

Studio J. Jih  
Future Firm  
Design Opera  
Building Electrification

A'22 Product Picks  
Parental Leave in Architecture  
President-Elect Kimberly Dowdell  
Designers Select Smart-Home Technology

architectmagazine.com  
The Journal of The American  
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## Building Community in Tijuana

Using local concrete,  
Design Opera creates  
a bespoke response  
to the housing crisis

### INSIDE:

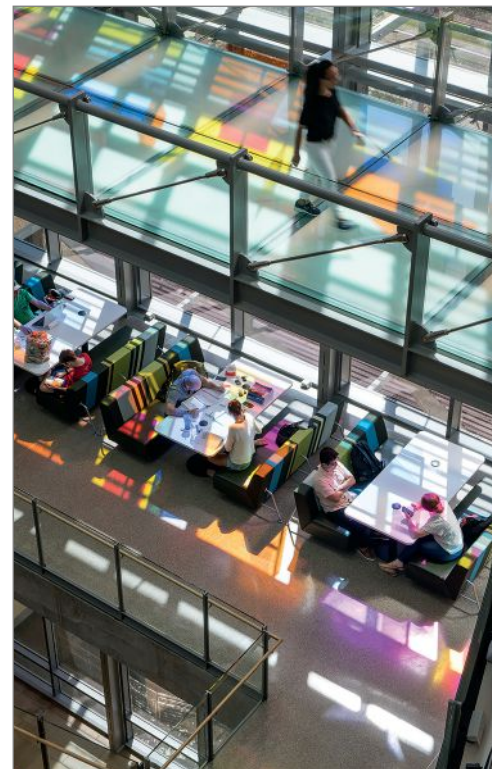
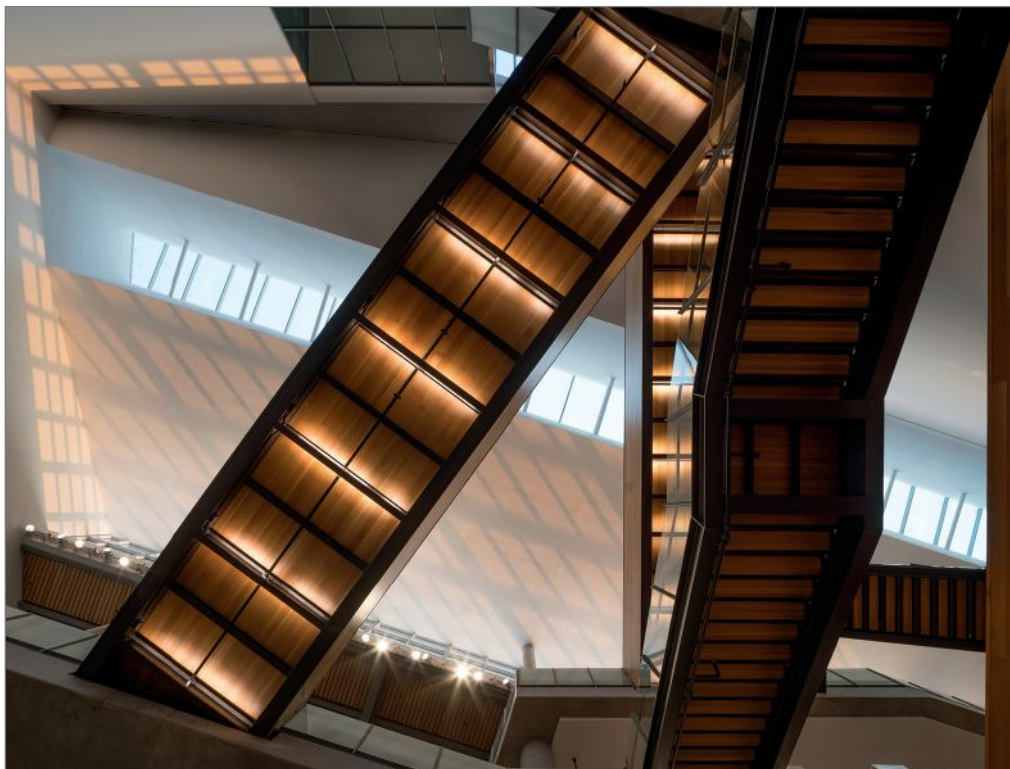
## The 16th Annual R+D Awards

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# TEXAS ARCHITECTURE SHINES BRIGHT

Embedded with a strong architectural tradition, the Texas design community stays true to its roots while looking to the future.



The Lone Star State is known for many things — cowboys, BBQ, football — but other than memorable structures like The Alamo, its architecture may not immediately spring to mind. Perhaps it should. Texas' rich architectural tradition, often organized into six distinctive periods: Indian or Precolonial (to 1862), Spanish Colonial-Mexican (1682–1835), Republic-Antebellum (1835–1861), Victorian (1861–1900), early 20th century (1900–1941), and Modern (1941–1990), reflects the evolution of architectural styles while embodying the state's very history. With the region's building boom and economic growth only accelerating, Texas firms are truly poised to set the tone for design directions moving forward.

Whether it is the historic missions in San Antonio or the regional vernacular of Hill Country, the iconic Modernist masterpieces such as Louis Kahn's Kimbell Art Museum in Fort Worth or the glass skyscrapers of Houston and Dallas, Texas architecture has always been rooted in a powerful sense of place and use of materials. At the forefront of design, Texas architecture is both bold and sensitive as its architect and engineer community tackles some of the most pressing issues of our time: sustainability and climate resiliency, migration, housing and shelter, transportation, and equitable public space.

With firms of all sizes and levels of renown calling Texas home, perhaps one of the best examples of an architecture that is both uniquely Texan and universal in its approach to design and place-making is the work of award-winning local architecture firm Lake|Flato. One of the office's recent projects, the Austin Central Library (pictured), a 2020 COTE Top Ten winner, is a showcase for sustainable design, daylighting, the creation of civic space, and community building. A portal within the city and to nature, the building connects past, present and future. In that way it embodies the essence of Texas architecture itself, rugged yet poetic, forward-thinking yet respectful. ■

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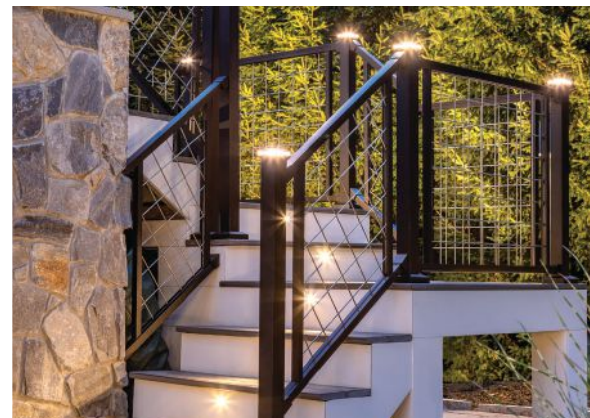
Trex Pergola



