored geometry with hospitality details, and furniture frames that go beyond pure function.



> To read an extended version of this article and more about this project, please visit bit.ly/ARioHI

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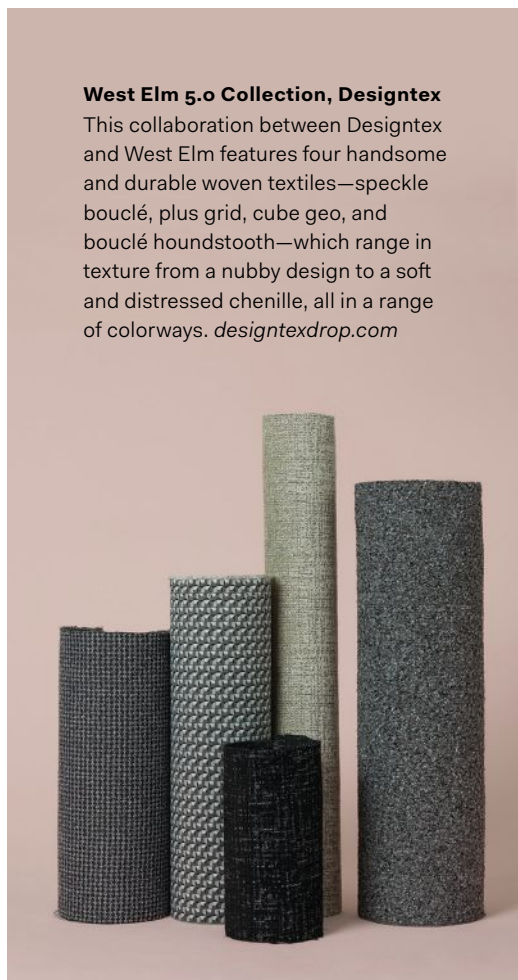


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Products: Editor's Picks

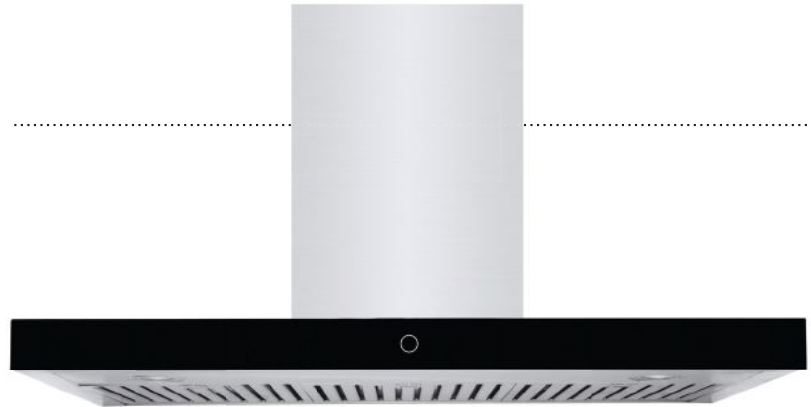
Pulled from a pool of over 140 submissions, here are the 15 winners of ARCHITECT'S 2022 Fall Product Call showcase.

TEXT BY ALEX V. CIPOLLE,
MADELEINE D'ANGELO, AND
PAUL MAKOVSKY



West Elm 5.0 Collection, Designtex

This collaboration between Designtex and West Elm features four handsome and durable woven textiles—speckle bouclé, plus grid, cube geo, and bouclé houndstooth—which range in texture from a nubby design to a soft and distressed chenille, all in a range of colorways. designtexdrop.com



Chimney-Style Range Hood (WM-739), Hauslane

The sleek, stainless-steel, chimney-style range hood with an onyx touch screen is powered by a single motor and ready for heavy-duty home cooking, from braising and frying to searing and sautéing. Powerful suction and three speeds mean no matter your level of finesse in the kitchen—whether you're *The Bear* or just starting out—this hood will eliminate grease and fumes. hauslane.com

No. 1 Vanity, Duravit

The minimalist, wall-mounted vanity unit series features two finishes—white matte and graphite matte—as well as customizable door, drawer, and cabinet options that can be paired with LED mirrors. The units come preassembled and feature left-hinged and right-hinged doors or a pull-out compartment. duravit.us

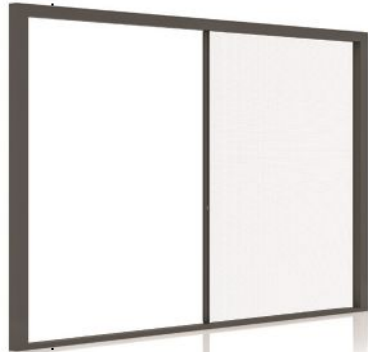




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Products:
Editor's Picks



Big Door Retractable Screen for MultiGlide and Folding Doors, Andersen Windows

Created with ease of installation in mind, this durable screen is built into a project's wall and features load-balancing technology for seamless operation. Users can maneuver the screen from any height and specify the screen in colorways including black, dark bronze, and an anodized clear. andersenwindows.com

Eave, Focal Point Lights

Let there be light, and sound baffling: This acoustic pendant luminaire is crafted from eco-friendly PET felt—in dozens of colors from pineapple and blush to seafoam and cornflower blue—complemented with real wood veneer end caps that come in three oak tones: white, amber, and espresso. This fixture's sound absorption makes it ideal for large open spaces like libraries, offices, and schools. focalpointlights.com



Enlight Collection Gas Fireplaces from Stellar, Heat & Glo

Created to keep indoor thermal comfort at a baseline for all end users, this collection offers six configurations in an array of lengths and heights. Each fireplace can be customized with driftwood logs, polished river rock, crushed glass, and LED accent lighting in virtually any color. heatnglo.com



SunGuard SNR 35, Guardian Glass

Designed for commercial exterior applications, this silver reflective-coated glass offers a very low 0.17 solar heat gain coefficient and 33% visible light transmission. It aims to help reduce interior heat loads and minimize HVAC equipment for a more energy-efficient interior experience. guardianglass.com

The background of the advertisement features a teal gradient with several fingerprints scattered across it. In the lower right corner, there are several red, spherical virus-like particles with spikes, representing bacteria and enveloped viruses. The text is written in a white, hand-drawn style with a slight shadow effect.

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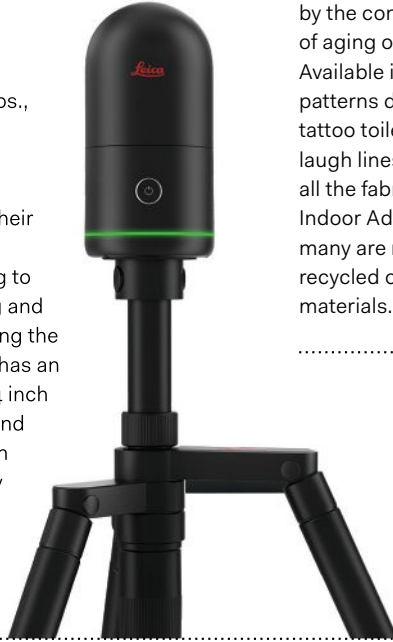
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Products:
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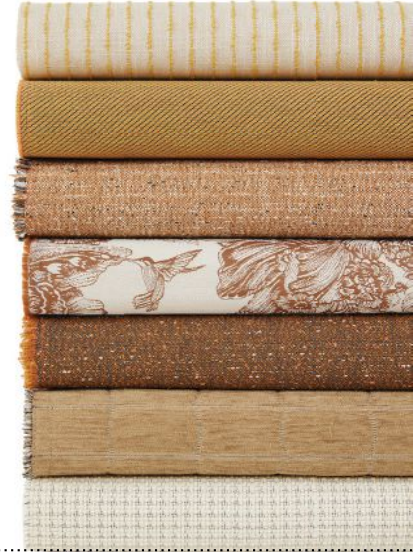
Leica BLK360 Laser Scanner, Leica Geosystems

Clocking in at just 1.7 lbs., this tiny-but-mighty scanner can generate HDR digital twins in seconds. Users scan their environments without interruption, according to Leica, all while viewing and sharing their data during the process. The scanner has an accuracy range of .024 inch at a 10-yard distance and .31 inch at 22 yards with a rechargeable battery good for 60 setups. leica-geosystems.com



In Your Skin, HBF Textiles

Created by New York designer Erin Ruby, this woven fabric collection for contract and hospitality settings is inspired by the contours and effects of aging on human skin. Available in 43 colorways and patterns dubbed chubby baby, tattoo toile, goosebumps, laugh lines, and stardust, all the fabrics are certified Indoor Advantage Gold and many are manufactured using recycled or post-consumer materials. hbftextiles.com



VLA26 Vega Chair, Carl Hansen & Søn

This lightweight, stackable chair—originally designed for a concert hall by Vilhelm Lauritzen in 1956—is now available from Carl Hansen & Søn. The chair has a black powder-coated steel frame, and a seat and back made of FSC-certified oak, with or without upholstery. carlhansen.com



Copper Force, Behr

This zero-VOC interior paint aims to kill germs. Need we say more? Developed with materials technology company Corning, the EPA-registered paint relies on the antimicrobial properties of copper, killing 99.9% of viruses and bacteria within two hours of contact for its six-year life span, Behr reports. The paint comes in a range of colors with eggshell and semi-gloss finishes. behr.com



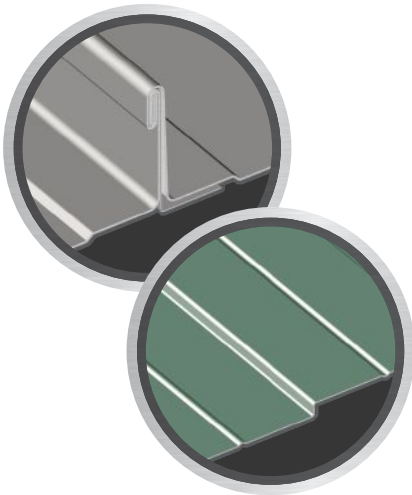


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Products:
Editor's Picks

**Barz + Brilliance, USG
Ceilings Plus**

Designed to offer a seamless look with fully integrated linear LED lighting, these acoustical baffles are available in an easy-to-specify, panelized cassette system with torsion spring-grid attachments. Offered in custom options and in white color temperatures of 3500K and 4000K, the system ships in approximately eight weeks. usg.com



**Oasis, GKD
Metal Fabrics**

This golden-anodized metal fabric weave, crafted from a combination of aluminum wires and stainless steel cables, is suitable for both building façade cladding or interior wall and ceiling coverings. gkdmalfabrics.com



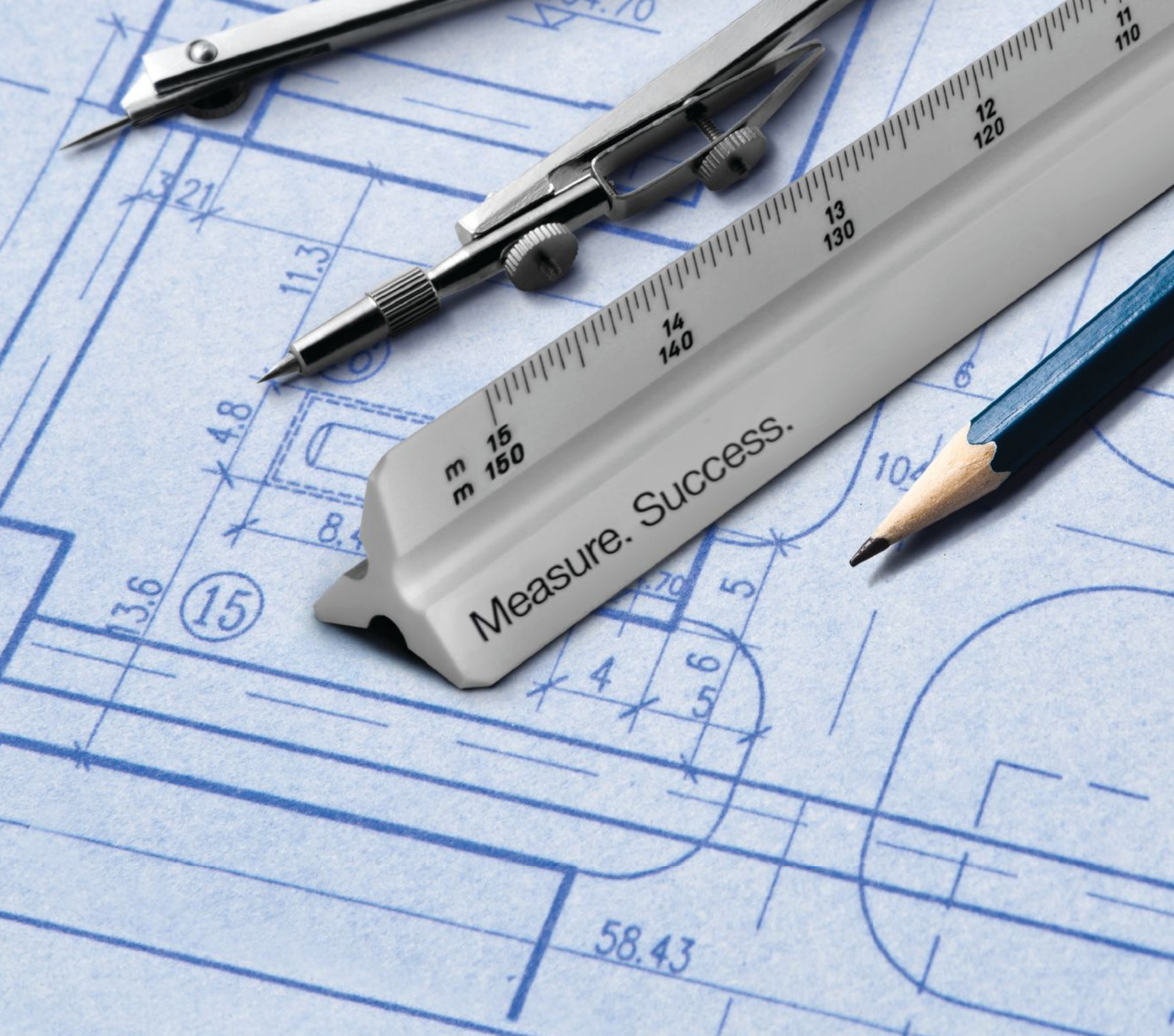
Mayday Outdoor Lamp, Flos

The outdoor lamp, by Konstantin Grcic, can be hung from a hook or tree branch, or used as a floor or table lamp. Made of recycled materials and with special waterproof features, the fixture comes in three nature-inspired colorways: mustard yellow, leaf green, and black. flos.com

Skinz Collection, Móz Designs

Designed to mimic the luster of rare materials, these solid-core aluminum panels are laminated with architectural-grade embossed vinyl film in six patterns: charwood, wenge wood, luna gold, aged bronze, aged gold, and glacier. The sheets are available in thicknesses ranging from .040 inch to .125 inch and in standard 47-by-96-inch or 47-by-120-inch panels. Corrugated options are also available. mozdesigns.com





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Opinion: Consider Licensure Alternatives

TEXT BY GABRIEL KELLER, ASSOC. AIA



Over the last few years, a conversation has evolved about barriers into the field of architecture. Perhaps the most difficult to cross, for

people without generational wealth, is the ever-increasing educational requirement for licensure, which can take seven years and cost as much as medical school, with starting salaries at a fraction of a doctor's. Few can afford this amount of time or money. Many are making efforts to remedy the situation—by retaining the historic apprenticeship model or offering an alternative pathway—but progress has been piecemeal; we need broader change.