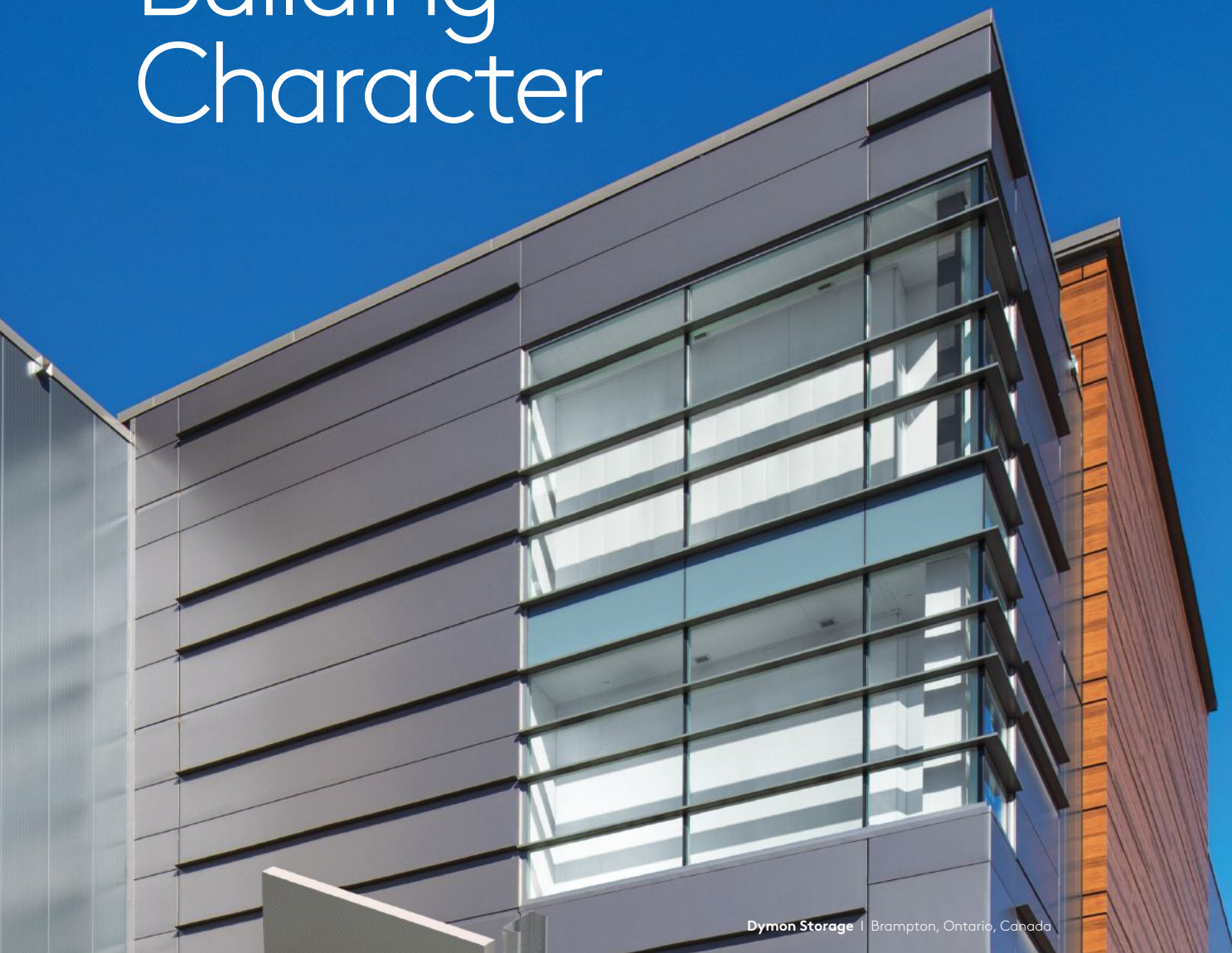
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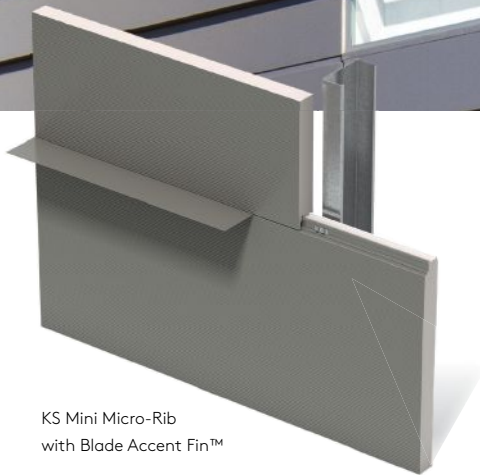
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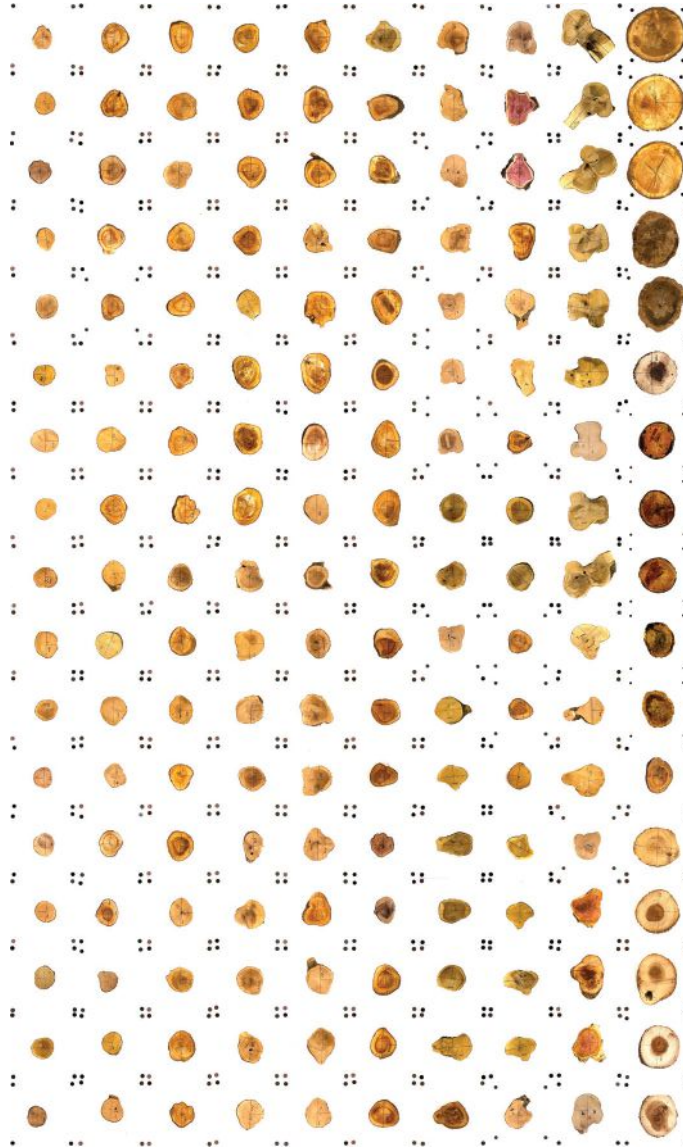


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Volume 111, number 05, July/August 2022.

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Below: R+D Award winner *Tangential Timber* by After Architecture and University of Virginia School of Architecture; photo by After Architecture.



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*For Tangential Timber's non-linear wood masonry construction, a custom parametric script processes 2D photographs of "cookies" into 3D digital models by scaling and straightening images based on the spacing and height of registration dots.*


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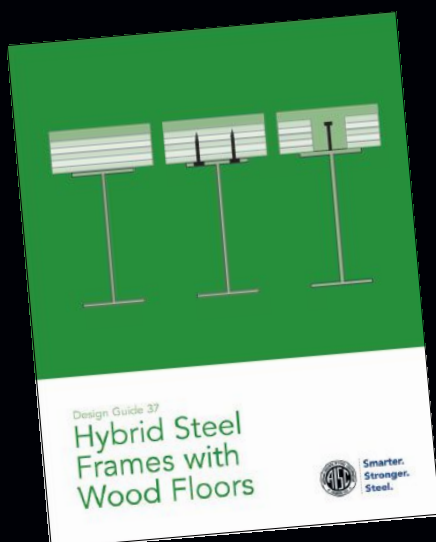


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# A Slam Dunk for a Celebrated Venue's Renovation

The Gainbridge Fieldhouse in Indianapolis has long been known as one of the best venues in the country for professional and college basketball, concerts, and other entertainment. But after hosting countless games and performances since its opening in 1999, it was time for an extended time out so the facility could undergo major renovations.

With sustainability, visitor comfort, and heightened hygiene concerns top of mind, the facilities management team chose Sloan for the renovated restrooms. "Sloan truly became our partner as we thought through every touch point of the guest experience in our restrooms. I cannot imagine a better partner to take us to the next level of innovation in this increasingly critical area of our business," says Mel Raines, president and COO, Pacers Sports & Entertainment and Gainbridge Fieldhouse.

## SUSTAINABILITY

Everyone involved with the renovation had sustainability at the top of their list of priorities and wanted fans returning to the arena to feel comfortable using exclusively touch-free restroom products. Sloan's BASYS® EFX-200/250 Sensor Faucets and matching ESD-500 Soap Dispensers throughout the main concourse level along with their hygienic benefits promote sustainability through features like automatic shut-off, three spray modules to adjust flow rate, a sleep mode, and more. Throughout the concourse, ST-2459 Water Closets and SU-1009 Urinals were paired with sensor-operated Crown® 186 and 111 ESS Flushometers, respectively, to help the facility meet water-efficiency goals.



## FINISHES

The team turned to Sloan's special finishes to help tell the story of the arena as it sets off toward a sustainable future. In Lower Bowl suites, Sloan's BASYS EFX-200/250 Sensor Faucets and matching ESD-500 Soap Dispensers fit the bill with their graphite finish. CX Flushometers in a graphite finish offer a touch-free solution in a concealed flushometer design featuring the industry's smallest front-access wall panel, creating a sleek look without hindering restroom design. And throughout the Lower Bowl suites, ST-2469 Water Closets and SU-1019 Urinals feature SloanTec® Hydrophobic Glaze to repel liquids and inhibit the growth of germs, making cleaning and maintenance easier for the facility's staff.

## FUTURE

Sloan's Touch-free Restroom of the Future initiative in the CareSource Courtside Club is an entirely hands-free experience that includes a sensor-activated entry door, flood-detection sensors, and more to give visitors a futuristic experience. There, digital signage indicates restroom capacity, helping to manage social distancing and streamline traffic. The restrooms also include AD-81000 and AD-82000 AER-DEC® Integrated Sink Systems, which feature Sloan's innovative BASYS Guided Handwashing Faucets. The faucets display an LED screen customized with the CareSource and Pacers logos, and provide a 20-second countdown to guide guests as they complete the handwashing process. And the SU-7409 Designer Urinal offers dependable performance and heightened aesthetics. ■

For more information on Sloan's lineup of advanced restroom products, go to [sloan.com](https://www.sloan.com).



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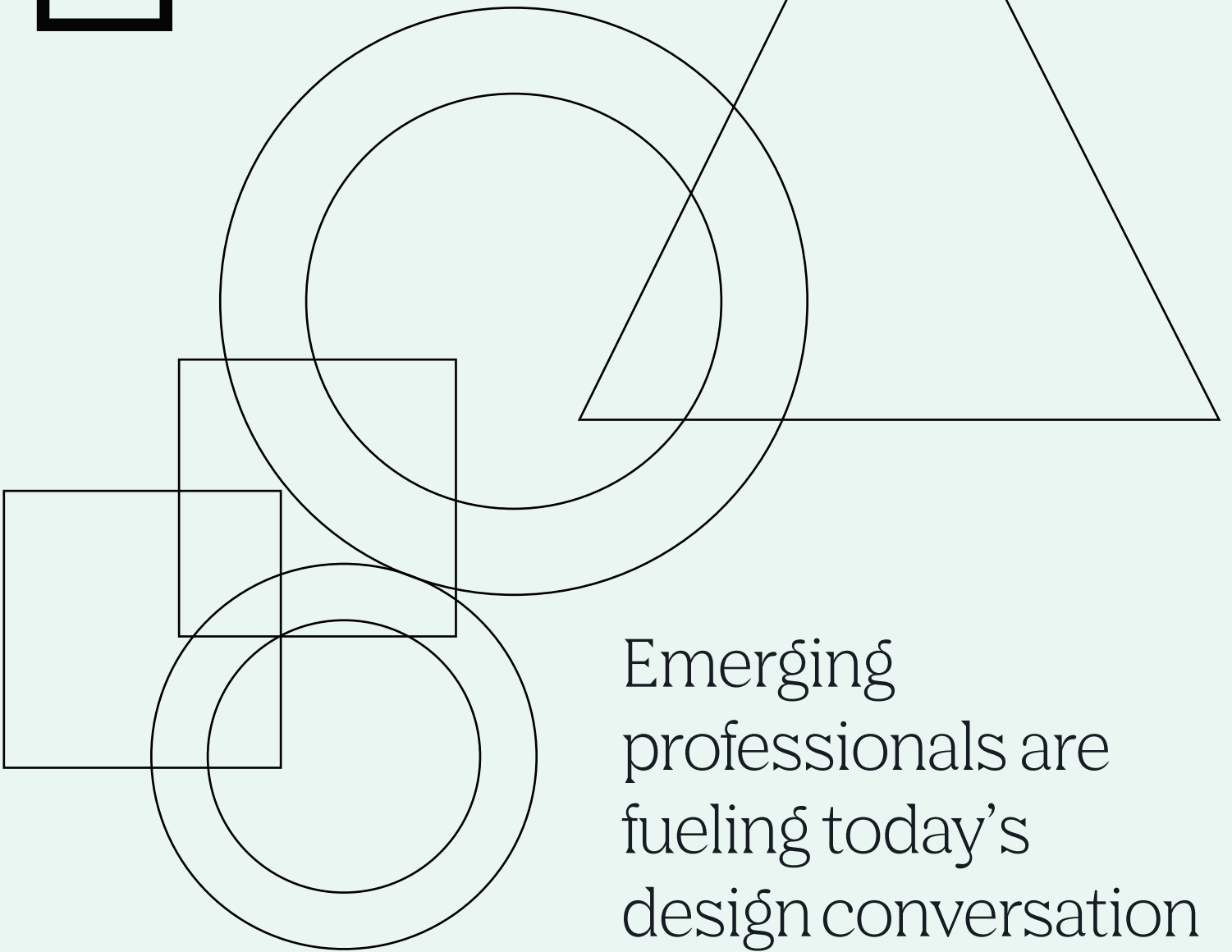
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Zonda Media congratulates and thanks ASI Group for its ongoing commitment to design innovation driven by architecture's next generation.