Historically, one could become an architect through apprenticeship. That's how David Salmela, FAIA—the most celebrated architect in Minnesota, where I live and work—got his license. Yet, by the time I entered architecture school in 1994, the state of Minnesota had eliminated that pathway.

The only way I could become an architect was with a degree, an unreachable feat considering my circumstances: I am the only child of a single mother who struggled with schizophrenia and drug addiction. I was lucky, however, as I excelled academically and entered the B.Arch. program at Cornell University.

During college, my mom's mental health deteriorated. I was also diagnosed with a serious heart condition, and for the next two years,

I bounced between doctors and hospitals, had heart surgery twice with the ensuing recovery periods, and cared for my mother—all while trying, and failing, to finish school.

Overwhelmed, depressed, and saddled with medical debt, I still had to support myself and my mother. I assumed I would go back to school, finish my degree, and become licensed.

Unfortunately, when I moved back to Minnesota to care for my mother, many credits did not transfer to the M.Arch. program at the University of Minnesota and, after I began working at a firm, I no longer qualified for financial aid. By the time I had a family to support, the window for school had effectively closed.

Even so, I worked at Domain Architecture & Design with the late Lars Peterssen—an architect who believed in me. In 2009, we co-founded Minneapolis-based PKA Architecture. Our firm has grown, and we've won numerous awards. Yet even after more than two decades working in architecture, designing award-winning homes, I still cannot—legally or otherwise—call myself an architect. Exclusion from even the language of our profession still feels like a personal failure.

I'm not alone. According to the AIA 2020 Membership Demographic Report, 19% of its 94,286 members are "Associate members," or unlicensed. Some are on their way to licensure; many will never make it. According to a 2021 report from the National Council of Architectural Registration Boards, over the last 10 years, only 63% of candidates stayed on the path to licensure, with people of color being the most likely to

drop out. Of AIA's Associate members, 32.1% are from "underrepresented racial and ethnic groups," compared to 12.8% of its "Architect members."

The elimination of the apprenticeship path has created a de facto caste system. Licensure is crucial for advancement in many firms. Within AIA, many feel that unlicensed professionals are not only unwelcome, but an affront to the profession. One AIA leader told me I was "only playing at being an architect."

Knowing this, I try to help others who face these or other barriers. At PKA, we hire people from all backgrounds based on their proven or potential abilities, regardless of degree status. We've witnessed firsthand that the quality and potential of employees doesn't correlate with their educational background.

Aspiring architects who lack seven years of personal, family, and financial stability are denied access to the highest level of the profession. The elitism and exclusion caused by educational inflation are not only unjust and unnecessary; they're bad for architecture. We would all benefit by having more people in the field from diverse backgrounds.

Some states are working to rectify this, while others have retained their historic apprenticeship model. In Wisconsin, you can meet the educational requirement with seven years of experience. In New Hampshire, it's 13 years. California requires five years under the direct supervision of a licensed architect. At least 13 other states have alternative pathways.

In Minnesota, the conversation has begun as I and others begin to share our stories. AIA Minnesota is now supportive of the efforts for removing barriers to our profession. My hope is every state will offer an alternative pathway open to those with a love for the field, a talent for design, and a desire to work hard to achieve the job of their dreams, no matter where, or who, they come from.

Gabriel Keller, ASSOC. AIA, is a co-founding principal designer at PKA Architects.

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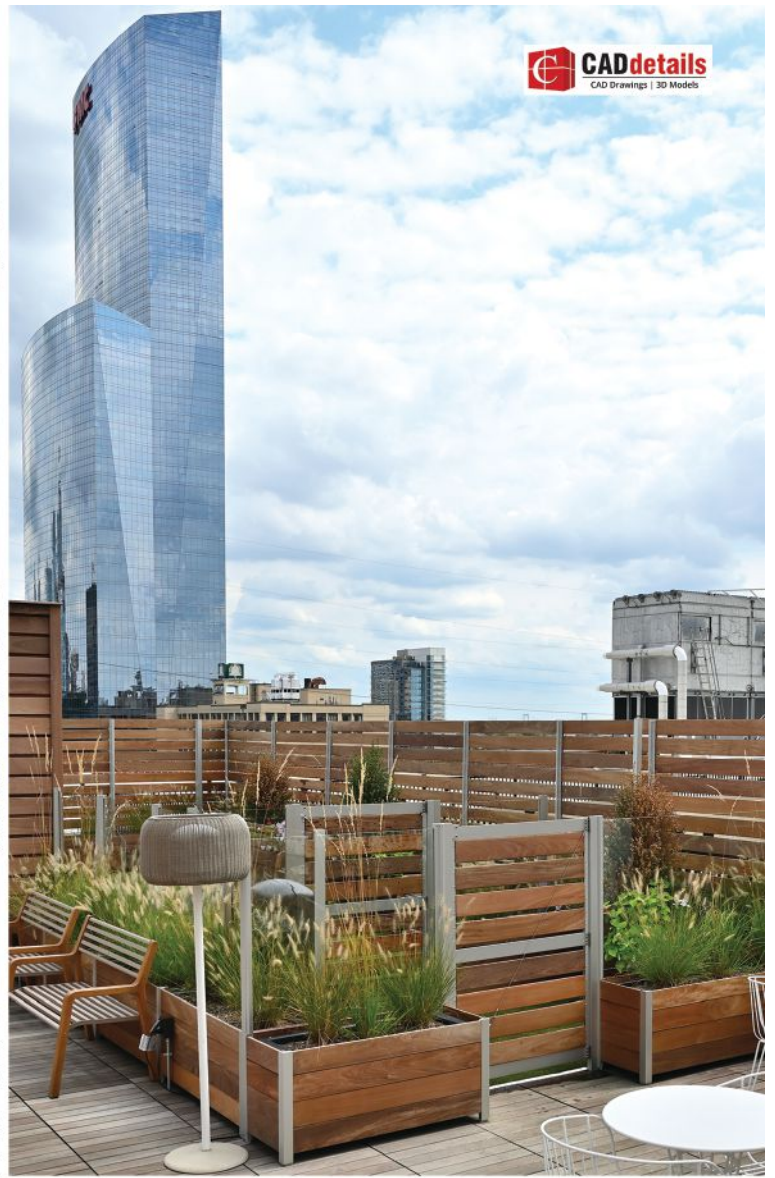
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Myers-Heckman Residence Cincinnati Sol Design + Consulting

TEXT BY IAN VOLNER



The adaptive reuse of the LEED Platinum Myers-Heckman Residence, an 1870 town house in Cincinnati, resulted in an energy-use reduction of 74% from its preexisting state—and that was before the solar array.

Since moving to Cincinnati in 2005, architect Sanyog Rathod, AIA, has become a serious booster for his adoptive hometown. “Cincinnati is a mecca for architects,” Rathod says. “On the one hand, it has over a dozen contemporary buildings by world-renowned architects—Gehry,

Libeskind, Zaha. On the other hand, it has this enormous continuous collection of historic buildings.”

As the founder of Sol Design + Consulting, Rathod’s own inclinations are in the contemporary camp, as borne out by his office’s long track record acting as both designer and

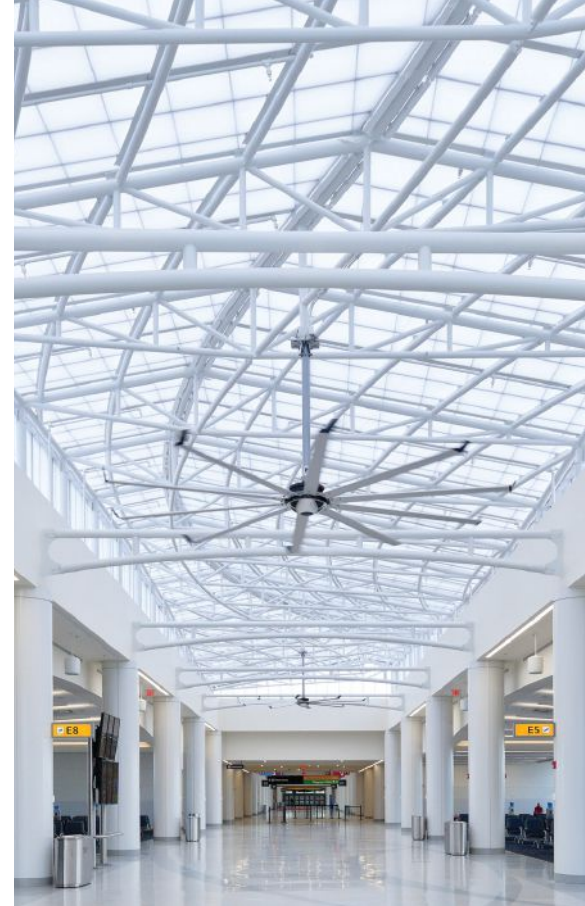
collaborator on a wide range of renovations, ground-up buildings, and interiors, all marked by a focus on energy efficiency. At the same time, Rathod has proven himself a devotee of the city’s unique architectural heritage—a commitment that helped propel one of Sol’s most energy-efficient projects to date, the Myers-Heckman Residence in the Over-the-Rhine neighborhood.

“In terms of urban density, the character of the neighborhood is very much comparable to places like Brooklyn or Chicago, with an especially high concentration of historic structures,” Rathod says. Originally a haven for Cincinnati’s German immigrant community, Over-the-Rhine grew and prospered from the early 19th century through the first half of the 20th; thereafter, it went into sharp decline, only to bounce back since the turn of the millennium as both longtime Cincinnatians and newcomers have rediscovered its charming mix of Queen Anne and Italianate-style buildings. After settling there himself, Rathod joined the local preservation nonprofit Over-the-Rhine Foundation to help protect the neighborhood’s architectural and cultural assets; it was there that he met Kristen Myers and her husband Chris Heckman, fellow foundation members who quickly became friends and started to speak to the architect, vaguely at first, about creating a new home for themselves in the area. “It took us about six years to actually do it,” Rathod says.

Completed in 2021, the four-story, 4,000-square-foot house stands as proof positive of how well ecological sensitivity and historical preservation can work in concert. The adaptive-

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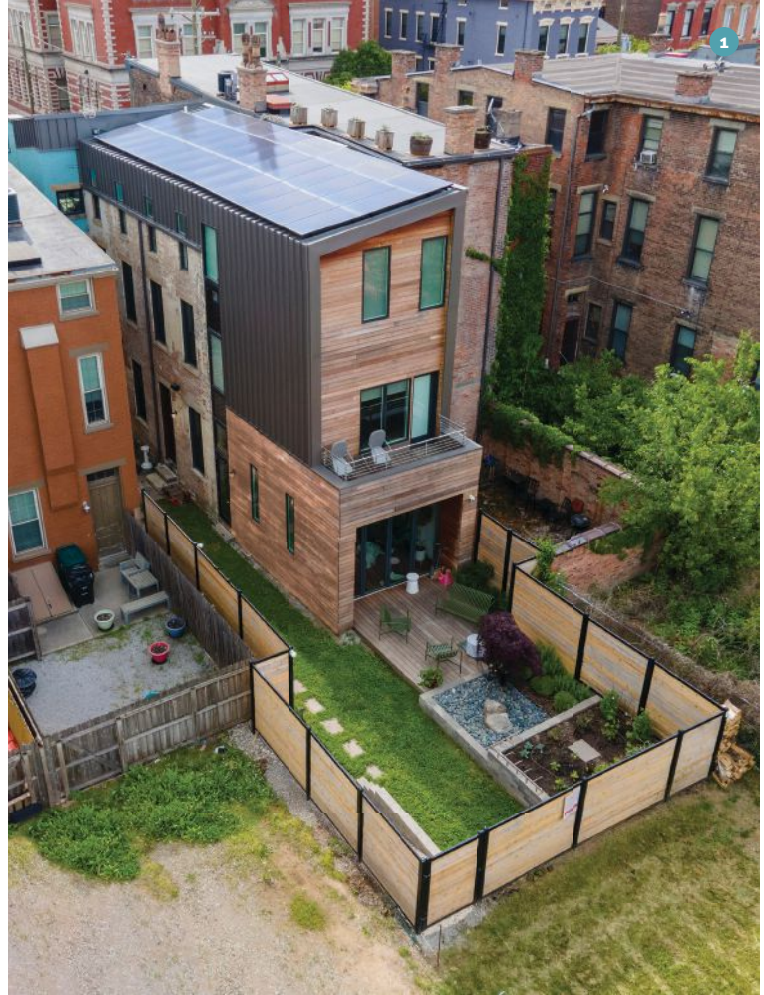
Residential:
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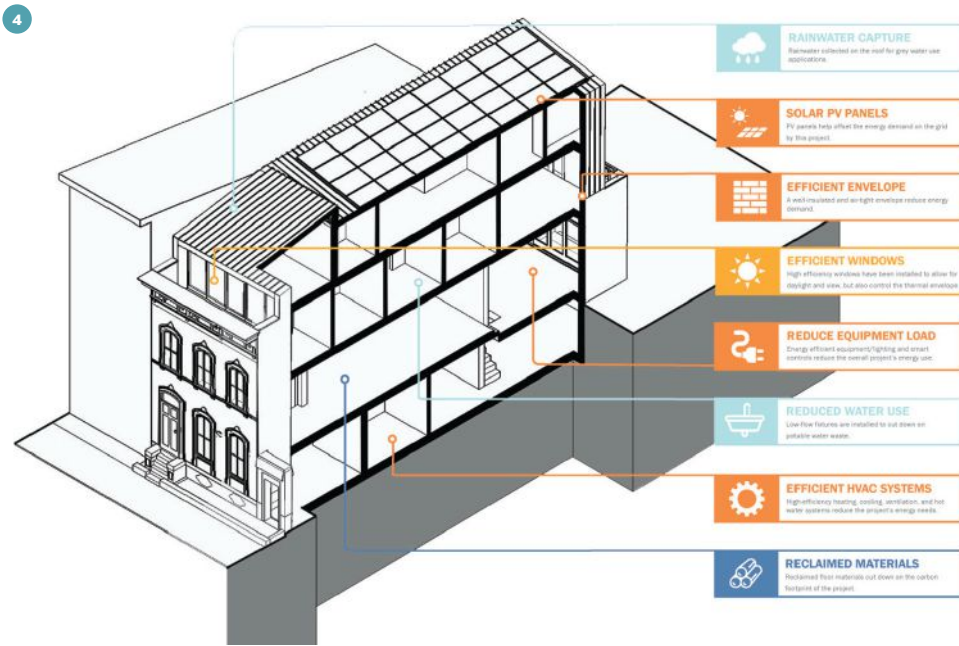
reuse project began with an archetypical specimen of the Over-the-Rhine streetscape: an 1870 row house, fronted in brick and decorative details, with a narrow yard behind it. Hoping to increase the usable space, the architect and his clients decided to add an extension to the back as well as an upper-level addition—immediately requiring tough decisions about competing priorities.