# Next Progressives: Studio J. Jih

EDITED BY ALEX V. CIPOLLE



**Firm leadership:** J. Jih

**Location:** Boston

**Year founded:** 2017

**Education:** M.Arch., Harvard Graduate School of Design; B.A. in architectural studies and sculpture, Brown University

**Firm size:** Five

**Firm mission:** Studio J. Jih operates in dialogue. We bridge, converse, overlap, implicate, and engage difference. We are interested in figure—both in the sense of architectural form and the bodies that choreograph and inhabit it. We like things that do double duty—solutions that are pragmatic, efficient, and rigorous, yet ambitiously sculptural.

**First commission:** Trinocular House in Stowe, Vt.

**Defining project:** Oblique Figures [in Boston] crystallized the office's interest in form and figure as an inherently implicated, intersectional device—a choreographer of relations.

The project brief required an oversized cubic loft to be spatially differentiated without partitions due to lighting constraints. In response, a double-height curved staircase anchors and domesticates its surroundings through its transforming silhouette in perspective, functioning as a perceptual fulcrum that bridges three scales, orientations, and dispositions of space.

**Another important project and why:** Fly Gallery [in Boston], designed for an art nonprofit called Opportunities for Artists, using rapidly deployable descending scrim partitions to produce a gallery space that transforms to suit the needs of the community around it, becoming classroom, theater, gallery, or community event space at will. It illustrates how the office considers material, social need, inclusion, and equity in relation to form.

**Biggest design challenge the firm has overcome:** Designing a stair like a hairpin-turning mountain road, which obliquely ascends four stories within a highly compressed 15-foot-wide 19th-century row house.

**Most successful collaboration:** Crown House [in St. Louis, Mo.] with [Cambridge, Mass.-based] Studio Sean Canty. Our common formal and queer proclivities made "Jih Sean," our drag identity and name of our collaborative practice, both a joy and an opportunity to center the inclusion of historically marginalized conceptions of the family within the lineage of

American domestic typologies. Crown House is our first completed project.

**How would you describe the personality of your practice?**

The website, made by New York-based graphic design firm Studio Lin, attempts to reflect the personality of the practice: a playful and somewhat informal layout, not too rigid in its alignments, characterized by intersectional clusters and related conversations, tightly annotated and interwoven. We tried to make the site itself a reflection of the studio's sensibilities and thought processes.

**Biggest challenge in running a successful practice:** Transmitting the ethos, values, and cultural orientation of the work throughout the office while respecting and integrating each member's own orientations, and maintaining that ephemeral quality in our modes of engagement.

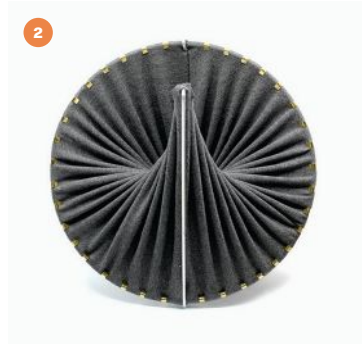
**What's on your bookshelf?** I'm at perpetual risk of drowning in an overloaded reading list, but on the nearest pile are: *On Weaving* by Anni Albers; *Bluets* by Maggie Nelson; *The Disappearance of Rituals: A Topology of the Present* by Byung Chul Han; *The Structure of Scientific Revolutions* by Thomas S. Kuhn; *Collected Fictions* by Jorge Luis Borges; *The Overstory* by Richard Powers.

**Special item in your studio space:** Several 7-foot-tall fiddle leaf figs and our behemoth laser cutter, Phil.

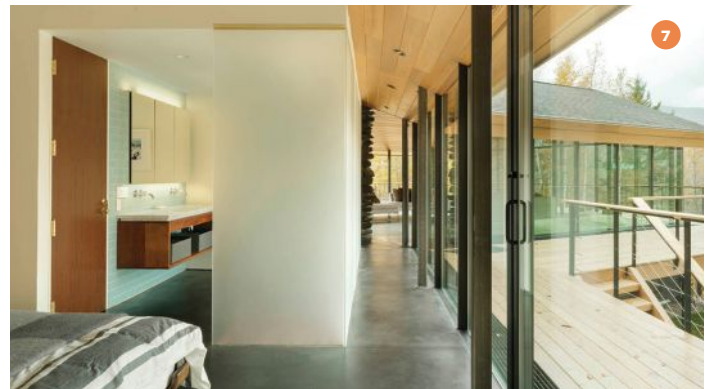
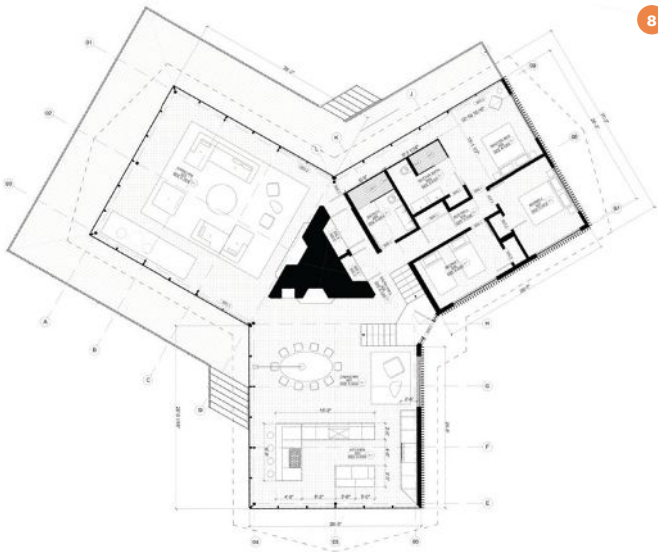
**Next Progressives:**  
**Studio J. Jih**



**1.** "Postured Assembly," a 2016 residential roof deck project modeled after a xylophone—assembled with interlocking joints, no screws or fasteners required—in a historic Boston neighborhood. **2.** *Geometric Essays* from top to bottom: "Conoid," tensile membrane; "Tricylinder," wood frame; "Conoid," standing seam; "Cyclide," rattan strip. **3.** The "Oblique Figures" residential project in Boston. **4–8.** The wheelchair-accessible Trinocular House in Stowe, Vt., is sited between three landscapes: a flat orchard, a sloped hillside, and a body of water. Each landscape is "faced and framed through a gable, and conjoined with a continuous glass-fronted trefoil circulation loop, allowing for an unbroken yet differentiated view of the site."









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#### Fire-Resistive and Blast-Rated Glass

West Coast-based U.S. Army Hospital  
Architect: RLF/U.S. Army Corps of Engineers  
Photo: Safti-First



#### Two-Hour Property Line Transparency

The Warehouse on 520 W 20th Street in New York  
Architect: Morris Adjmi Architects  
Photo: Safti-First



#### Two-Hour Walkable Floor Transparency

Union Square Station in San Francisco  
Architect: Robin Chiang & Company  
Photo: Safti-First

Stairwells. Corridors. Floors. Elevator enclosures. Property lines. Yes, many walls that require fire resistant UL 263 or ASTM E-119 compliance can be transformed through transparency.

For architects and interior designers seeking to add more daylight, reduce artificial light, cut electricity use, and achieve greater sustainability, the breakthrough of fire-resistive glass couldn't come at a better time.

Today, examples abound as designers reimagine space for light, vision, and transparency. The examples shown are just a few to consider.

Few understand the design implications better than Sharon Heagney, vice president of engineering and project management for U.S.-based Safti-First, a leading innovator and manufacturer of fire-resistive glazing for commercial applications.

Heagney is pleased by the way architects and designers have responded to the natural light imperative. "When I first came into the industry I would see incorrect fire-rated products being specified or a lack of code understanding," Heagney says. "That often resulted in incorrect information being issued within contract documents. Now there is far less reliance on

fire-endurance rating (20/45/60/90/180 minutes) and more on overall performance. More architects turn to the IBC Chapter 7 tables for

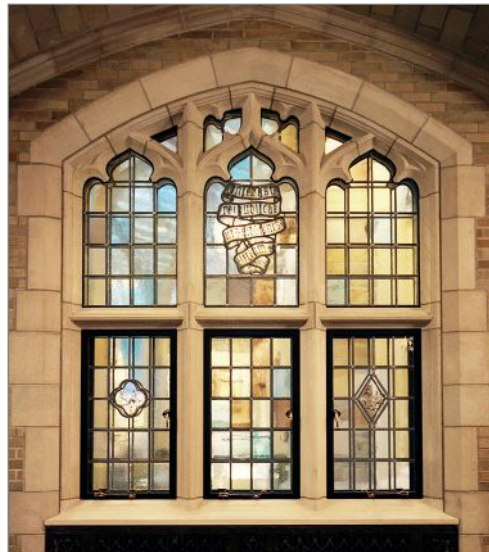
guidance on where and what type of fire rated glass — fire-protective or fire-resistive — is allowed based on the application. That's very good news."