“The design seeks to respect the historic architecture and allow contemporary intervention, while achieving near net-zero energy performance,” Rathod says. Topping the aluminum-clad roof with solar panels and choosing wood and high-efficiency windows for the rear addition, the Sol team used eco-friendly materials to articulate a distinct identity for the new portions of the house that still complements the original.

The sensitivity to context went further. “Soon after conceptualizing our design for the addition, we invited the Over-the-Rhine Foundation to critique our response for its historic appropriateness,” Rathod says. Soliciting input from other Over-the-Rhiners, Sol and company were encouraged to trim the width of the extension volume to better accord with the building’s original footprint. They took the same painstaking steps with the interior, which still boasted a substantial amount of period detail; determined to keep it, the designers removed the ornate moldings, panels, and mantels, applying new, high-performance insulation and then reapplying all the ornament precisely as it had been pre-renovation.

Living up to its dual role as architect and sustainability consultant, Sol succeeded in reducing household energy consumption by more than two-thirds, reusing over 60% of on-site water, and generating enough electricity to power the structure for more than six months. Through it all, the designers were aided by their clients’ shrewd choice of the site: The property sits alongside a trolley line and a short walk from a large farmer’s market, making the most of Over-the-Rhine’s traditional, pedestrian-friendly urbanism. The embodied-carbon savings from preserving the building further upped the project’s green bona fides, serving as further evidence of something that the Sol crew’s extensive research and data analysis has already persuaded them to be so. “It’s a common myth among developers and builders that historic renovations and sustainability are at loggerheads,” Rathod says. “Everything we’ve learned shows historic renovations are inherently sustainable.”





1. Sol Design + Consulting added a rear extension and upper-level addition to the 1870 row house to increase usable space within its compact footprint. **2.** A back porch overlooks a landscaping scheme by the local Tepe Landscape & Design Group. **3.** For the new construction portion of the project, Sol made use of Huber Zip System sheathing, ipe siding, and standing-seam metal from Metal Sales. **4.** Sustainability measures for the adaptive reuse project include a 9.9kW solar array, an on-site cistern, and a ground source heat pump providing heating, cooling, and preheating for domestic hot water. **5.** Although 67% of the original hardwood flooring was refinished, the new flooring is locally harvested walnut by Schlabach Woodworks. **6.** The residence is fully electric, and its kitchen includes Miele appliances and Maistri cabinets, provided by local interior design firm Noli Modern Italian Living. **7.** To create an efficient envelope, Sol incorporated continuous rigid insulation on the existing walls, air sealing, R-50 roof insulation, and high-performance windows from Pella, NanaWall, and Quaker Windows. **8.** The new addition at the rear and top of the existing home was done in contemporary metal and wood to complement the original masonry.



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Tori Wickard, AIA
Senior Project Architect
Perkins&Will
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Accoya: Acetylated Wood

accoya.com



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Armstrong: Invisacoustics

armstrongceilings.com



"This plant-based option is a hidden acoustical solution that installs to the deck, with an NRC up to 0.75. It is a low-carbon product, made with recycled content, and is recyclable and reusable if installed on channels."

Mermet: GreenScreen Revive

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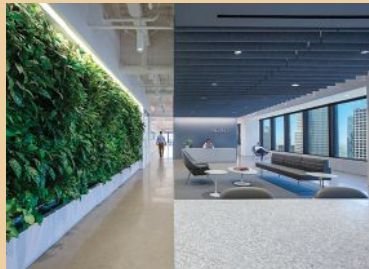
"This 100% recyclable roller shade fabric is a translucent polyester available in 1% and 5% openness preferred to traditional PVC fabrics. It is Cradle to Cradle Bronze and LBC Red List Free, and eligible for GreenScreen's fabric takeback program."



Carlos Madrid III
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Turf: Straight Ceiling Baffles

turf.design



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Baux: Wood Wool Panels

baux.com



"This acoustic product is an environmentally friendly, recyclable material made from wood wool, cement, and water. The organic texture and curated color palette yield environments that are casually sophisticated."

Zip Water: HydroTap

zipwater.com



"The life cycle of disposable water bottles uses fossil fuels and contributes to global warming. Why pollute when you can have filtered boiling, chilled, or even sparkling water at your fingertips?"



Theresa Genovese, AIA
Principal
CetraRuddy
New York

Fundermax: Exterior Panels

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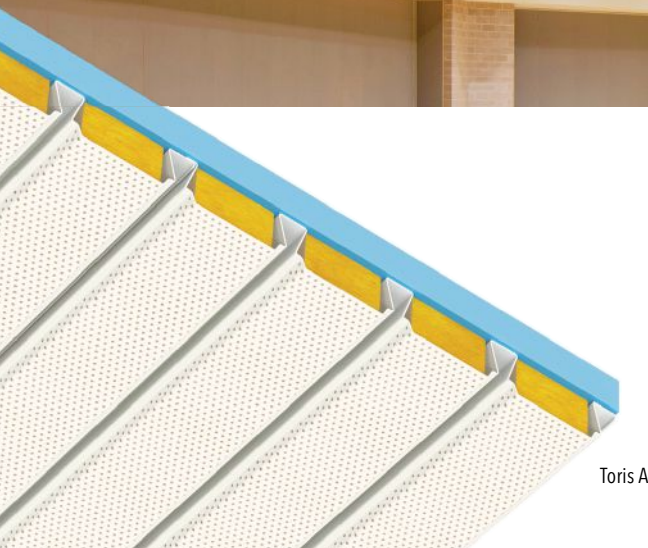
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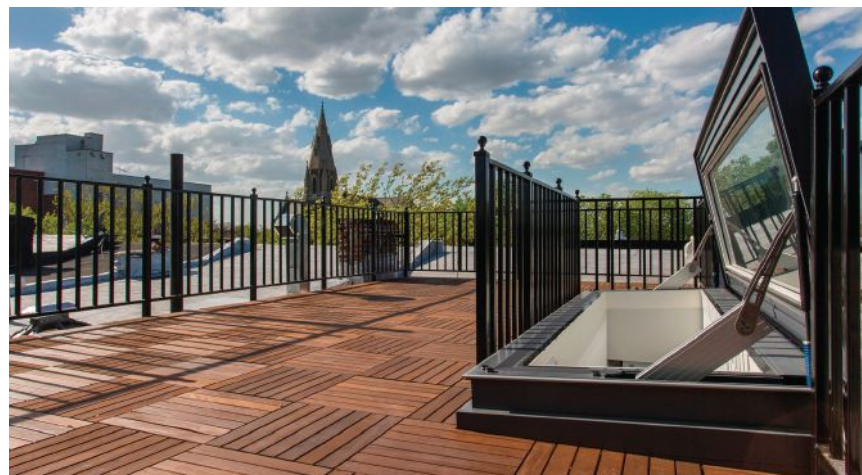
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As told to Stephen Hicks



PETER DRESSEL

Joel Sanders, FAIA, is a founding principal of New York-based MIXdesign and a professor of practice in the Yale School of Architecture. He has broken ground over the course of his career in inclusive design, and we talked to him about the principles behind his mission-driven practice.

In 2016, I established MIXdesign, a new branch of my architectural studio JSA. MIXdesign is an inclusive design think tank that supports the civil rights, health, and well-being of marginalized communities typically left out of the architectural conversation. We work with progressive clients to develop tools for making everyday building types—like public restrooms, workplaces, campuses, and museums—safe and accessible for a wide spectrum of people with different identities and embodiments.

Unlike most accessibility standards in the United States, which tend to focus on people with physical or sensory disabilities alone, we consider the intersecting needs of a broader spectrum of the population: disability (people with mobility, sensory, and neurodiversity challenges), gender (women, trans, and nonbinary folk), and culture (spatial requirements associated with race and religion).

We offer an alternative to the “separate but equal” model of most accessibility standards that prescribe physical accommodations like separate ramps and entrances, which unintentionally segregate and stigmatize those with “special needs.” Our goal is to enable the maximum number of differently embodied and identified people to interact in different settings. However, we recognize that there are ways of being different that don’t allow for one-size-fits-all solutions; for this reason, our designs accommodate people and communities with unique functional and privacy needs.

Now with the spread of the coronavirus, all of us have become hyperaware and often anxious about how to maneuver safely within once familiar but now disabling spaces. MIX believes that in order for people to feel safe but connected, they need public spaces designed to minimize environmental stressors induced by disorientation and overstimulation triggered by noise, light, and crowds. Reducing environmental stressors depends on spatial awareness: sensory cues that make people aware of the presence and activities of others, especially in unfamiliar places.

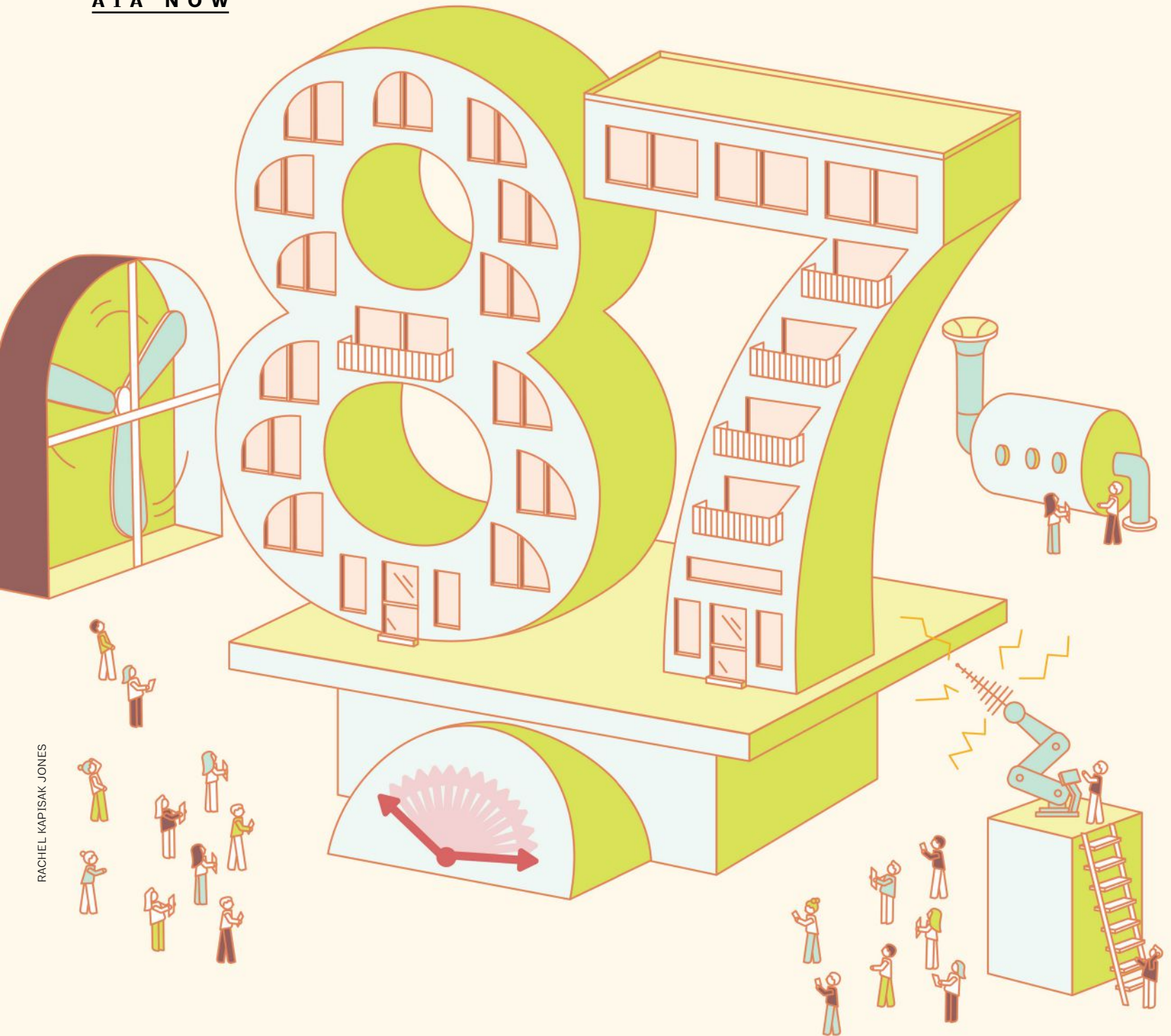
Inclusive design is in a similar place as sustainable design was 20 years ago when architects were skeptical that clients would invest the time and resources to make buildings more efficient. Moving forward, AIA needs advocates to make inclusive design a central part of design education in the same way that sustainable design is today. Only then can inclusive design principles not be an afterthought, like code compliance, but a central and integrated aspect of the entire design and implementation process. As MIXdesign team member Magda Mostafa says, “When you design for extreme conditions, we all benefit.” **AIA**



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RACHEL KAPISAK JONES

Do Current Building Codes Make for Resilient Buildings?