Advances in material science manifest themselves a variety of ways, including glazing applications that go beyond natural lighting with multifunction versatility:

How can fire-resistive glass help transform your next project? What's the best way to comply with IBC Chapter 7 through light, vision and transparency?

Heagney offers a simple solution: "Consider all options. The best way to do that is engage a fire-resistive glazing manufacturer early in the design phase. All fire-rated glass products are limited by size and application they are tested to. To ensure maximum transparency in fire rated areas, it helps to identify the manufacturer with the largest tested and listed individual lite sizes."

There was a time when ASTM E-119/UL 263 compliance meant opaque sheet rock or masonry walls. No more. Today's advanced fire rated glazing products means designing for natural light has never been more accessible, affordable and versatile. ■



#### Fire-Resistive and Decorative-Glass

University of Michigan Law School Academic Building and Hutchins Hall Student Commons Addition in Ann Arbor, MI  
Architect: Hartman-Cox and Integrated Design Solutions  
Photo: Safti-First

Learn more about how fire-resistive glazed assemblies from Safti-First can transform your space at [safti.com](http://safti.com).

# Residential:

## Frame Tijuana, Mexico Design Opera

TEXT BY ALEX V. CIPOLLE

Driving around the city of Tijuana, Gregory De Peña, AIA, finds inspiration in a cityscape marked by the skeletal outlines of new construction. And in Mexico's second most populous city—where concrete is cheaper than in the U.S.—there are plenty of new buildings on the rise.

"You see these beautiful concrete structures coming up and they're just like our building, but the difference is, they cover it up," De Peña says. "The beauty of the concrete frame is having those open spaces. The minute you enclose them, it's gone."

De Peña, founding principal of the Los Angeles–based firm Design Opera, is speaking about the Frame Apartment Building, which was completed in August 2021 after about two years of construction. Built on a hillside in the El Grano neighborhood of Tijuana, Frame is a 32,000-square-foot post-and-beam residential tower that rises six floors and houses 12 units, ranging from 1,200 to 1,500 square feet.

Frame is the first apartment building for Design Opera, which also has an office in Tijuana. The goal for this design-build project, De Peña says, was to create beautiful and spacious family-friendly units, build community, and help alleviate the housing crisis that has hit Tijuana, like cities worldwide.

Design Opera design principal Christian Santini says having a private client—famed Mexican boxer Julio César Chávez—was a boon to the design process. "A lot of the buildings



Frame is the first apartment building designed and built by Design Opera. The firm cut its teeth on single-family homes, but when the 2008 recession hit, it pivoted to commercial projects, mostly restaurants and bars.

in Tijuana are developed by developers. Every square foot counts," Santini says.

De Peña recalls reviewing apartment plans when he was on the design review board of the Centre City Development Corporation in San Diego, only about 20 miles from El Grano. "The developers always wanted to cram in additional units. There was never any concern for how you live in a space, how you use a space, how you furnish a space," he says. De Peña also lived

in one of these units and did not want to replicate the cramped experience.

To avoid this pitfall, the Design Opera team envisioned Frame from the inside out, prioritizing the larger bedrooms—each unit has two or three bedrooms—and kitchens often found in single-family housing. Each floor features two units, and each unit features oak floors and cabinetry juxtaposed against concrete, glazing, and white quartz countertops. The



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## Residential: Design Opera

largest windows are on the north side to reduce solar heat gain.

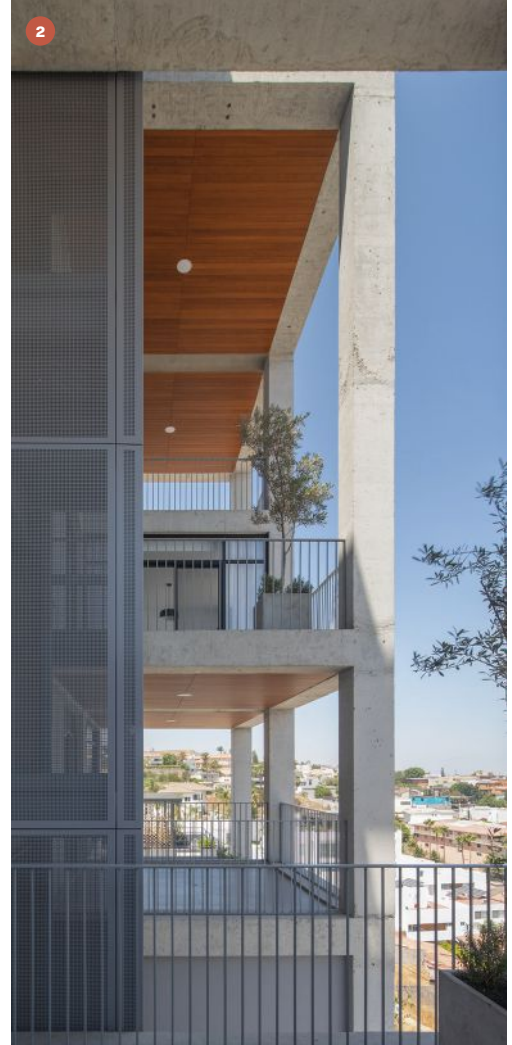
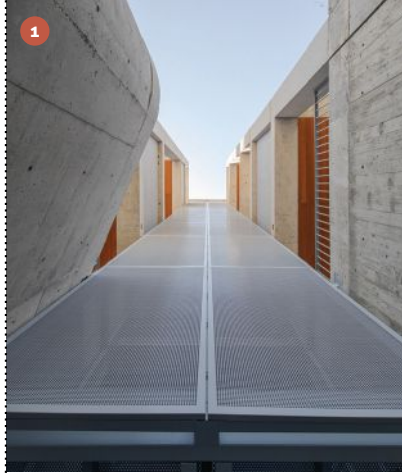
The exterior is an ode to the ever-changing concrete silhouettes of the Tijuana skyline. Bernardo Enriquez, a design principal, says they chose concrete as a primary material for several reasons: It is used widely in Mexico and does not require a specialized labor force; it is resilient and low-maintenance; it regulates temperature; and it is amenable to adaptive reuse. The firm also sourced concrete from a producer near the site, Enriquez says, which helped minimize the project's carbon footprint.

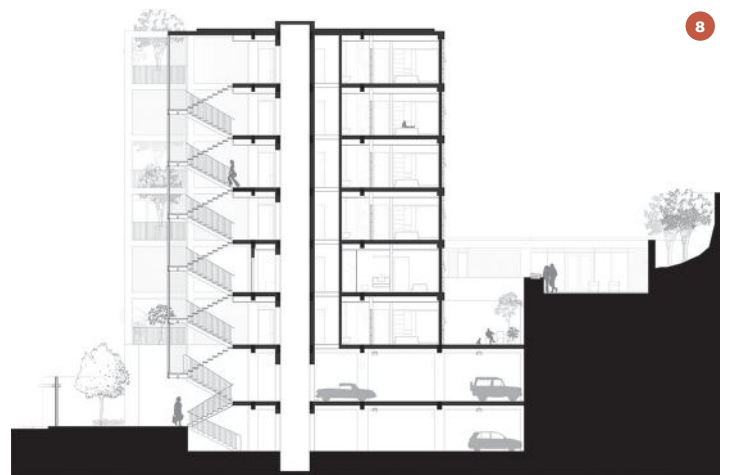
To highlight the building's frame and mimic the yards of single-family houses, Design Opera included staggered terraces throughout, both for private-use and common areas, including the ground level south-facing terrace with a pool. The terrace's carbonized and pest-resistant bamboo plank ceilings add warmth to the exterior.

"Having those huge terraces improves the quality of life," says Santini, explaining that indoor-outdoor spaces are a signature of the firm. Some are two stories high so residents can plant trees, and while the terraces are at different levels, neighbors can still communicate if they choose.

"We wanted to promote community," says Santini, who says they are prioritizing this in upcoming multi-residence projects.

"We try to tell a story. No matter what project we're working on, we look at and research the heart of the problem so we can develop a valuable solution," De Peña adds. "The housing subject right now is everything. Working on this project really opened our eyes and made us want to be more involved."





**1.** A translucent staircase with perforated screens at the building's spine allows light and air to penetrate the spaces within. **2.** Staggered terraces promote social engagement among neighbors. **3.** Carving into the curved concrete creates a nearly uninterrupted lower façade. **4.** Oak floors and built-ins are used in each unit to bring warmth to the concrete. **5.** Design Opera began the project by laying out units first, rather than working backward from the building's envelope. **6.** Terraces are designed to maximize the city views for residents from the site's hillside. **7.** Each of the 12 units features white quartz countertops and Urrea kitchen and bathroom fixtures. **8.** To minimize the grading of the hillside site, Design Opera chose to do a split-level parking garage, going 6 feet below street level on the east side and 6 feet above on the west side.



# Is This America's Best Airport Lounge?

The Capital One Lounge inside the Dallas Fort Worth International Airport reimagines the traveler experience from the ceiling on down.



The design team at Studio K, Chicago-based hospitality design firm, set out to create an elevated lounge experience at Dallas Fort Worth International Airport, one of the world's most traveled airports.

Little did they know the 10,000-square-foot Capital One Lounge in Terminal D would be recognized as best in class. Numerous trade publications have offered their praise with comments ranging from "nailed it" and "one of the nicest airport lounges in the U.S." to "lives up to the hype and then some."

"We worked hard to infuse the lounge design with the Capital One ethos," explains Matt Simpson, studio lead on the project for Studio K.