By Michele Russo

According to “The State of Resiliency in the Built Environment,” a study by AIA and Owens Corning, 87% of architects report believing that a building that technically meets code is not resilient enough for its location. This is a departure from the opinions of contractors and building owners. In the same study, more than three-quarters of contractors and 85% of building owners and developers reported that they do believe that a

building that meets code is resilient. This gap in perception is an important one for architects to close as they expand their leadership role in ensuring a resilient and sustainable built environment. **AIA**

Source: “The State of Resiliency in the Built Environment,” AIA/Owens Corning, 2022, www.aia.org/resources/6526316-new-report. For more information on resiliency, visit www.aia.org/resilience.



MAGGIE CHIANG

Rising Tides

Extreme weather events are growing in frequency and severity, but architects are prepared.

By Katherine Flynn

As communities across the United States prepared for another hurricane season, we talked with three members of AIA's Resilience and Adaptation Advisory Group on their resilience work in three key areas of the country. Amid a growing national conversation about how both sea-level rise and extreme weather events will impact our built environment over the next decade and beyond, the expertise of leaders like the three we spoke to will place architects and their skill set more squarely in the spotlight.

San Francisco Bay Area

Tian Feng, FAIA, has dedicated thousands of hours to planning for the impacts of sea-level rise—but he'll be the first to tell you that he can't do it alone.

Feng is the district architect of San Francisco Bay Area Rapid Transit (BART) District and a leader on climate resilience in the Bay Area. He uses two dimensions to explain the impacts of sea-level rise adaptation: lateral and vertical. Integrating the two, he says, can be a challenge.

"Our work at BART is more focused on the vertical dimension. The vertical

dimension is specific," he says. "[The asset] is an apartment building, or a transit system like us. There's a set of unique vulnerabilities and, based on that, we develop strategies for adaptation. If an earthquake happens, it's challenging, but it's easier."

BART has hardened its assets with specific design performance against earthquakes, but sea-level rise, Feng explains, is different. "Your asset is one of millions of assets that will be impacted by coastal, regional flooding," he says. "So, your performance can be defined at a certain level, and then beyond that, there's a collective decision."

Feng has been working for BART for the last two decades. In addition to his day job, he is currently a member of AIA's Adaptation and Resilience Advisory Group, and he also serves on the Research Advisory Committee of the Bay Area Resilient by Design Challenge—all ways in which he is helping to facilitate the Bay Area's lateral approach.

"The lateral dimension is wide, inter-agency, inter-ownership. Half our asset is below-grade, underground," he says. "Most

of the high-rise [buildings] are well above grade." Protecting a high-rise building is very different from protecting a below-grade transit system, for obvious reasons.

BART has never experienced service delays due to flooding—at least, not yet. "We have not suffered the impact of [a storm like Hurricane] Sandy for now," Feng says. "But, in coming decades, if we are encountering the same effect as Sandy, what are the adaptation strategies that we can evolve from what we have now? So [that] by the time the effect of a storm like Sandy comes in, we are prepared." Those who would be most impacted by an interruption of BART service due to a major flooding event, Feng points out, are the Bay Area's most vulnerable communities—and they are the ones who will most benefit from adaptation efforts.

At first glance, the number of agencies that Feng's work intersects with can seem dizzying—the Port of San Francisco, the Army Corps of Engineers, and the Federal Transit Administration, among others. Each piece, however, is essential to Feng's best efforts to ensure that BART's operations will adapt over the next 50 to 100 years, even as

the projected sea-level rise for the Bay Area is an increase of 7 feet by 2100.

BART's building-based solutions to keep trains running after a major flood event include hardening components of individual stations, like areas that house transformers and other sensitive electrical and mechanical equipment. The mitigation measures that the transit agency already employs in the event of heavy rainfall are simple but effective: being vigilant and proactive about keeping system drains and sump pumps clean and free of debris, and clearing trees that could cause problems in extreme weather.

Ultimately, Feng says, the best solutions will strike the right balance between adapting or retreating and hardening.

"I hope architects take a leading role in harmonizing the vertical and lateral approaches to climate resiliency," he says. "Participating in codifying resilient design is something I see happening. A holistic approach—that is the architects' duty. We're trained to always see multiple solutions."

East Coast/Northeast

When Dena Prastos, AIA, was growing up in Anchorage, Alaska, she became interested in the ways in which human-made infrastructure can withstand extreme weather conditions caused by the natural environment—and learned that the two don't always have to be in opposition.

"That was a departure point, to be able to appreciate nature and the built world and focus on that interface of nature and the man-made," she says.

Prastos describes herself as "an atypical architect who does not usually work on buildings, at least not in the traditional sense." She is the founder of Indigo River, a New York-based transdisciplinary studio focusing on climate adaptation, specifically regarding waterfront infrastructure and flood resiliency. She also lends her unique insights in this area to the efforts of AIA's Resilience and Adaptation Advisory Group.

"Because we're so comfortable working on, in, and with the water, we've parlayed into analyzing structures where the project architects may be great at what they do, but they're not always used to flood mitigation concerns and impacts from water, or environmental impacts," she says.

Recently, Prastos was called on to consult for Wildflower Studios to focus on waterfront edge resiliency. The project, slated to be constructed in Astoria, Queens, is located on a site directly adjacent to

Steinway Creek. The seven-story film, television, and creative studio, a project of Robert De Niro's Wildflower development group with Bjarke Ingels Group as the architect of record, is projected to be completed in 2023. Prastos initially became involved with designing the shoreline adjacent to the building, a rip-rap and bulkhead park intended to mitigate the impacts of erosion and potential flooding.

"Midway through, the team realized they needed someone to coordinate resiliency efforts on the upland site and within the building," Prastos says. The team developed a series of risk-mitigation and adaptation recommendations for the property, and the finalized design accounted for emergency response and business continuity plans in the case of rising sea levels.

Indigo River's work is innovative, and Prastos sees it becoming increasingly necessary and in demand in the coming years. Being well-versed in the permitting and regulatory process behind waterfront infrastructure—an area that Indigo River specialized in on another recent project, 5 miles of bulkheads that needed repair at the Manhattan Waterfront Greenway—allows the firm to fill a variety of roles to best meet clients' needs.

Adaptation and flexibility, Prastos feels, are going to be essential to the profession moving forward. "Within the traditional architecture field, it's not common to have forward-looking designs based on future climate projections," she says.

"As a profession, it's our duty to adapt physical infrastructure. Climate adaptation and climate justice are inextricably linked."

Gulf Coast

Gina De Leon credits her architecture background as the catalyst behind her career as a disaster recovery manager—that, and her deep roots in her hometown.

"I'm Houston, Texas-born and raised," she says. "I like to say I survived my first hurricane at age 1, Hurricane Alicia. It's just a part of life."

While in graduate school, De Leon assisted with disaster recovery efforts in Biloxi, Miss., after Hurricane Katrina, mobilizing residents to engage in participatory design as part of the rebuilding process. In the time since, she says, the term "resilience" as it relates to the built environment has become more holistic—to include "resilient communities, social determinants of health, how we think about communities and how we build them and design them with an equity lens and [with] the resident as stakeholder."

After 2017's Hurricane Harvey, De Leon worked with nonprofit agencies to secure funding for the repair of 230 homes. She has continued to hone her skills managing the complex funding and compliance threads woven in and out of the process of disaster recovery, which she currently does at a consulting firm. She also lends her expertise to AIA's Resilience and Adaptation Advisory Group.

"A lot of my clients now are local governments. What do they do with an influx of [Community Development Block Grant Disaster Recovery] dollars or federal funding?" she says. "How do we effectively use those dollars for the communities that need them? Especially when you're prone to disasters reoccurring—they're just happening more frequently. The data and research show that."

All of the restorations that De Leon helps facilitate allow for structures to be retrofitted so that they will be able to better withstand the next flood or hurricane.

"All the clients that you help, you hope that you don't have to help them again, because their home was able to withstand," she says.

De Leon is passionate about emphasizing equity—the people she is doing the work for—at every turn.

"Communities of color are always disproportionately affected by disasters," says De Leon, who is first-generation Mexican American. Disinvestment in these communities can often lead to homes with deferred maintenance, causing a cascade of problems from an extreme weather event.

In her work, De Leon sees a gap that she wishes would be addressed by lawmakers and policymakers: When disasters happen, there are fewer financial resources for renters or residents of multifamily housing versus those who own their homes.

"Philanthropic funding is flexible. At least in [Hurricane] Sandy, they were able to help renters, but here we can only work with homeowners," she says. "Unless you have a good landlord or somebody who is really invested, they have to sometimes wait for those CDBGDR dollars to come down. It can take years."

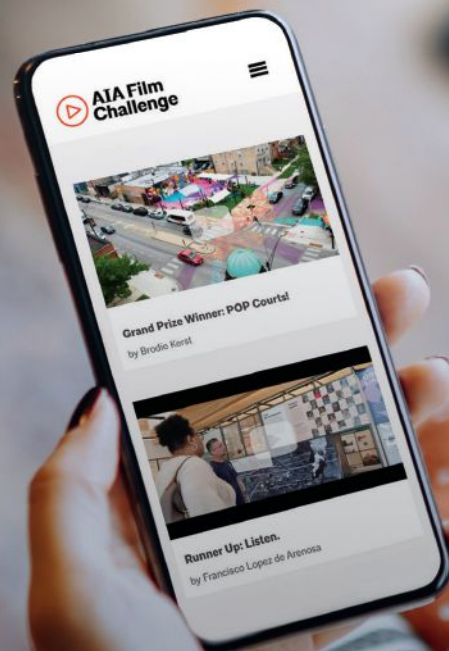
When it comes to issues of resilience and disaster management, De Leon says she would like to see more architects at the decision-making table acting as community-building stewards, especially ones who understand the intricacies of federal funding.

"I see the research, I see the patterns, I think resiliency is only going to become more necessary and imperative," she says. **AIA**

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Designing at Hyperscale

The architects behind today's data centers are fashioning innovative additions to the landscape.

By Patrick Sisson

Architects have always placed their own signatures on the spaces where the future happens, from the glass skyscrapers that symbolized midcentury corporate dominance to the tech campuses and urban office spaces that have defined the pioneering industries of the 21st century.

Today, one typology at the center of scientific and technological progress, the data center, tends to get dismissed—seen more as a functional facility filled with cords, servers, and empty space than one shaped by architects.

“The traditional way of doing architecture may look at them as bland, boring boxes, and that does a huge disservice to the building typology,” says Chheng Lim, Assoc. AIA, an associate at Chicago-based Sheehan Nagle Hartray Architects who specializes in data-center design. “There’s something stoic about these projects. The repetitive elements and façade components really have a certain presence on the landscape.”

In addition to the complex balance of technology, sustainability, and modularity that often shapes data centers today, the sheer scale and scope of these campuses and massive vertical skyscrapers offers designers a chance to reshape the landscape and occupy a true presence on the horizon. One of Lim’s recent designs, the award-winning Fort Worth Data Center administration building, boasts an undulating, patterned façade that recalls the shape of archaic IBM punch cards.

As our digital lives and data needs

expand, data centers have become fixtures on the landscape, with roughly 2,670 in the United States alone—often the size of multiple football fields. With the increasing need for more data storage and so-called hyperscale sites used by computing giants, these structures will only become more prevalent, powerful, and important, as will the role of the data-center architect. James Simon, AIA, an architect, associate, and critical facilities leader at Gensler who started in this field in 2000, has seen the industry double in size every other year for the last five years.

Typically consisting of administrative buildings surrounded by data halls that utilize the latest technology to sustainably cool racks upon racks of servers, these buildings “no longer have anything in common with traditional architecture other than the fact that they have a roof and walls and can withstand wind loads,” Simon says. Instead, ensuring the orderly operation of machines that store terabytes of key information and remaining incognito or at least unnoticed for clients become the driving factors; it’s a delicate balance of presentation and secrecy.

But anonymity doesn’t need to be boring, says Lim; within the confines of computing technology and budgets, there’s room for architectural playfulness. The architecture sector figuring out how to bring more rigorous and creative approaches to these projects has heard the call and continues to grow well beyond a niche; this year, Lim organized

a presentation at AIA’s Conference on Architecture 2022, the first time the organization has so addressed this emerging building typology. She says graduates of top-tier architecture and engineering schools are increasingly entering the workforce seeking to work on these buildings, whereas talent was very hard to find years ago.

The proliferation of these structures has also brought more scrutiny, and higher expectations, from local governments, says Michael Welch, vice president of procurement and design at Dallas-based Aligned Data Centers. There’s been a sea change, with cities and towns shifting from simply wanting more data centers to caring about how they look and impact the landscape, with zoning and design standards following suit. The standards are being raised, he says, and there’s a lot more nuance expected of new designs.

Today’s massive data centers were shaped by both technology and, to a lesser extent, terrorism, according to Gensler’s Simon. Beginning in the early 2000s, the dot-com boom, followed by the growth in mobile computing, social media, and e-commerce, created a need for more data storage, while 9/11 inspired many organizations, including the Department of the Treasury, to advocate for remote data storage away from corporate headquarters in remote areas to guarantee better data security.

Currently, data-center design and



The NY5 data center in Secaucus, New York, was designed by Sheehan Nagle Hartray Architects.

construction lean heavily toward function over form; Lim estimates that 80% of construction costs go toward engineering services and tech, with the remaining 20% for the structure and design. But even within those constraints, architects and landscape architects have license to be more creative; Simon pointed to his firm's IBM data center in Barrie, Ontario, filled with sloping berms and plantings that blended with the landscape and created a sense of ambiguity over the site's true purpose.

Lim labels the design challenge of data centers as a case of "human by proxy," a reflection of the symbolism and representation of these spaces. On the surface, it's easy to talk about these structures as removed pieces of equipment; hotel rooms exist for guests and malls are laid out with shoppers in mind, so these sites could simply be reduced to rest homes for servers. But Lim argues that, in addition to the fact that people do work in these cavernous structures, these data storage sites are part of us: They contain our memories, communications, and work, and are part of our collective human soul. As such, they deserve more elevated design. Lim looks specifically at materials and the landscape, focusing on touches and façades that, like the punch-card pattern at Fort Worth, reflect site context and the history of the company and surrounding landscape.