Capturing that ethos had its share of challenges, including:

- Compliance with strict building and security codes
- Managing large room acoustics in a busy airport
- Delivering a signature aesthetic that could be replicated in other airports

"We wanted to present an upholstered feeling," Simpson says, describing the aesthetic intent. "We performed several studies to identify materials that could deliver an elevated experience and still check the boxes on acoustics and code."

## NO-RISK CUSTOMIZATION

Consider the ceiling, for example. "We opted for a customized version of an existing ceiling material," Simpson says. "We wanted to see how far we could push customization of a well-established and available product."

They went with a smooth-faced panel that resembled engineered drywall or plaster — Decoustics Clean-Air Claro from CertainTeed Architectural. The Claro line is highly customizable and comes with a noise reduction coefficient rating of up to .95 out of a possible 1.0, presenting Capital One Lounge visitors with an audibly restful experience.

Another complication was the space configuration: a trapezoid. The design team wanted something non-directional that would "... create a feeling of movement," recalls Simpson. They proposed oversized ceiling panels that were meticulously handcrafted in an expansive 4'9" by 9'2" rounded diamond shape. Smaller butterfly panels would close in-between spaces and support lighting, sprinkler, alarm and other overhead requirements. What's more, the ceiling system had to be fully accessible and seismic certified.

"We ended up specifying an oversized panel that could be popped out and suspended at any point. The tricky part was getting the size just right," Simpson says. "What was the most efficient size for manufacturing and airport authorities?"

## HEALTH AND SUSTAINABILITY WITH CREATIVE FLAIR

In addition to exceptional acoustical control, Decoustics Clean-Air Claro offered several advantages that benefit the performance of the space and the health and wellbeing of traveler:

- Nearly no detectable volatile organic compound (VOC) emissions for improved indoor air quality

- No-added urea formaldehyde (NAUF) components
- Certification for high seismicity
- Safest class A fire rating on finished composite

While the oversized Decoustics Clean-Air Claro ceiling panels dominate the majority of the main lounge area, smaller sections of the space feature aesthetic points of interest with two other CertainTeed Architectural products:

- Techstyle large-format acoustical ceiling panels — lightweight fabric panels with a honeycomb core in a vibrant custom blue — offer a pop of color in an adjacent space
- Box 2 Series linear metal ceilings installed in the lounge's double-story entry space offer eye-catching modern lines that seamlessly transition wall to ceiling.

Simpson says partnering with CertainTeed Architectural as the single-source supplier for all three ceilings helped the entire process run smoothly, from design to specification to installation. Materials arrived as planned, with no overseas delays due to North American sourcing. "CertainTeed was highly responsive throughout design and installation," Simpson says. "Everyone was on the same page."

## JUST THE BEGINNING

Capital One Lounge opened late last year, and the buzz surrounding it is still strong. "I'm humbled by the praise," Simpson admits. "To see our vision realized like it was, especially during a pandemic, is very gratifying."

What do you do for an encore? Capital One is expected to open similar lounges in Denver and Washington D.C.-Dulles later this year. ■

Learn more about how ceiling solutions from CertainTeed Architectural can help enhance your next project at [certainteed.com/architectural](https://certainteed.com/architectural).





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# CarbonPositive: Beyond the Building

TEXT BY PAMELA CONRAD

The urban built environment is responsible for approximately 75% of greenhouse gas emissions. As building professionals tackle this challenge, a tremendous opportunity for impact lies, quite literally, outside the box of the buildings themselves: in the exterior built environment of site, landscape, and infrastructure. Although we often overlook these elements as major carbon contributors, the emissions drawdown and carbon sequestration opportunities are immense.

Climate Positive Design is an initiative dedicated not only to understanding the potential that site, infrastructure design, and urban planning have to reduce emissions and sequester carbon, but also to igniting a powerful set of co-benefits, such as resilience, improved water quality, biodiversity, and human health. Built and natural landscapes are complex, living ecosystems that change and evolve. Until recently, however, the carbon impacts of sites and infrastructure have been overlooked. If we pay attention to the design of the exterior built environment—such as material selection, project operations, overall low-carbon, green infrastructure approaches that draw down carbon—emissions can be cut in half (or more), and sequestration can be doubled.

I launched the Climate Positive Design Challenge and the Pathfinder app to guide designers of the exterior built environment to improve the carbon performance of sites,



A case study from the San Francisco firm CMG Landscape Architecture shows how specific design improvements, such as careful material and foliage selections, can transform a university campus into one that more powerfully sequesters carbon for a 74% reduced footprint.

and I'm expanding that work in partnership with Architecture 2030. Our collaboration will strive to deliver accessible tools, resources, and guidance to professionals and industry organizations responsible for planning and designing the exterior built environment to achieve the drawdown needed to meet the 1.5°C climate target. With targeted guidance and thought leadership, the initiative will empower the exterior built environment sector to reduce CO<sub>2</sub> emissions dramatically, sequester more carbon than emitted by 2030, and remove

1 gigaton of CO<sub>2</sub> from the atmosphere beyond offsetting emissions by 2050.

Specific approaches include urban afforestation, habitat restoration, and habitat creation including constructed wetlands and the use of native and drought-tolerant plant species. These nature-based solutions can improve health through better air and water quality and offer protection from the adverse effects of climate change, such as drought, flooding, sea-level rise, and wildfires.

By combining our knowledge, leadership, and networks, we are



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issuing a call to action to the most influential firms and professional organizations in the architecture, landscape architecture, and urban planning professions: We cannot ignore the exterior built environment. We will support their efforts with tools, guidance, and resources to enable projects that sequester carbon—and we want and need their support, too.

**“Every person and organization in the built environment community can take climate action beyond the building.”**

If your firm designs places outside the building, take the Climate Positive Design Challenge and support the International Federation of Landscape Architects Climate Action Commitment. Or, if you work with landscape architects and planners outside your firm, you can all use the Pathfinder app for your site designs. And you can urge those professionals to sign up for the challenge as well.

Every person and organization in the built environment community can take climate action beyond the building—an effort that requires this broader perspective to reach emissions drawdown in our sector. For every on-the-boards project, the built environment team can optimize value and benefits with these strategies for sequestration and resilience. Will you join us?

*Pamela Conrad is a principal with CMG Landscape Architecture, a senior fellow with Architecture 2030, and a 2023 Loeb Fellow at the Harvard Graduate School of Design. She created the Climate Positive Design initiative to enable climate action by providing guidance and an app to support design teams in drawing down carbon while creating environmental, social, cultural, and economic co-benefits. She is a farm girl from Missouri, inspired by the richness and ingenuity of nature.*



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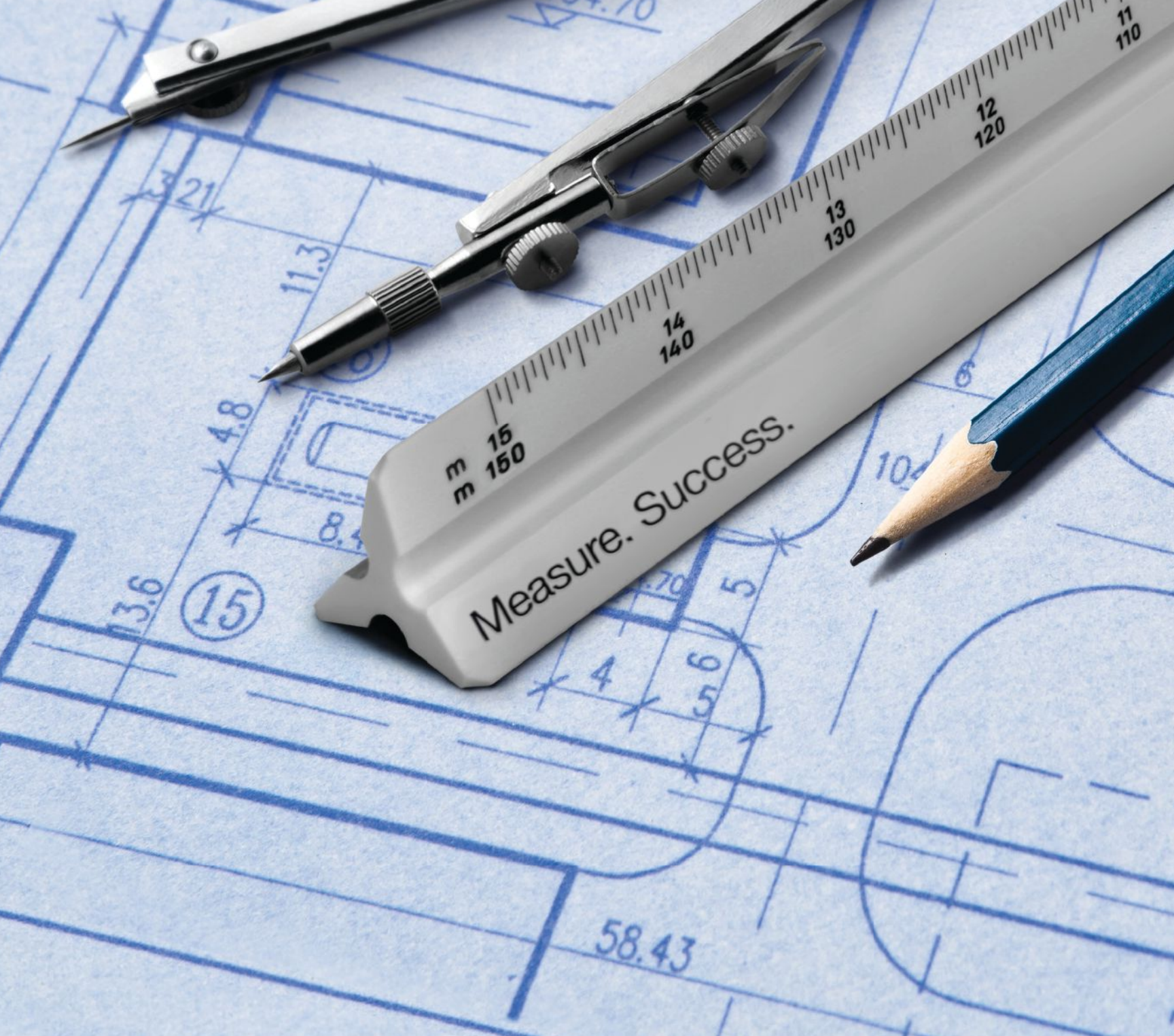
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# Inside Out:

## Cultivating a Destination for Community, Local Art, and, Of Course, Good Wine

EDITED BY MADELEINE D'ANGELO AND ALEX V. CIPOLLE

### The Project:

Bronzeville Winery, Chicago

### The Client:

Eric Williams and Cecilia Cuff partnered to realize Bronzeville Winery, a shared vision to add a unique dining experience to this historic economic and cultural hub of Chicago's Black community.