What makes these projects so challenging is the balance of technological progress with the aesthetic vision; architects constantly feel like they're in a tech race as new server design and cooling strategies unfold at an almost exponential rate. Every building has its own site, business, and client constraints, but architects always find themselves playing the role of ringleader, says Simon, trying to balance all these different metrics and performance requirements.

"A key aspect of good design is making a building that's flexible, that can accommodate varying needs of different customers in the future, which means keeping up and understanding a rapidly shifting tech landscape," he says. "They have to be adaptable, they have to have a visual presence, they have to have something that allows them to coexist with the neighbors that are around them, but then do all these industrial processes on the inside."

Industry players can't change construction and supply-chain delays, but they can look ahead and stay abreast of technological shifts. Welch focuses

on bi-directional feedback with clients, especially the so-called hyperscalers like Amazon and Meta, plotting out where they want to be in one, or five, years and beginning to research and plan as targets and tech move.

Sustainability will increasingly play a huge role, in both designing for renewable power and incorporating cooling tech, especially new fluid and water-based systems, to keep data centers humming; recent studies suggest 1% of the globe's energy—more than used by many small countries—is eaten up by data-center

operations. Simon believes eventually, engineers will figure out how to recycle heat and turn that waste energy back into electricity; regardless of how the industry arrives at its goal, net-zero performance has become a major benchmark.

These increasing constraints on the industry will invite even more creative solutions from architects and designers. Simon says that as more data centers go online, especially in more crowded and urban areas, the reality of urban development, including planning and zoning issues, will become more prevalent.

And while pictures of endless boxy buildings in rural sites seem to suggest an endless horizon, Lim says rapid growth has meant the available space for these facilities is shrinking, suggesting land constraints and the need to go vertical. This rapid evolution suggests these so-called boxes will be anything but bland.

“These buildings can feel incognito,” says Lim. “But when we start paying attention to site history and community history, it creates opportunities for design that isn't so foreign to a landscape.” **AIA**

A I A P E R S P E C T I V E

Essential Components

Equity is sustainability and sustainability is equity.

By Dan Hart, FAIA, 2022 AIA President

Sustainability is not a concept that is new to our profession. Neither is equity. Over 50 years ago, Whitney M. Young Jr. rebuked AIA for not taking a stance on civil rights as “thunderous silence” and “complete irrelevance.”

To be vocal and relevant, our profession needs to challenge itself every day to address the goals of sustainability and equity. We cannot remain aspirational. We also cannot apply and consider practices separately for these goals—we must address them concurrently. In fact, we define sustainable design as a built environment that protects the planet and enhances human health while creating equitable and resilient communities.

We have an urgent climate imperative for carbon reduction. The causes and effects of climate change disproportionately affect low-income groups and negatively impact their overall well-being. Our design solutions affect more than the client and current occupants. Good design positively impacts future occupants and the larger community.

For every project, ask yourselves:

- What is the project's greater reach? How could this project contribute to creating a diverse, accessible, walkable, just, and human-scaled community?
- Who might this project be forgetting? How can the design process and outcome remove barriers and promote inclusion and social equity, particularly with respect to

vulnerable communities?

- What opportunities exist in this project to include, engage, and promote human connection?
- How can the design support health and resilience for the community during times of need or during emergencies?

If you're working on a Sustainability Action Plan for your practice or firm, start with a diverse and culturally responsive group. AIA's Guides for Equitable Practice can help ensure your organization meets career development, professional environment, and cultural awareness expectations of current and future employees and clients. The plan should also be a living document that you can amend as needed based on your measured progress.

If you are pursuing LEED certification, remember that the program has a “Social Equity within the Community” credit. It is tied to LEED's Social Economic Environmental Design (SEED) Network evaluation, a tool for assessing the social, economic, and environmental impact of design projects.

In October, we will announce the winners of the Film Challenge. You will be able to draw inspiration from these stories about architects collaborating with civic leaders to design sustainable and equitable communities.

This issue highlights the winners of the 2022 COTE Top Ten Awards, recognizing projects that integrate design excellence

with environmental performance. For the submissions, we ask for examples of successful outcomes of strategies across the triple bottom line of social, economic, and environmental value. You do not need an award submission as impetus to incorporate a triple bottom line in your projects. We hope reading about these projects will spark your creativity and curiosity—starting with active listening of all stakeholders.

Also look for the latest AIA Sustainability & Resilience Trends Survey, which will be released in the coming months. It measures member awareness of sustainability and resilience issues and compares data to previous reports.

In your role as stewards of the built environment, use your critical eye, question the status quo, and look at radical changes in the way you design and deliver buildings. Enhance the awareness of the public and policymakers about the role buildings play in climate change, public health, and resiliency. **AIA**



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by ANJULIE RAO

canos?

The 2022 COTE Top Ten Award winners showcase why prioritizing carework in design—rather than tech innovations or green metrics—will lay foundations for more sustainable communities.

King Open/Cambridge Street
Upper Schools & Community
Complex in Cambridge,
Mass., by Arrowstreet and
William Rawn Associates

“Community needs included green space, cooling centers, recreation, meeting space, educational programming, and technology resources. The building allows for community access to all of those things through the public library and pool as well as the shared resources with the schools such as gyms, auditorium, and cafeteria.”

*Arrowstreet and William Rawn Associates, King Open/
Cambridge Street Upper Schools & Community
Complex, as told to the COTE Top Ten committee*

The project “has provided a sustainable space our Streets and Water Distribution Divisions can be proud of. This was highlighted through a 2022 Public Works Week event that combined the local quilters guild show and an Iowa City equipment showcase titled ‘Beauties Amongst the Beasts.’ This event provided the opportunity to show off this project to over 1,500 community members.”

Ron Knoche, public works director, Iowa City Public Works

Attending the sustainability-focused *Energy Revolution* exhibition at the Chicago Architecture Center this summer, I was struck by what was being sold to visitors: cutting-edge washer-dryers, heat pumps, and other home goods—all objects that encompass lifestyle changes that individual consumers can make to lower their household carbon footprint. Fans of the early-aughts show *30 Rock* might recall the character Greenzo: an amateur actor hired by General Electric to be “America’s first non-judgmental, business-friendly environmental advocate” to mascot the company’s sustainability initiatives as a cover for peddling GE home goods. While Greenzo’s one-episode arc turns hilariously disastrous, his mission feels prescient among current conversations (and this exhibition) about what sustainability entails. Is the message we want to communicate about climate change mitigation one of consumer choices and new technologies? Or, is it about large-scale social and political wills?

I squarely choose the latter. Acknowledging that Black, Indigenous, immigrant, and impoverished groups are most often the worst affected in climate disasters focuses efforts on climate vulnerabilities as the result of ongoing neglect and disinvestment; recognizing that rates of climate vulnerability were established long ago under historically racist political and social conditions allows architects and design professionals to address sustainability as endeavors both of design and of community repair. So, while perusing the 2022 COTE Top Ten Awards, I was struck first by the public projects included among the winners. Public projects, funded by taxpayer dollars, are the result of the will of the people, and as citizens of those municipalities demand more equitable transit, greater community connections, and greater investment of their tax dollars in social programs, cities become the leaders of the climate movement—and issues of public care rise to the forefront of sustainability.

Care is a less-conventional lens through which to see sustainability practices in architecture. When Shannon Mattern, professor of anthropology at The New School for Social Research in New York, opens her 2018 *Places Journal* article, “Maintenance and Care,” she immediately recognizes a connection between newness and decay. “Values like innovation and newness hold mass appeal—or at least they did until disruption became a winning campaign platform and a normalized governance strategy. Now breakdown is our epistemic and experiential reality,” she writes.

The slow dissolving of our built structures, ever-more expedited by climate change, has yielded full-throated responses from big tech: crumbling bridges and roadways spurring new AI-monitoring schemes and concrete sensors to measure deterioration; public transit that won’t seem to resume its pre-pandemic regularity being met with Elon Musk’s subterranean private vehicle “alternatives”; data-crunching tools that predict rat infestations.

The Iowa City Public Works facility by Neumann Monson Architects prioritizes safety and well-being for employees, with more than 90% of the occupied spaces having direct views to the outdoors.

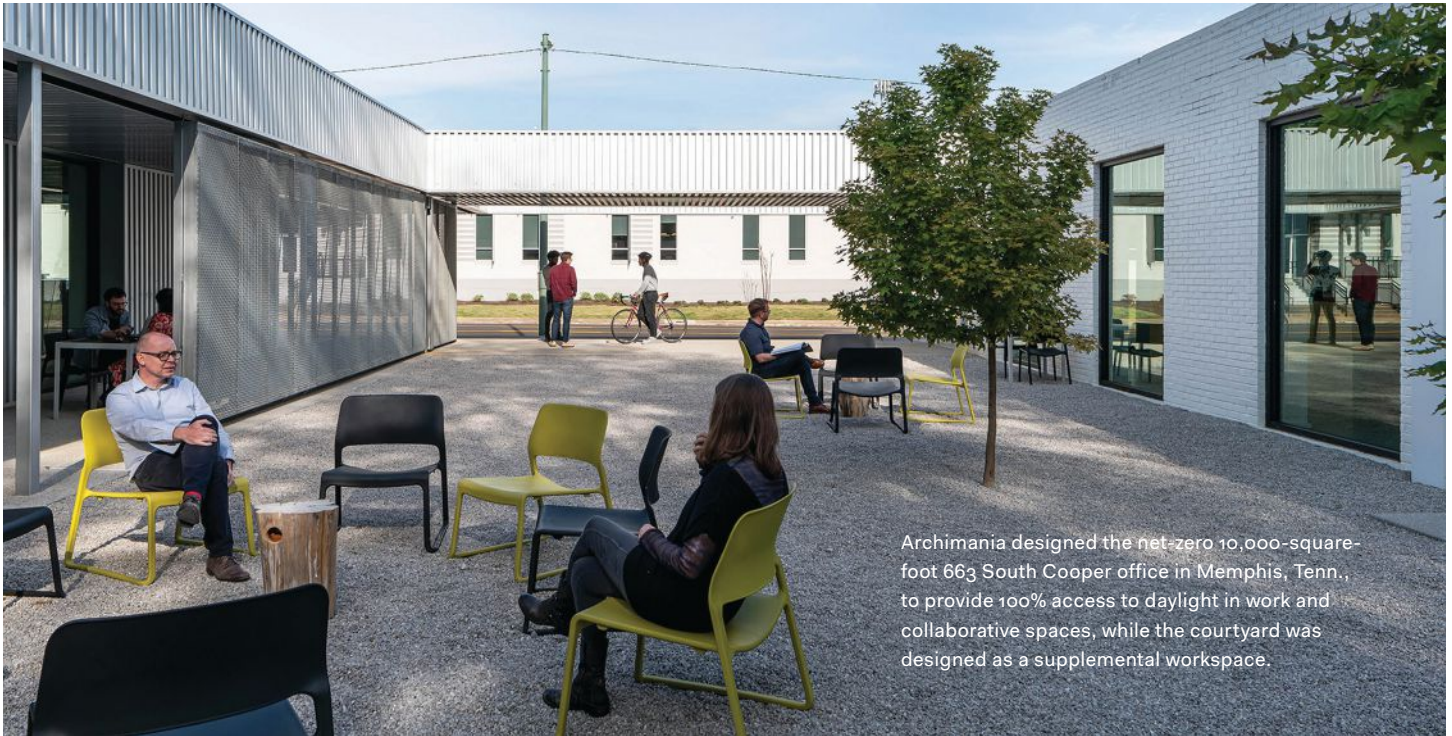


"This is a great place, a really great place to be. It's safe; it gives you peace of mind and security. It also makes you feel comfortable because you're around people willing to help you if you need help."

*Richard, U.S. Army, 1977–1981,
resident of Edwin M. Lee Apartments*

The Edwin M. Lee Apartments, by Leddy Maytum Stacy Architects and Saida+Sullivan Design Partners, are the first combined homeless veteran and low-income family development in San Francisco.





Archimania designed the net-zero 10,000-square-foot 663 South Cooper office in Memphis, Tenn., to provide 100% access to daylight in work and collaborative spaces, while the courtyard was designed as a supplemental workspace.

“The program provides multiple circulation routes to various interior and exterior amenities, including a variety of rooms that facilitate different kinds of work. Providing daylight throughout the building encourages users to choose spaces based on their need and easily move to them to accomplish tasks.”

Archimania, 663 South Cooper, as told to the COTE Top Ten committee

Addressing breakdown, however, isn’t only about developing new technologies, Mattern says, and instead requires an everyday practice of maintaining stability through carework. In many ways, the AIA Framework for Design Excellence—which asks architects to create narratives around their efforts to address ideas like “equity” and “community connectivity”—forces architects to think clearly about care as a linchpin to “sustainability” work.

This idea of care comes through most clearly in the Iowa-based Neumann Monson Architects design for the Iowa City Public Works building. Housing vehicles like plows and sanitation trucks, school and public buses, to be deployed across all city streets underscores the significance of these humble structures in the role of city care.

“These are the unsung heroes of our community,” says Jesse Bulman, AIA, a Neumann Monson project architect, of the people who work with this equipment. “They go out in the middle of the storm and clear the roads, plow the snow, they collect the garbage, make sure the water is running. These people make modern life modern.”

The building emerged as a part of a 2015 town master plan that consolidated city services into a 14-acre site. While it’s still in phase one of a multiyear process, the building has already solved a critical issue: Prior to its construction, Bulman says, maintenance sites were spread across the city in poorly maintained buildings, which often meant that parts of their community were cut off from maintenance services. Placing the new facility in this location allows service vehicles to reach all parts of the city—and being sandwiched between a public park and the Terry Trueblood Recreation Area has allowed the facility to become a venue for community gatherings. From the new facility, people and services flow both in and outward.



“One of the most significant features of the renovation was the repositioning of the front door. This was important not only because it made the entrance more accessible, but it was also meaningful from a symbolic perspective. The Boston Public Library’s charge is to remain ‘free to all’—making sure that our entrances are welcoming and part of the heart of our communities is an incredibly important piece of fulfilling that mission.”

Allen Knight, librarian for the Boston Public Library’s Roxbury Branch

Fourteen community meetings were held to identify goals for the Roxbury Branch renovation done by Utile, which included opening the library visually to the neighborhood and preserving existing programming while also expanding it with a makerspace and nutrition lab.

The project includes myriad sustainability tech components that elevated the facilities building to an anticipated LEED Gold certification, as well as adaptive “readiness” features that can withstand major flooding from the nearby river. More impressive still is that the new facility cuts the “deadhead” time for maintenance operators to commute to and from the facility—a form of care for the careworkers.

Attending to issues of care—who does it and who receives it—creates a feedback loop of nuanced “social grammars” critical to understanding contemporary racism and grappling with building justice into our environments, writes philosopher Olúfẹ́mi Táíwò in his book, *Reconsidering Reparations* (Oxford University Press, 2022).

“Our habits of thought and action also feed back into our material reality: The patterns of care, concern, and attention that we learn in our mundane interactions ultimately explain which sorts of bodies are taken into account when a building is designed,” Táíwò writes. And, responding to environmental catastrophe “requires a working epistemic infrastructure: robust networks of knowledge and trust.” Trust, as a function of historic decisions that prioritize care and attention for certain groups over others, must be established to properly attend to the climate crisis in a way that prioritizes justice for marginalized groups.

This type of trust-building comes into play at the Boston Public Library’s Roxbury branch revitalization by local firm Utile. Located in the historically Black Roxbury neighborhood, the library was a part of Boston’s great lineage of Brutalist public buildings. While the building’s extensive use of glass brick created a thermal bridge, requiring a total overhaul using a timber curtain wall, the primary focus for the public project was to reconnect the library with the community.

“The team gained a strong appreciation for the importance of fully open, safe, non-gender-specific spaces as a means to make everyone feel welcomed, secure, and at home in the spaces where they work at all hours of the day or night.”

*Lake|Flato Architects, Knox College Whitcomb Art Center,
as told to the COTE Top Ten committee*



After receiving student input about the need for gender-neutral bathrooms, the Whitcomb Art Center project team designed single-use undesignated restrooms, explaining to the COTE Top Ten committee that they “committed an act of civil disobedience to violate the state of Illinois’ building code, which mandated that all restrooms be designated only male or female.”





Local firm EHDD designed the Lick-Wilmerding High School Historic Renovation and Expansion project in San Francisco to be a physical manifestation of the school's public service ethos by creating a place that welcomed the outside community, including a large pedestrian sidewalk, an improved bus stop and sheltered plaza, and indoor meeting spaces that can host local nonprofits and community functions.

As told to the COTE Top Ten committee, the Boston-based firm Payette worked with Tufts University to create a Science and Engineering Complex that fosters "interdisciplinary research in biology, environmental science, and neuroscience while connecting two historic buildings to create a dynamic, community-focused, high-tech hub for open communication and cross-pollination."



“The new building has been instrumental in creating a stronger sense of community and meaningful partnerships. One big change in the new building was the decision to move the Center for Civic Engagement to the front of the school. The new location allows for easier access to our nonprofit partners and more opportunities for our students to engage in service and leadership. Tax Aid, a nonprofit that offers free tax services to low-income families, recently shared with us that our welcoming lobby and open space make LWHS an ideal location to host their events.”

Christine Godinez Jackson, director of The Center for Civic Engagement at Lick-Wilmerding High School

“The atrium at the SEC has been instrumental in building a sense of community among the engineering student community. Students meet up there to eat, show off final projects, receive awards, and meet alumni. Further, the Blake-Perlman lab borders on the atrium and has been a great place to experiment with new ways of teaching project-based courses.”

Chris Rogers, professor of mechanical engineering at Tufts University

Michael LeBlanc, AIA, a principal at Utile, characterizes the original building as “introverted.” “We were striving to make it an extrovert,” he says. As a library constructed after the civil unrest of the late 1960s, the building was meant to create a “quiet urban retreat”—a bit too successfully, LeBlanc says. As a result, LeBlanc recalls how then-Mayor Martin J. Walsh, who grew up visiting that branch, called it “the only public library in America constructed without a front door.”

“It just demonstrates that this building was not communicating well with its community, that it was not engaging its community in the proper way,” LeBlanc says. “That became the driving design agenda behind this whole project: to present a real and meaningful connective front porch to the community.” Library patrons can now look outward onto the plaza’s expanded footprint (made possible by the renovation), and those enjoying the plaza out front can see the library’s activities inside.

The resulting adaptive-reuse project dramatically lowered the excessive energy costs required to heat and cool the building—LeBlanc noted that Boston’s iconic Brutalist city hall building was the highest per-capita energy user in the city, and that the Roxbury branch was not “too far behind”—but it also made space for the neighborhood’s desires for public art and expanded programming. And, the library now hosts a nutrition lab: a space dedicated to teaching residents how to prepare nutritious meals on a time and financial budget. The renovation also made the library more accessible to users of all abilities.

Several other notable COTE-awardees include two projects in San Francisco: the Lick-Wilmerding High School renovation and expansion project, which retrofits a public school known for its commitment to student community service, and the Edwin M. Lee Apartments. Though not a public design project, the complex provides 62 apartments for formerly homeless veterans and 57 apartments for low-income families. These projects tout myriad sustainable features and strategies for climate mitigation, but at their core, the most exceptional projects provide a basis of care. The challenge is not about embracing new technological features for sustainability but is instead about communicating to the public how climate mitigation and care should be overlapping endeavors. Then, when the public will bend toward issue areas like equity or inclusion, sustainability becomes an integral part of those public demands.

Arathi Gowda, AIA—a principal of ZGF Architects’ Project Performance Team, COTE leader, and a steering member of US Architects Declare—has struggled to make connections between various AIA groups working in, and between, sustainability and equity. At an August national committee meeting that brought DEI groups, COTE, and 2030 Committees together, Gowda found some frustration in what seemed like ships passing in the night.

“The DEI team came totally focused on the education track. And the 2030 team came out talking straight about carbon,” Gowda says. “To me, any critique of all of this work just has to say that people are well intentioned, but we have a weak flank in the industry: We are not connecting these things.” Much of the trouble, she continues, comes from the siloing of design professions—some designers focus on



“When Louisiana Children’s Museum opened in 2019, no one anticipated the challenges of a global pandemic or the opportunity to activate LCM’s unique vision. Like most businesses, LCM closed its doors. But soon after, our 8-acre site reopened as an expansive classroom for 100 local school children, providing a healthy and dynamic learning experience in the face of great challenges in education. The result was unprecedented learning gains for the students, training for educators to effectively use LCM as their classroom, and confirmation that connecting children to nature and a child-centered approach to multisensory play is beneficial to early learners.”

Lauren Clay, interim CEO, Louisiana Children’s Museum

sustainability while others focus on community engagement—which can lead to what she calls “community-washing,” or the practice of measuring successful community engagement through, for example, the number of public meetings held and walkability scores versus a deeper dive into community tensions, barriers to public meeting attendance, and the distribution of power to those who live in the project’s neighborhood. With little connection between sustainability and care, project “successes” get reduced to the COTE spreadsheet measurements.

“The community measurements aren’t as developed, using walk scores versus informing or partnership or actual citizen control, which is what it should be like in actual dialogue with communities,” she says.

What this can lead to is a public perception that community life is disconnected from climate-resilient design. Walkability, for example, is a measurable sustainability metric, but it can also increase public safety à la Jane Jacobs’ “eyes on the street” and social cohesion that generates trust. The Iowa Public Works building might manage water sustainably and reduce driving time for diesel-fuel vehicles, but it also reconnects residents with critical city services, allowing them to build greater trust with city management. Framing sustainability through care allows designers to focus their efforts on the most

The Louisiana Children’s Museum in New Orleans, a project by Mithun and associate architect firm Waggonner & Ball, was designed to address storm-related trauma and the state’s low rankings in educational outcomes. The project team did this, they told the COTE Top Ten committee, by combining “environmental education and colocation of community resources with conventional children’s play elements.”

Local firm Lever Architecture worked with the Meyer Memorial Trust to create a headquarters in Portland, Ore., that would create “positive transformation without spurring gentrification,” as told to the COTE Top Ten committee. The process included frequent community engagement and sourcing project materials from BIPOC-owned, woman-owned, and emerging small businesses.



“We are located in the Albina neighborhood of Portland, which has deep roots and historical significance for our Black community. We’re also located in Oregon, which has a complex and difficult history in its treatment of people of color, including the Indigenous peoples who were here since time immemorial. We hope that when community comes through these doors, they feel a deep sense of welcome, belonging, and hope.”

Phoebe O’Leary, interim CEO, Meyer Memorial Trust

climate-vulnerable groups and communities, while also relieving the measurability-heavy burdens of public demand for resilient infrastructure. Sustainability, then, becomes a loop of care, repair, and resilience—rather than a simple series of metrics made possible through building features.

In some ways, the COTE Top Ten Awards is a flawed system for recognizing sustainability in design. But those flaws are not always the result of failures from within the industry. Without large-scale mandates demanded by residents, supported by public funds, and enforced with political teeth, sustainability will remain relegated to features, tech, and innovation. As Michelle Addington, dean of the University of Texas at Austin School of Architecture recently told me, “one of the things—and this is about our profession writ large—is that we really like the types of sustainable solutions that don’t require us to do anything really different.”

Perhaps the impetus for doing something different must begin with a new lens—not the Greenzo-ification of sustainability, nor an endless showcase of technologies, but the pursuit of compassionate care in our work toward building a more resilient future for everyone.

Exploring How Propane-Fueled Hydronic Heating Technologies Improve Sustainability and Occupant Comfort

Presented By:



LEARNING OBJECTIVES

1. Analyze how hydronic heating can help building owners overcome space-heating challenges such as energy efficiency and thermal comfort.
2. Examine radiant hydronic heating, including how the technology works and how it improves occupant comfort and energy efficiency.
3. Understand how forced-air hydronic technology works with both boilers and tankless water heaters, and how it can help to save money and energy while improving occupant comfort.
4. Explore case studies where hydronic heating was used to increase energy efficiency and improve occupant comfort.

CONTINUING EDUCATION

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ENERGY CHALLENGES

There have been dramatic improvements in the energy efficiency of buildings over the past two decades, but energy use for heating and cooling is still a large portion of the total national energy use and provides a significant opportunity for further reductions.¹ In fact, although it is no longer a majority, energy use for heating and air conditioning still accounts for 48% of the primary energy consumed in United States residences.² And according to the Radiant Professionals Alliance, “Of the roughly 59 billion square feet of total commercial floor space, about 82 percent is heated and 61 percent is cooled.”

When considering net zero performance goals, it’s critical to improve the energy efficiency of HVAC systems and appliances because of how much energy they consume in buildings. But it would be cost-prohibitive to design with standard HVAC systems and appliances then generate the required energy through on-site renewables.³ It is far more practical to reduce energy needs through efficiency gains and then make up the remaining energy needs via on-site renewables. Whether designing a standard or net zero building, these efficiency gains can be accomplished with propane-fueled hydronic heating systems.

A SOLUTION: HYDRONIC HEATING

According to the Radiant Professionals Alliance, hydronics are a heating or cooling system that transfers energy by circulating a fluid through a network of pipes using mechanical systems, including, but not limited to, renewable and nonrenewable energy sources, energy recovery, associated equipment, and appliances for space heating and cooling. In addition to home heating and cooling, hydronic systems can be used for potable and nonpotable water heating, swimming pool or process heating, solar thermal systems, snow melt and frost protection systems, dehumidification, and humidification.⁴



It's important that comfort not be ignored, as even small residential heating systems affect the health, productivity, and comfort of occupants. Properly designed hydronic systems control both the air and surface temperature of rooms, and it's easier to maintain a comfortable humidity level with hydronic systems.

Hydronic heating systems use hot water and glycol to move heat from where it's produced to where it's needed to heat a home or commercial building. The hot water usually comes from a boiler, although it can also come from a tankless water heater or electric heat pump. Appropriate Designs, a team of engineering professionals dedicated to advancing the use of modern hydronic heating, notes: "The water within the system is neither the source of the heat nor its destination, but only its 'conveyor belt.' Heat is absorbed by the water at a heat source, conveyed by the water through the distribution piping, and finally released into a heated space by a heat emitter. Modern hydronics technology enables heat to be delivered precisely when and where it is needed."⁵

There are two types of hydronic heating — radiant hydronic and forced-air hydronic. Radiant hydronic uses hot water to directly heat the building through radiant floor heating, baseboards, or radiators, while forced-air hydronic uses a hot-water loop in the air handler to heat the air that runs through the building (like a furnace but with hot water instead of gas heat). Whereas heat pumps deliver register temperatures that can feel cool at around 95 degrees Fahrenheit (below human body temperature), gas furnaces deliver heated air at around 140 degrees. And air handlers with a hydronic

heating loop can reach a cozy level of about 130 degrees. We will discuss each of these technologies in more detail in the following learning objectives.

ADVANTAGES OF HYDRONIC HEATING

There are many advantages of hydronic heating, including increased comfort, energy savings, and design versatility.

Comfort⁶

Although providing a comfortable environment should be the primary objective of any heating system designer or installer, this goal is often compromised by other factors such as cost. But it's important that comfort not be ignored, as even small residential heating systems affect the health, productivity, and comfort of occupants for the entire lifecycle of the building or until a better system is installed. Unfortunately, we tend to simply "deal with" uncomfortable heating and cooling systems by wearing layers, using blankets, or otherwise compromising our thermal comfort because stasis seems impossible. According to Appropriate Designs: "Often people who have lived with uncomfortable heating systems simply don't realize what they have been missing. In retrospect, many would welcome the opportunity to have truly comfortable buildings and would willingly spend more money (if necessary) to achieve it."

GLOSSARY

Air Temperature Stratification: The tendency of warm air to rise toward the ceiling while cool air settles to the floor.

Combi-Boiler: A residential condensing gas combination boiler (combi-boiler) that provides both space heating and domestic hot-water heating.

Convection: The natural circulation of heat within a room as air warmed by the floor rises.

Dry-Installed Radiant Floor System: An installation method where radiant floor tubing is sandwiched between two layers of plywood or is attached under the finished floor or subfloor.

Forced-Air Heating Systems: HVAC systems that use air to transfer heat from the furnace to the rooms that require heating.

Forced-Air Hydronic Heating: HVAC systems that use water or steam to transfer heat from the boiler to the room.

Hydronic Heating: A heating or cooling system that transfers energy by circulating a fluid through a network of pipes using mechanical systems, including, but not limited to, renewable and nonrenewable energy sources, energy recovery, associated equipment, and appliances for space heating and cooling.

Radiant Heat Transfer: Radiant heat is the effect you feel from the warmth of the sun or a fireplace that's across the room; radiant heat transfer is the delivery of heat directly from the hot surface to the people and objects in the room via infrared radiation.