### What were the guiding principles for this project?

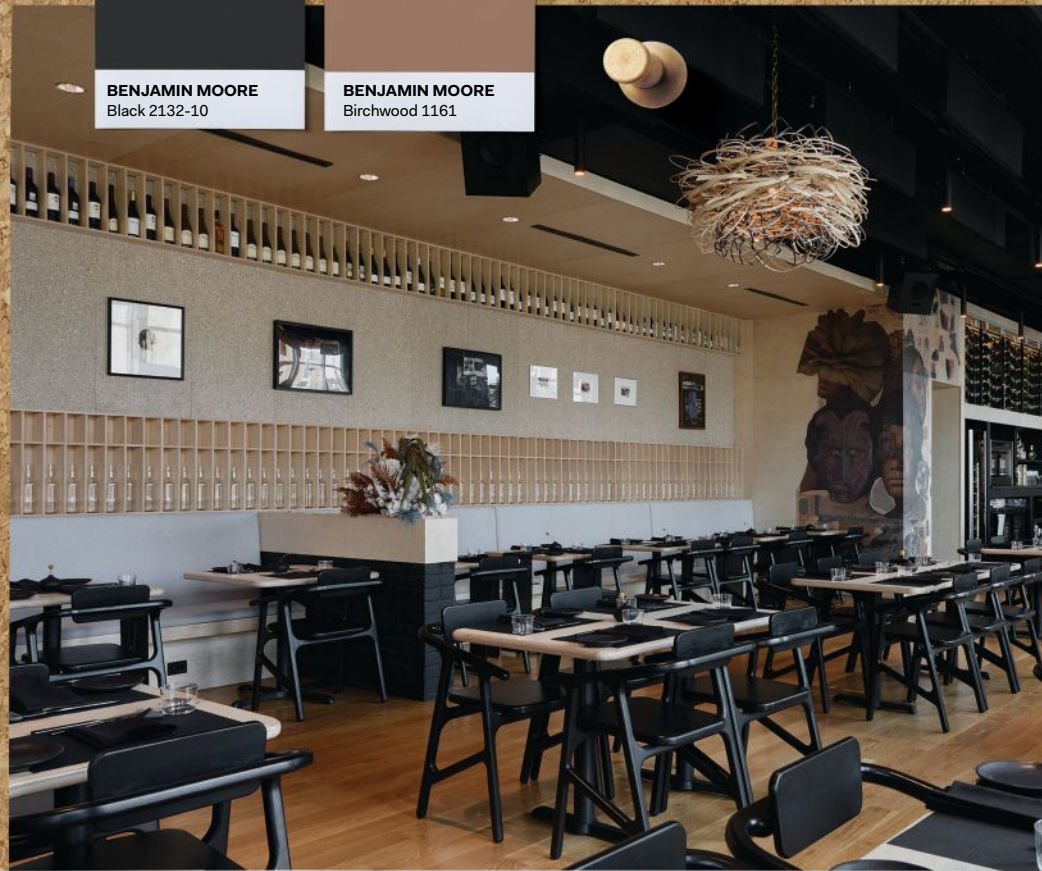
The vision for Bronzeville highlights artists, musicians, winemakers, and chefs, as well the rich culture and futures of the neighborhood—known as the “Black metropolis.” The quiet palette of wood with black accents allows features, such as commissioned works from local artists, to shine. A flexible, open floor plan and efficient back-of-house mean that the restaurant can transform into a space for events like live performances and art exhibitions.



*Ann Lui, AIA, and Craig Reschke, AIA, launched Future Firm in 2015 as “architecture for changemakers.” Now a practice of six architects and designers, Future Firm works with small businesses, nonprofits, and individuals working to catalyze change.*

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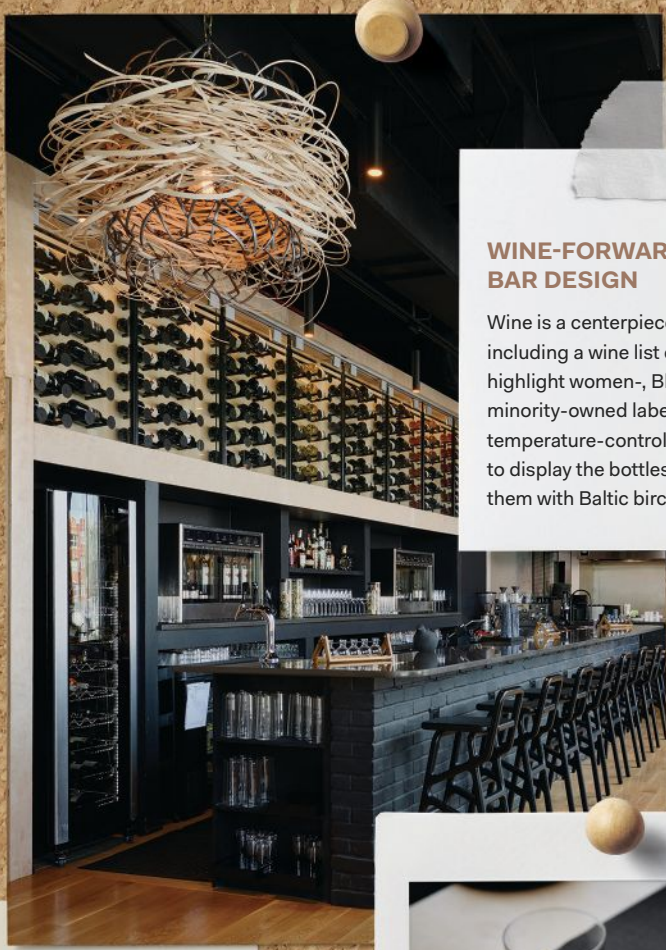
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### COMMUNITY ON DISPLAY

A millwork display wall in the dining area creates a crenellated acoustic surface and nooks for wine and art. Wine bottles were donated by a neighborhood resident who traveled the world collecting wine. Rotating exhibitions of local artists are mounted on natural, unfinished acoustic panels made from recycled materials.

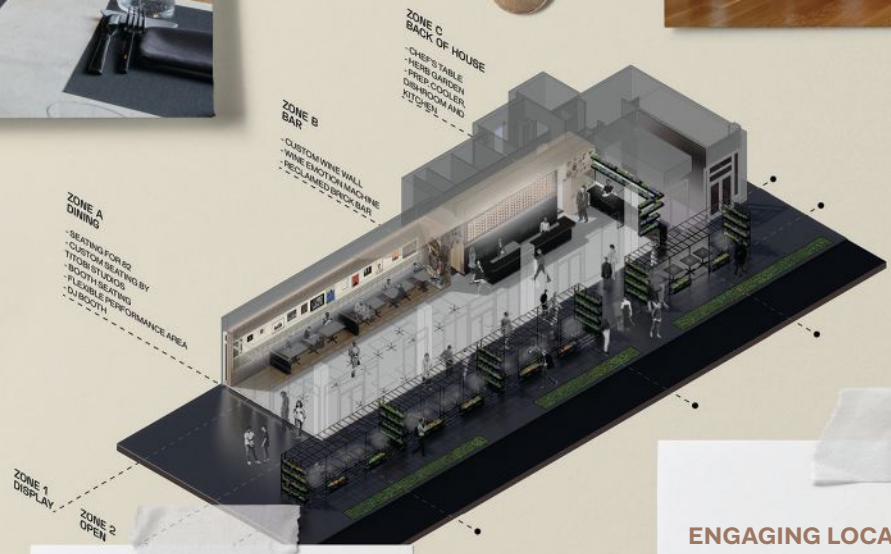


### WINE-FORWARD BAR DESIGN

Wine is a centerpiece of the restaurant, including a wine list curated to highlight women-, Black-, and minority-owned labels. We designed temperature-controlled wine cabinets to display the bottles, framing them with Baltic birch artwork.



> To read more about this project, please visit <http://bit.ly/ARioFF>.



### FLEXIBLE SPACE

Designed to host events, performances, and rentable community space, the winery features built-in bench seating encased in Baltic birch, which balances openness with a more intimate dining experience.

### ENGAGING LOCAL CREATORS

The restaurant design features local designers, artists, and materials from Chicago's South Side, including soft-edged, gloss-black dining chairs and bar stools custom-designed by Max Davis + Norman Teague Design Studios and produced by Titobi Studios. Custom light fixtures from the Chicago artist Lucy Slivinski feature scrap steel from a nearby die-cast factory. Bricks used in the project were donated by the multidisciplinary artist Theaster Gates from his St. Laurence Church project.

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# Twinmotion



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## TWINMOTION— A NEW VISUALIZATION TOOL FOR ARCHITECTS

ADVANCES IN ARCHITECTURAL  
VISUALIZATION

Introduction by Terry Beaubois

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Cover Image courtesy of Anh Pham

➔ **This is an incredible time** for architects with the recent developments in software that can change the practice of architecture. What used to be capabilities only accessible to visualization specialists, are now available in software that can be easily used by architects — to explore design concepts and to advance your projects with your clients. These are advances that can significantly assist architects to explore “what if” design possibilities of your own ideas and move to the “like this” phase, when you show these ideas to your clients.

Some of the advances that have occurred recently are what we’ve always wanted and needed



**Twinmotion was created by architects for architects. With the speed of real-time renderings tools, architects can accomplish more design progress, in less time, all in a more continuous workflow.**

in software for architecture. Some are even beyond what we thought possible. With the speed of real-time renderings tools, architects can accomplish more design progress, in less time, all in a more continuous workflow. This will increase our efficiency and effectiveness for us as architects.

Twinmotion, is a real-time architectural visualization software tool. Being part of video game and software developer Epic Games, Twinmotion leverages the company's Unreal Engine technology to help architects create a range of visuals from sketches to photorealistic visuals in real-time immersive experiences. Epic Games' vision is for a more connected architectural design workflow, avoiding dead ends, reducing miscommunication, and eliminating the need to redo work in multiple software programs. Twinmotion enables you to quickly import your CAD/BIM files into Twinmotion to further your design and present ideas in a real-time environment with instant visual feedback. So, no time or work is lost in the process. For many architects Twinmotion will be all you need. You will enjoy learning and exploring the possibilities. Twinmotion allows you to work in teams. You can quickly and easily share data

Twinmotion / Made by Pawel Rymnsza

during in-house collaborations and also bring this ease and speed to interaction with your clients.

Twinmotion was created by architects for architects. They focused on ease of use so that anyone can easily get the software and start using it quickly, without having to invest hours learning complex rendering workflows. At the same time, Twinmotion is fully supported for professional architects with a wide range of tutorials, online webinars, and courses to assist your introduction and use of this real-time, visualization tool.

Twinmotion is part of the Epic Ecosystem. It is part of a continuum of software and tools. For those wanting to take their visualizations further, Twinmotion files can be easily imported into Unreal Engine to leverage the advanced feature set of that software. With Unreal Engine's powerful features your team has the open-ended flexibility and creative freedom to truly differentiate your projects with sophisticated software used by movie and television productions studios. As you will read in the following interviews, some architecture firms are already taking advantage of this capability.

As an architect very involved in the use of computers in architecture from the beginning, I have the pleasure of knowing many architects who do incredible work and incorporate computer hardware and software in their practices. This special section includes interviews with a range of architectural practices as examples for you to see how Twinmotion is already being used in architectural firms.

So don't only take my word for it, read these examples about how architects — in small, medium and large firms, even universities — are already using Twinmotion in their projects. Be inspired by their stories and then imagine how this technology could be used in your own practice with your projects!

#### **About Terry Beaubois**

Terry is a graduate of the University of Michigan, M.Architecture program. He has practiced in Boston, Ann Arbor, San Francisco, Bozeman, and Palo Alto. He has lectured in person and online about "The Future of Architecture" at numerous universities and conferences, including Stanford University; Montana State University; Aizu University, Japan; the Sorbonne, Paris, France; and the University of Hawaii joint program with Tongji University, Shanghai. Terry is CEO of BKS: Building Knowledge Systems in Palo Alto, California.

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## FROM CAD/BIM TO REAL-TIME VISUALIZATION IN TWINMOTION

“TWINMOTION FURTHER EXTENDS THE BENEFITS OF BIM/CAD INTO ARCHITECTURE AND IS CRITICAL IN MAINTAINING AND IN FACT, MATURING THE ROLE OF THE ARCHITECT, AS PART OF THE AECOO TEAM.”

—DEKE SMITH

**DANA “DEKE” SMITH,**  
FAIA Emeritus, FbSI  
Executive Director AiC (Academic  
Interoperability Coalition)

→ **Deke Smith**, is both a facilities architect and IT architect, and his specialties include Building Information Modeling, BIM Education, Cost Engineering, Lifecycle Costing, Total Cost of Ownership, Specifications, Construction Criteria, Computer-Aided Design, and Building Standards.

Deke has a long history with advancing technology and software in the practice of Architecture. Currently as Executive Director of the AiC (Academic Interoperability Coalition) Deke guides a coalition of over 85 university academics working to develop and improve education related to Building Information Modeling (BIM).

As such, Deke has an excellent perspective on the teaching and use of CAD/BIM in Architecture as well as software that extends the benefits of CAD/BIM, such as Twinmotion. Here is what Deke has to say:

“Twinmotion, further extends the benefits of BIM/CAD into advanced architectural rendering, including photorealistic levels of architecture visualization and continues architects on their journey along the path to real-time rendering and 3D Imagery of architectural projects, along with increased collaboration in-house and with clients.”

It is through real-time visualization of the final product that owners and future users can

truly understand and experience the final product prior to any commitment of wood, concrete, and steel. In a total cost of ownership mentality this will also help ensure that the facilities and structures we produce will meet or exceed the customers’ expectations.”

“The reality is that most (potentially as high as 80%) owners cannot interpret a set of blueprints into a vision of a final deliverable in their heads, Twinmotion can help with this. A lack of vision has led to many dissatisfied clients upon final delivery of a facility. Therefore, having an accurate picture of the final product is paramount.”

“Visualization is not just a marketing tool, It is also important within the design and construction community because we must be able to produce integrated solutions that allow all parties to truly understand the ramifications of their decisions in the overall project as it progresses. Twinmotion can play a role in improving the communication that needs to occur throughout all phases of project development.”

“Teaching BIM then becomes the paramount challenge as there is so much to teach in such a short time to transform a person into a designer. In addition, it is no longer acceptable to only learn your area of expertise, one now needs to also understand most other aspects of the process to deliver a facility. Ideally the visualization provided by tools such as Twinmotion can help with this enormous task and reduce the time required into a more realistic outcome.”

Over the years, Deke’s consulting has included helping organization leaders in the facilities and infrastructure industries to maximize the benefits of modeling, simulation, total cost of ownership, lean construction, resiliency, sustainability, and cybersecurity.

Throughout his forty years of leadership, Deke has led the development and advancement of national and international information technology standards and models essential for delivering cost-effective, energy-efficient, and sustainable high-performance buildings.

## SMALL ARCHITECTURE FIRM USE OF TWINMOTION

“When I’m talking with clients about their house design, I work with them interactively, on a Zoom call, showing them information during our discussion — plans, elevations, sections and a Twinmotion 3D model — as the design is progressing.” —GREG MILLER

### GREG MILLER DESIGNS

→| **Greg Miller**, located in the San Francisco Bay Area, specializes in residential design. He currently has projects in Montana, Washington State, San Diego and Park City, Utah. His use of Twinmotion includes beginning his work in Vectorworks and then importing his CAD/BIM work into Twinmotion. There, he can further develop the visualization to show his clients, consultants and contractors. This information is often shared in an online video conference.

“During the pandemic, all of my clients have become comfortable viewing and discussing their projects with me online. I can actually do more online, sharing Twinmotion, than I used to be able to accomplish during in-person meetings. In addition, it saves me and my clients the travel time that in-person meetings require.

With Twinmotion, this process is so much faster than before, when I would have to say, “I’ll make that change and show it to you next time.” Often I can make the change right in Twinmotion, or I can change the model in Vectorworks and re-import it into Twinmotion quickly.

#### Sharing Twinmotion Models with Clients

In Twinmotion, we really get a sense of the space — beyond plan, section, elevation and preliminary fixed views. I can do a “walk-through” of the spaces on-screen. This helps with everything, from the

placement of windows and doorways to other architectural features. When I review the project with the client, I can get their reactions and quickly show them any revisions, in real-time.

For a client who had a collection of artwork, I was able to show the art on the walls, in the design. They said they felt like they were moving in and decorating their new home already! Another example is when studying the size of a bank of windows, we were able to view the range of possibilities — balancing structural considerations, cost and resulting views — and come to a conclusion quickly.

#### Products and Material Libraries

When a client is considering a specific product, I check with the manufacturer’s website to see if they have 3D objects of their products. Or with the Quixel Megascan Library in Twinmotion, there is an amazing range of textures, materials and 3D objects I can use.

“Twinmotion really extends my capabilities, and is an important part of my small firm’s approach to architecture. I can do more of the work myself, and not have to hire someone to do it for me. Once my clients see Twinmotion, they all appreciate this level of visualization in their projects.”



## COLLABORATION IN A MID-SIZE ARCHITECTURE FIRM

**AB DESIGN STUDIO,  
SANTA BARBARA CA,  
LOS ANGELES, CA**

→ | **AB Design Studio** is a full-service architecture, interior design and urban planning studio. Clay Aurell and Josh Blumer, are the founding partners of AB Design and have maintained the company's interest in functioning as a creative architecture studio, while growing to 25 - 30 people, with offices in Santa Barbara and Los Angeles.

For this interview I spoke with partner Josh Blumer and Will Rivera a project architect.

In addition to his architecture projects, Will has worked on architecture models for TV and Film projects. Will commented: "In the past, I experienced a level of collaboration during those film and television projects that I had never experienced in an architecture firm...until I joined AB Design." AB Design is currently using Epic Games' Twinmotion and plans to use Epic Games Unreal Engine on future projects.

At AB Design, team members are encouraged to collaborate between all levels and members of the studio.

As Josh Bumer explains: "It is important that our use of software, like Twinmotion, works for us to carry out the collaborative model in our firm. By encouraging an openness to new ideas, the collaborative studio process allows our projects to independently evolve to reflect each specific project."

"Our work requires not only the in-house collaboration of our teams, but extends to collaboration with our consultants and our clients. Software, like Twinmotion, helps us carry this out.



### Bringing architecture to life—VR and Twinmotion

"We can bring our Archicad, Rhino, and other software assets into Twinmotion and can begin arranging furniture and populating the space with people in the design. Perhaps the most important aspect of Twinmotion for us, is that it allows us to view our designs immersively and get a sense of the spaces we are creating, early in the design phase. The reality of architecture is being in the space and moving around and looking around, not viewing static forms and images. We are creating, viewing and able to see the design in a meaningful way — the way the building will be experienced after it is built."

"We use Oculus VR goggles with Twinmotion to experiment with early design. In this way we can quickly and easily explore the preliminary design of the building, the spaces, view various materials

Images: AB Design Studio



“HAVING ARCHITECTURE TOOLS THAT CAN KEEP UP WITH OUR PACE OF DESIGN IS PRODUCTIVE, PLEASURABLE AND REWARDING.”