Tankless Water Heater: Water heaters that heat instantly without the use of a storage tank and do not retain any water internally, except for what is in the heat exchanger coil.

Wet-Installed Radiant Floor Systems: Those that use cables or tubing embedded in a concrete slab foundation or in a thin layer of lightweight concrete on top of a wooden subfloor; they are the oldest form of radiant floor system.



Hydronic systems can use a wide variety of energy sources to heat the liquid, including standard propane-, gas-, or oil-fired boilers; wood-fired boilers; solar water heaters; or a combination of these sources.

To optimize comfort and accommodate how the body releases heat, the interior environment must balance air temperature, average surface temperature, and relative humidity. Fortunately, properly designed hydronic systems control both the air and surface temperature of rooms, and it's easier to maintain a comfortable humidity level with hydronic systems. In addition, while both traditional HVAC and hydronic systems can be zoned to allow individuals to adjust the temperature in their space, hydronic systems are easier to control.

Energy Savings⁷

Otherwise identical buildings can have significantly different rates of heat loss based on the types of heating systems installed and how the heat is replaced. According to *Appropriate Designs*: "Buildings with hydronic heating systems have consistently shown lower heating energy use than equivalent structures with forced-air heating systems. Another factor affecting building energy use is air temperature stratification, which is the tendency of warm air to rise toward the ceiling while cool air settles to the floor. Hydronic systems that transfer the majority of their heat by thermal radiation reduce air temperature stratification, and thus reduce heat loss through ceilings. Comfort can often be maintained at lower air temperatures when a space is radiantly heated."

Design Versatility

Hydronic heating systems also offer design versatility, with several technologies and many additional options that can change based on the aesthetics, comfort, usage, and budget constraints of building owners. A single system can supply space heating, domestic hot water, and specialty loads such as snowmelt systems and pool heating, which reduces installation costs because redundant components such as multiple heat sources, exhaust systems, electrical hookups, and fuel supply components are eliminated.⁸

Multiple Fuel Sources

Most hydronic (liquid-based) systems use little electricity, a benefit for homes off the power grid or in areas with high electricity prices.⁹ In addition, hydronic systems can use a wide variety of energy sources to heat the liquid, including standard propane-, gas-, or oil-fired boilers; wood-fired boilers; solar water heaters; or a combination of these sources. Compared with oil, propane and gas systems offer better modulation and control that lead to higher-efficiency systems. Having propane available also allows homeowners to include other gas features such as a propane pool heater to extend the pool's swim season, gas log fireplaces, gas cooking appliances, and gas lines to outdoor grills and smokers.¹⁰

APPLICATIONS

There are numerous applications for hydronic heating, ranging from single- and multi-family residential to commercial buildings and specialty applications such as snowmelt systems and pool heating.

Residential

Hydronic radiant heating is popular in homes in the Northeast, as well as in custom homes. In addition to its comfort benefits, radiant heating can provide design benefits by allowing architects to reduce or eliminate ductwork in a home, often in combination with ductless mini split air conditioning.



More single-family residential builders will embrace hydronic heating systems as homebuyers already familiar with the benefits of energy-efficient tankless water heaters learn that those energy- and water-saving devices can also help heat their homes.

While forced-air hydronic heating is still in the early stages among single-family homebuilders, the technology appears more commonly in light commercial buildings such as townhomes, condominiums, and apartments, all of which can utilize the compact size of the tankless water heater/air handler combination. More single-family residential builders will embrace hydronic heating systems as homebuyers already familiar with the benefits of energy-efficient tankless water heaters learn that those energy- and water-saving devices can also help heat their homes. The energy efficiency of the two-appliance system can also play a role in sustainable design, as heating air with hot water is an efficiency double play.

Commercial

In commercial buildings such as large warehouse projects, the ability of radiant heating systems to deliver heat efficiently over large surface areas makes them a smart choice. The boom in e-commerce has only accelerated since the pandemic, driving continuing growth in the construction of large distribution centers and warehouses. These large buildings utilize a variety of heat sources, but in Radiant & Hydronics, George Youngvorst argues that radiant heating should be given more consideration. "The larger the building footprint, the more incentive there is to use radiant heating," Youngvorst writes. "A well-designed radiant system can more efficiently deliver heat over large surface areas than forced air. It is also much easier to create zones that regulate temperatures to be warmer in some areas and cooler in others. There are few to no obstacles for the shelving to work around and the owner can 'go up' as high as needed without concern for air vents." In addition, to find enough affordable space for large warehouses, companies are moving to where land is cheaper, which frequently means less-developed areas without natural gas infrastructure. With propane's versatility, architects and building owners can meet the



This article continues on
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QUIZ

- Although it is no longer a majority, energy use for heating and air conditioning still accounts for _____ of the primary energy consumed in United States residences.

A. 25%	C. 48%
B. 38%	D. 49%
- Hydronic heating systems use _____ to move heat from where it's produced to where it's needed to heat a home or commercial building.

A. Hot water	D. Natural gas
B. Air	E. Both A and C
C. Glycol	
- Which of the following systems use a hot-water loop in the air handler to heat the air that runs through the building (like a furnace but with hot water instead of gas heat)?

A. Radiant hydronic	C. Heat pump
B. Forced-air hydronic	D. Gas furnace
- Which of the following is a benefit of hydronic heating?

A. Occupant comfort	D. Multiple fuel sources
B. Energy savings	E. All of the above
C. Design versatility	
- Hydronic systems use _____ as the heat-carrying medium and are the most popular and cost-effective radiant floors for heating-dominated climates.

A. Radiant air	C. Electricity
B. Hot water	D. Refrigerant
- Which radiant floor installation method is becoming more popular because the tubing is run in the air space beneath the floor and it is faster and less expensive to install?

A. Wet installation	C. Above ground
B. Dry installation	D. None of the above
- When air is heated above _____ degrees Fahrenheit in a conventional system, dust particles become more reactive and irritating to occupants because they are essentially burning on the heating elements (dust singe).

A. 100	C. 120
B. 110	D. 130
- Unlike conventional systems such as baseboard heating and forced-air heating, radiant systems are more efficient because they eliminate duct losses, which can waste up to _____ of the energy in certain building types.

A. 10%	C. 30%
B. 20%	D. 40%
- Which of the following is a benefit of forced-air hydronic technology with a tankless water heater?

A. Less extreme heat that avoids stratification	D. No smell
B. Heat is more even and less dry than from a traditional gas furnace	E. Easier installation
C. Requires only one gas appliance	F. All of the above
- Since the water heater is the source of heat for both the air and the water, hydronic systems are as efficient as the tankless water heaters they run on, which can achieve efficiency levels around _____.

A. 80%	C. 90%
B. 84%	D. 94%

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Exploring the WELL Building Standard and the Plumbing Industry's Role in Health and Wellness

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LEARNING OBJECTIVES

1. Understand the need for healthy buildings and the importance of the WELL Building Standard and the International WELL Building Institute.
2. Introduce the 10-Concept WELL Certification framework.
3. Explore how commercial restroom products can help designers achieve WELL Certification.
4. Identify how reducing water consumption in commercial restrooms impacts the health and well-being of building occupants and technologies that have been developed to overcome perceived challenges.

CONTINUING EDUCATION

This course is approved for AIA, IDCEC, GBCI, and ASPE Learning Unit Credits.



Use the learning objectives to focus your study as you read this article. For details on the learning units or credit information, and to earn credit and obtain a certificate of completion, visit <http://go.hw.net/AR9223> to view the entire CEU and complete the quiz. If you are new to Hanley Wood University, CEU courses are free of charge once you create a new learner account; returning users log in as usual.

IMPORTANCE OF OCCUPANT HEALTH AND WELL-BEING IN THE BUILT ENVIRONMENT

The buildings we live, work, go to school, and spend our free time in can have a compounding effect on our mood, productivity, and long-term health. This effect can either be positive or negative based on the spaces we occupy but, in general, the majority of North Americans are spending enormous amounts of time in “sick” buildings. These buildings are at risk for Sick Building Syndrome (SBS), which “is used to describe situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified.”¹ A 2021 survey by Savanta and Clear Inc. of 1,165 participants, ages 18 and

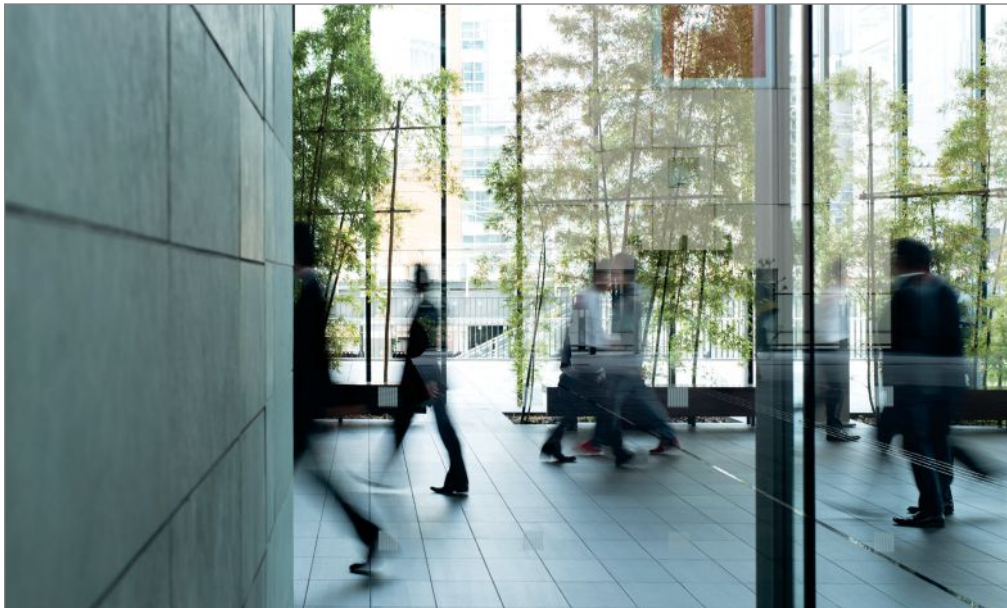
over across Canada and the US, “found that 73% of North Americans do not consider the indoor air and water in office, condominiums, and hotel buildings to be safe.”²

Americans spend approximately 90% of their time indoors, compounding the health effects of poor indoor environmental quality caused in part by the multitude of chemicals used in building products and construction.³ Indoor air quality, thermal comfort, lighting, and acoustics in a building, among many other factors, can significantly affect the productivity and comfort of building occupants. Hygiene is also supremely important, especially due to increased concerns resulting from the pandemic. “Research reflects that our health and happiness are impacted by our built

environments,” but we’ve been building, working, and living in buildings that are not supportive, and indeed are sometimes harmful, to our physical and mental well-being.⁴ Fortunately, consumers and the design industry are taking notice, and there is a more conscious effort, even a responsibility, to plan, design, and develop for well-being.

Indoor Air Quality (IAQ)

While it’s long played an important role in building design, there is an increased focus on indoor air quality (IAQ) due to the pandemic, with IWBI noting: “Because of COVID-19, everyone – from parents and school administrators to employees and facility managers – not only better understands the importance of the quality of the air we’re



The buildings we live, work, go to school, and spend our free time in can have a compounding effect on our mood, productivity, and long-term health.

breathing inside our buildings, but also the outsized role clean, ventilated air can play in keeping us safe.”⁵

IWBI has been “calling for more government action at all levels to support and better deploy indoor air strategies and solutions,” and in early 2022, President Biden released his National COVID-19 Preparedness Plan, which “doubles down on the critical work to better support schools, companies, and organizations in taking measures to improve indoor air quality.” They are giving these facilities the tools they need to improve ventilation and are launching a Clean Air in Buildings Challenge outlining “key strategies to improve ventilation in buildings and implement cost-effective ventilation and air filtration improvements in buildings.”⁶



Proper lighting, with a mix of natural and artificial lighting, is extremely important to the well-being and productivity of building occupants.

Architects can play an outsized role in this effort by not only designing buildings and systems that provide more frequent air exchanges and optimize filtration, but also by specifying products with low VOC emissions to further improve indoor air quality for occupants.

Thermal comfort

Thermal comfort is a subjective measure, and it's very difficult to satisfy the needs of all building occupants. But, it greatly influences how we experience a space, “impacting individual levels of motivation, alertness, focus, and mood,” as well as a building's energy consumption. Therefore, it is extremely important that designers make every effort to consider the thermal comfort of as many users as possible.⁷

Lighting

Proper lighting, with a mix of natural and artificial lighting, is extremely important to the well-being and productivity of building occupants. It can minimize disruption to the body's circadian system, support quality sleep, enhance productivity, and of course provide the light necessary to safely complete tasks.⁸ In addition, more exposure to natural light while indoors increases the amount of serotonin the brain produces, which can improve occupant mood.

GLOSSARY

Automatic Line Purge: Plumbing fixtures such as water closets, urinals, and faucets that can be programmed to automatically purge potable plumbing lines, which helps to keep water moving even if users aren't in the building or using a particular product frequently; this feature can greatly reduce the potential for complications and health risks associated with stagnant water.

Closed System Soap/Sanitizer Dispenser: Closed systems utilize cartridges or bags that are sealed from the air and fit into the dispenser, fully eliminating the risk of soap/sanitizer contamination.

Electronic Sensing Technologies: Electronic plumbing fittings that offer sanitary, touch-free operation, while conserving water and energy in that they only dispense water when the sensor detects a user and can also limit water delivery duration.

Electronic Soap Dispenser: Sensor-activated soap dispensers automatically dispense a pre-measured amount of liquid soap or foam soap to reduce waste while delivering the convenience of touch-free operation.

HEPA Air Filter: A hand dryer filtration system that removes 99.97% of potentially present bacteria at 0.3 microns from the air.

Hydrophobic and Oleophobic Glaze: A glaze that imparts permanent hydrophobic (water-repellent) and oleophobic (oil-repellent) properties to vitreous china to keep it looking cleaner, longer.

Legionella: A waterborne pathogen that can cause a serious pneumonia-type illness called Legionnaire's disease.

Pressurized Flushing: The technology in a pressure-assisted system that offers improved flushing performance to efficiently eliminate waste to keep toilet bowls cleaner; the pressure supplied by the pressurized flushing vessel pushes waste out of the bowl and into the drainline far faster than a standard gravity flush.

Sick Building Syndrome (SBS): Situations in which building occupants experience acute health and comfort effects that appear to be linked to time spent in a building, but no specific illness or cause can be identified.

WELL Building Standard: A performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and well-being.

Acoustics

Noise is ubiquitous, but this unwanted sound coupled with poor building acoustics can negatively influence the health and well-being of occupants. According to the WELL Building Standard, “Built environments can harbor sounds that are distracting and disruptive to work or relaxation. Employee surveys show that acoustic problems are a leading source of dissatisfaction within the environmental conditions of an office.” But an acoustically sound environment can increase focus, improve speech intelligibility, enhance privacy, and reduce stress. This can be accomplished by designing spaces that “mitigate unwanted indoor noise levels and reduce exterior noise intrusion in order to enhance social interaction, learning, satisfaction, and productivity.”⁹

Hygiene and cleanable surfaces

Hygiene, sanitation, and accessibility are hot topics, especially considering the COVID-19 pandemic. Architects and allied professionals are in a unique position to coordinate a range of mitigation strategies that can reduce bacteria, multiple touch points, and cross-



Architects and allied professionals are in a unique position to coordinate a range of mitigation strategies that can reduce bacteria, multiple touch points, and cross-contamination in buildings by specifying antibacterial and hydrophobic materials, providing sensor-operated, touch-free appliances, and requiring better cleaning protocols.



Plumbing manufacturers are laser-focused on hygiene, sanitation, and accessibility and are developing products that play an essential role in the fight against the spread of disease and can help projects earn points toward WELL Certification.

contamination in buildings by specifying antibacterial and hydrophobic materials, providing sensor-operated, touch-free appliances, and requiring better cleaning protocols.

Water

In addition to providing hydration for building users, water plays a large role in other aspects of building design and operation. It is frequently used in heating and cooling systems, plumbing, irrigation, pools and baths, and general appliances. Because of the widespread use of water in many systems, it presents significant opportunity for contamination that must be mitigated. One example is the need to control Legionella, a waterborne pathogen that can cause a serious pneumonia-type illness called Legionnaire's disease.¹⁰ Additionally, if water from any source wets building materials that are not moisture resistant, it sets up prime conditions for mold, mildew, and bacteria growth.

It's important to reduce health risks due to contaminated water and excessive moisture within buildings and provide adequate sanitation through better infrastructure design and operations coupled with awareness and maintenance of water quality. Thoughtful building design that integrates responsive operations and allows for easy and meaningful means of inspection can mitigate these risks. Careful material research and

selection, intentional design and detailing, and construction of high-performance assemblies is extremely important in meeting the challenges we've just discussed and providing an environment that is safe, healthy, and comfortable for occupants.

Thanks to an evolving evidence base, the industry understands more about the relationship between the physical environment and human health than ever before.¹¹ “We know how to create spaces that enhance – rather than hinder – health and well-being. We can measure – and then improve – the quality of our air, water, and light. And we can design environments that fuel our bodies, move us, keep us connected, inspire our best work, and facilitate a good night's sleep.”¹²

INTRODUCTION TO THE WELL BUILDING STANDARD

The International WELL Building Institute (IWBI) has taken up the mantle of wellness in the built environment and oversees the world's premier framework for advancing health in buildings and spaces of all kinds: the WELL Building Standard (WELL). WELL is similar to LEED, but WELL focuses more on the building occupant versus the environmental impact and sustainability of the building itself so that designers have a way to measure how their buildings improve health and well-being.

LEED is the most widely used green building rating system and has been around for over two decades, since it was created by the U.S. Green Building Council in 1998.¹³ LEED criteria focus on the overall impact to the environment, such as optimizing energy performance, carbon footprint reduction, and sustainable water management. WELL Certification, on the other hand, sets standards for air, water, nourishment, and light, among other concepts, that are aimed to improve occupant health and wellness. "WELL applies the science of physical and social environments to benefit the health, well-being, and performance of people."¹⁴

The International Well Building Institute launched WELL v1.0 in 2014. It is now in its second iteration and is growing exponentially. "The WELL Building Standard™ version 2 (WELL v2™) is a vehicle for buildings and organizations to deliver more thoughtful and intentional spaces that enhance human health and well-being."¹⁵ In the 6 months between August 2020 and February 2021, WELL grew from 4,200+ registered projects covering 550M+ square feet of real estate in 62 countries, to 15,600 registered projects covering 2.1B+ square feet in 82 countries, with the majority in the United States (9,900).

10 CONCEPTS AND RELATED FEATURES

WELL is based on 10 Concepts:

- Air
- Water
- Nourishment
- Light
- Thermal comfort
- Materials
- Movement
- Sound
- Mind
- Community

Each concept consists of several features that are either performance-based or prescriptive.



This article continues on
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QUIZ

1. _____ greatly influences our experiences in the places where we live and work and is one of the highest contributing factors influencing overall human satisfaction in buildings, impacting individual levels of motivation, alertness, focus, and mood.

A. Indoor air quality	C. Lighting
B. Thermal comfort	D. Acoustics
2. Which of the following is a strategy for architects and allied professionals to help in reducing bacteria, multiple touch points, and cross-contamination in buildings?

A. Specifying antibacterial and hydrophobic materials	C. Requiring better cleaning protocols
B. Providing sensor-operated, touch-free appliances	D. All of the above
3. _____ is a waterborne pathogen that can cause a serious pneumonia-type illness.

A. Mold	C. Staphylococcus aureus
B. E. coli	D. Legionella
4. _____ criteria focus on the overall impact to the environment, while _____ certification sets standards for air, water, nourishment, and light that are aimed to improve occupant health and wellness.

A. WELL, LEED	C. LEED, WELL
B. IWBI, GBCI	D. IAQ, WELL
5. _____ standards allow flexibility in how a project meets acceptable quantified thresholds, while _____ standards require specific technologies, design strategies, or protocols to be implemented.

A. Performance-based, prescriptive	C. LEED, WELL
B. Prescriptive, performance-based	D. WELL, LEED
6. Under Hygiene Support _____, toilets must be equipped with hands-free flushing, contactless soap dispensers and hand drying must be provided, and users must be able to exit the bathrooms hands-free.

A. Part 2: Enhanced Bathroom Accommodation	C. Part 4: Provide Handwashing Supplies and Signage
B. Part 3: Support Effective Handwashing	D. Beta: Non-potable Water Reuse
7. _____ are the primary tool used to create efficiencies, sustainability, and hygiene in commercial restrooms.

A. Sensors	C. Electronic faucets
B. Automatic shut-offs	D. ADA fixtures
8. Under WELL Feature X07 - Materials Transparency Part 2 - Select Products with Enhanced Ingredient Disclosure, a point can be earned if at least _____ permanently installed products disclose ingredients down to 100 ppm (parts per million).

A. 5	C. 15
B. 10	D. 20
9. Which technology offers improved flushing performance to efficiently eliminate waste to keep toilet bowls cleaner?

A. Concealed flushometer	C. Automatic line purge
B. Pressurized flushing	D. Hybrid urinals
10. Which technology helps to keep water moving through the plumbing lines even if users aren't in the building or using that particular product frequently?

A. Concealed flushometer	C. Automatic line purge
B. Drainline carry	D. Hybrid urinals

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Sloan is the world's leading manufacturer of commercial plumbing systems. Sloan has been at the forefront of the green building movement since 1906 and provides sustainable restroom solutions by manufacturing water-efficient products such as flushometers, electronic faucets, soap dispensing systems, sink systems, and vitreous china fixtures for commercial, industrial, and institutional markets worldwide.



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Editorial: Reshaping Our Commemorative Landscapes

TEXT BY PAUL MAKOVSKY

If you visit any city or town and take a walk through a public park, chances are you'll encounter statues, plaques, or place names that commemorate, memorialize, and honor people or events. More often than not, it's a tribute to war and not to peace, and if there's a statue, it's rarely to celebrate a woman. When it comes to monuments and memorials, the art critic and philosopher Arthur C. Danto perhaps said it best: "We erect monuments so that we shall always remember, and build memorials so that we shall never forget." It's a good starting point, but it's a lot more complicated than that.

In 2020, the Andrew W. Mellon Foundation, the largest humanities philanthropy in the United States, pledged to spend a quarter of a billion dollars over five years "to help reimagine the country's approach to monuments and memorials in an effort to better reflect the nation's diversity and highlight buried or marginalized stories." The Monuments Project—as it's called—is the largest initiative in the foundation's 50-year history, and it supports "the creation of new monuments, as well as the relocation or rethinking of existing ones." Initial grants were handed out to existing projects, such as the expansion of artist Judith Baca's Great Wall of Los Angeles mural, one of the country's largest monuments to interracial harmony. Another grant went toward the completion of the North Carolina Freedom Park in Raleigh, honoring the history of Black North Carolinians.

Architects and designers are also part of the Mellon-funded initiatives: Zena Howard, FAIA, of Perkins&Will is continuing the work of the late Phil Freelon with the Freedom Park; Theaster Gates and SCAPE Landscape Architecture are collaborating on a commemorative project at Tom Lee Park in Memphis, Tenn.; and MASS Design Group is collaborating on the King Boston memorial, sited on the Boston Common, where, in 1965, Martin Luther King Jr., "called on Boston to live by its highest ideals," according to the memorial's website.



The King Boston memorial, *The Embrace*, will be located in Boston and dedicated to Martin Luther King Jr. and Coretta Scott King. The forthcoming project was designed by artist Hank Willis Thomas and MASS Design Group's Public Memory and Memorials Lab, with funds from the Mellon Foundation.

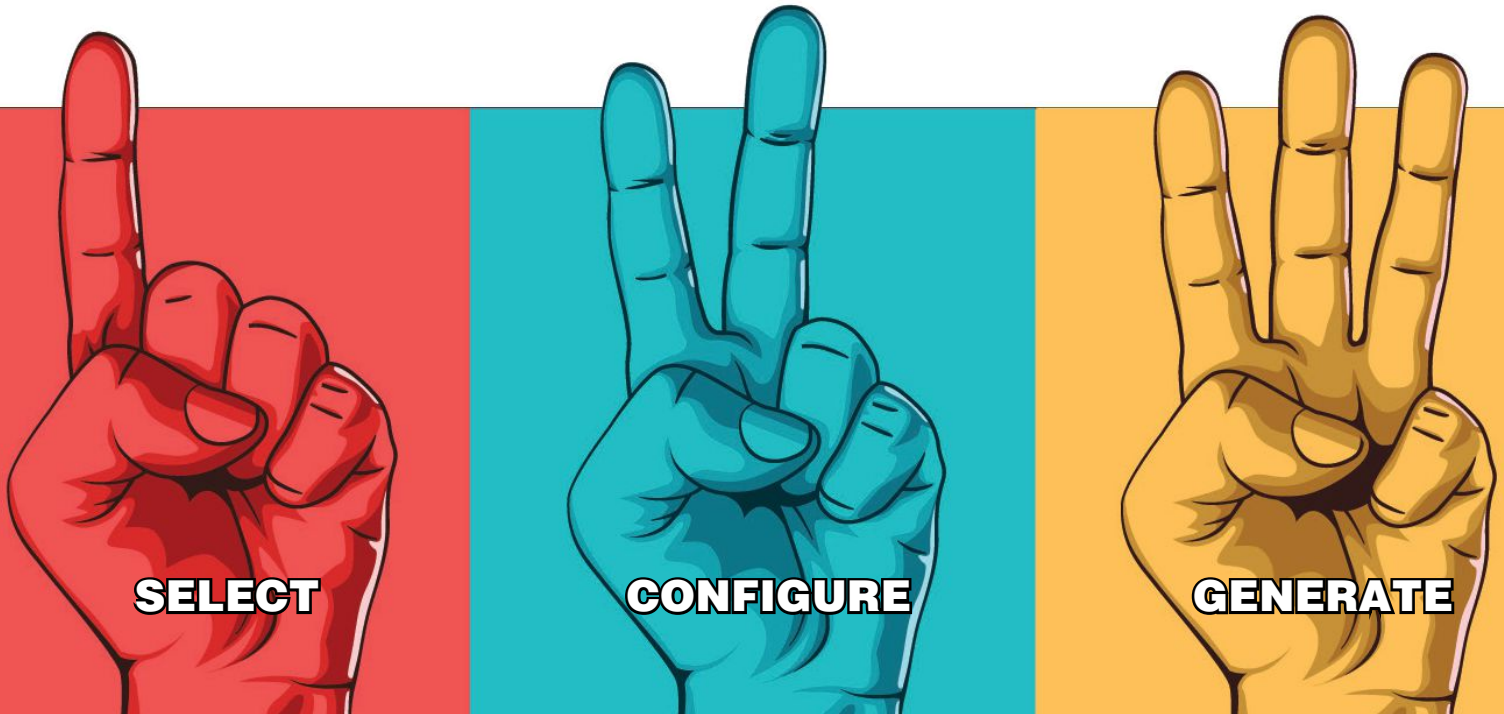
A Monuments Project grant supports the Monument Lab, a nonprofit public art and history studio in Philadelphia, which audited—drawing from records of approximately 50,000 conventional monuments—the existing commemorative landscape in the U.S. Not surprisingly, the resulting report, "National Monument Audit," found that 200 public monuments celebrate Abraham Lincoln in the U.S., with George Washington and Christopher Columbus coming in second and third, respectively. As the report states, "the story of the United States as told by our current monument landscape misrepresents our history."

Building on that audit, the Mellon Foundation has awarded more grants that support thinkers probing the definition of a monument and exploring new approaches to commemoration. The foundation's website describes how in Alabama and South Carolina, for example, Wideman Davis Dance is engaging histories of antebellum and post-industrial architecture that "invoke the legacies of slavery" through interactive dance-based performances. The company "involve[s] local communities and engage[s] live audiences in antebellum histories as told through dance," reconceptualizing the form of a monument. In Lawrence, Kan., the Kaw Nation, community organizers, and the city are relocating a sacred stone (*Iⁿ'zhúje 'waxóbe*)—a 25-ton glacial stone with spiritual and cultural significance to the Kanza people of the Kaw Nation—to its rightful location. The organizations are also building infrastructure and interpretive programming at the stone's natural site, as well as in Lawrence at what will be the stone's former site.

The Monuments Project addresses questions about how we make and shape our public spaces, and about whose stories are preserved and celebrated. It's also creating new commemorations that will expand the American story—telling a more complete and complex story of who we are as a nation.

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