—JOSH BLUMER, AB DESIGN



in the building, at different times of day, as we are siting and orienting the building.”

This brings the experience of the building when complete, into our early design for our own and our client’s viewing. We use this method, because it helps us collaborate and move our designs forward more efficiently, than in the past.”

“Using tools like Twinmotion in our process, gives us the experience similar to walking into a building when it is under construction or when it is completed.... it’s that “moment of truth” when you can enter the building, look around and see how the design looks. This method, helps us collaborate and move our designs forward more efficiently. Now we can make that experience part of early design and make adjustments as we further develop the design.”



## A LARGE, ARCHITECTURE, PLANNING, AND DESIGN PRACTICE

### CallisonRTKL

→ | **CallisonRTKL** is a global architecture, planning, and design practice. They began over seven decades ago and now have over 20 offices worldwide, located in the U.S., Mexico, Europe, the Middle East and Asia. Nandi Nobell in their London office and Orlando Orozco in their Seattle office spoke with me about CallisonRTKL's use of real time visualization software in their projects.

As with many architecture firms, in the beginning much of CallisonRTKL's visualization work was outsourced to companies specializing in illustration. In recent years, with the advent of real time visualization tools and capabilities, they are again doing more visualization of projects in house.

At CallisonRTKL they feel that the real time aspects of current software, such as Twinmotion, has increased the speed of creating, reviewing, and modifying projects in-house.

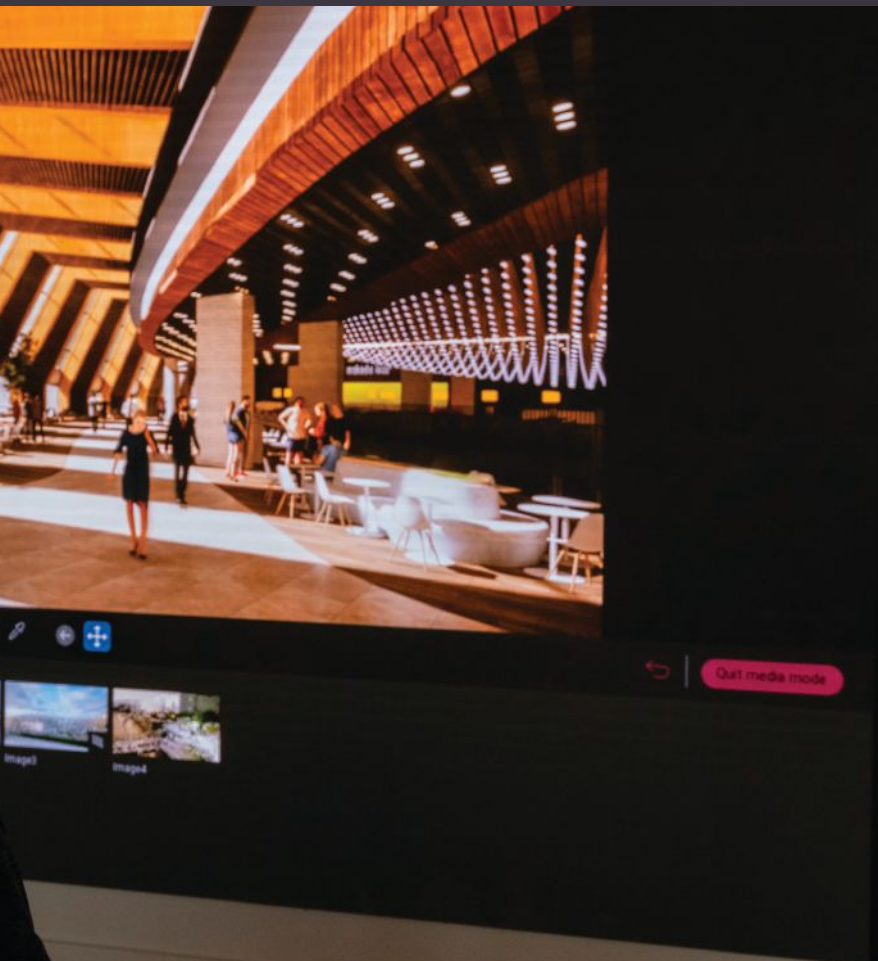
Orlando Orozco mentions: "Before real-time rendering and visualization software, the illustration process could take place quite slowly. With Twinmotion, a couple of things happened — it became easier to use the software, the time it takes to render can be in real-time, and the really convincing lighting with the scenes makes everything so much better. It has increased our interest in doing the work in-house."

"Getting instant updates on visuals during the design process is a great improvement. Visualization can be more easily integrated into our existing workflows now. The improvements in lighting in products like Twinmotion allows the designers to take lighting and other spatial qualities of the design into consideration earlier in the design process."

"Having many offices and then with the

Once you go from static models — and begin experimenting with animations in Twinmotion, the design goes from being a simple sketch into an interactive "infographic" animation, that is better able to convey the whole idea of what being in the space would be like in real life.





pandemic, we have many people working remotely. We are beginning to use “virtual computers” with the cloud environment to share and view work.

Nandi Nobell joined CallisonRTKL as an experience designer. “Some visualization software that we consider for use just doesn’t convey the feeling of being in the space or what the space is — as a restaurant or a town center, populated with people using the space.” We like that Twinmotion has great Quixel Megascans textures, features and objects that are easily added to the spaces. It makes it feel like we are looking at a project and how the spaces function. For our company a lot of our work is large buildings. Speed and the ability to handle large amounts of data is important to us.”

Orlando mentioned that he has a film background. “I feel that real-time visualization and rendering technology can help create the feeling that the client is seeing their project in use. This is more effective as a tool to show clients our projects during the design phase. Twinmotion can be easily viewed by many people. Later it can be brought into Unreal Engine, which has even more features and capabilities to make our presentations even more interesting.

Nandi adds, “It is important for architects to start thinking about this..... it is easy to forget how smart and advanced the world is becoming. The more features the building has, and the better you can show this in an immersive, real time visualization presentation, the more we are able to communicate to our clients what the space will be like.

For architecture firms — being able to convey what it is like to go into the architectural space, that is at the heart of what we need to accomplish.

CallisonRTKL reviewing Twinmotion

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## INTERNATIONAL DESIGN PRACTICE

**MARK CICHY,**  
DIRECTOR OF DESIGN  
TECHNOLOGY, HOK

→| **HOK, Ottawa** is using real time visualization technology in their project in Canada's Parliamentary complex. Centre Block is one of Canada's most important and historic buildings. It houses Canada's Senate, House of Commons, and Library of Parliament.

One of the major goals of Center Block project is to preserve as much of the existing heritage building as possible. From the beginning, there was great interest in how the new design would preserve the beauty of the existing spaces and create universal access to accommodate all types of visitors.

For accessibility and for many other reasons, there was a need on this project for the design team to continuously visualize various states and strategies and how those related to the existing condition, to review with the client. HOK studied the "before and after" of the proposed renovation, prior to approving major elements of the design. Creating this "user experience" to get a feel for the space, became a high priority for the project, both for the architects working on the project, as well as the client who wanted to see and comment on the proposed design before it was implemented.

By creating immersive experiences to test the proposed modifications to the building, HOK and their partners (CENTRUS, a joint venture comprised primarily of Architecture 49, HOK, and

WSP) were able to create a spatial model that they could enter and experience for themselves and in turn represent what the proposed changes would be like, both visually and spatially.

HOK's use of advanced visualization technology, includes VR goggles with Twinmotion created spaces, to test with people. In this way HOK is able to meet the client's needs to demonstrate designs that will meet accessibility and other requirements, while respecting, preserving and upgrading the existing building and spaces.

"With Twinmotion, our design teams can create spaces that can be entered and experienced. This allows our architects, conservation specialists, and engineers to constantly assess and evaluate design interventions to ensure that they are both effective and respectful of the intended heritage fabric developed in parallel with the original design. —Mark Cichy, HOK

XR headsets were useful, so the viewers were "in the 3D space in real time" and could look around and move around to test the space themselves. With such design studies, members of the HOK team and the client are collaborating on the design to reach the desired results. In the visualizations, they are able to show what is existing and what is new and compare the two as they evaluate the design and the resulting changes with design team members and the clients.



To learn more about this project, please see this [online article](#) about this HOK project for the Canada's Centre Block.



“Over the next decade, the HOK team’s goal is to use architectural visualization technologies to document a multitude of future restorative states for this project. This will enable client partners to walk through the virtual Centre Block building to experience and assess future design stages and strategies, of the various phases of the project.” —MARK CICHY, HOK



HOK—Centre Block project

## TEACHING ARCHITECTURE: TWINMOTION AND UNREAL ENGINE IN EDUCATION

### JONATHAN RULE

TAUBMAN COLLEGE OF ARCHITECTURE  
AND URBAN PLANNING UNIVERSITY OF  
MICHIGAN, ANN ARBOR

→ | **University of Michigan's** Taubman College of Architecture and Urban Planning is a great example of a university architecture program that is exploring the benefits of using real-time software.

I spoke with Jonathan Rule, an Assistant Professor of Practice in Architecture at Taubman College and XR Faculty Innovator in Residence where he teaches design, construction, and digital technologies.

Jonathan explains: "Students are still developing their ability to imagine things spatially, and how to manifest those spaces in reality. They are learning about architecture and how to use advanced visualization tools at the same time."

"I teach a design studio that focuses on the design of buildings and spaces. These studios typically start with a quick assignment that

looks at basic architectural elements of floor, walls, roof, etc. for the development of a conceptual drawing. Assignments are quick, taking just one week. We are not trying to accomplish "finished works"; we are teaching students how to think about spaces. In this course, they begin to understand the relationship between their ideas, a drawing and the resulting space."

"We have used VR headsets and screens, and Unreal Engine or Unity, to create and view student work. Today the standard still seems to be V-Ray and Rhino for visualization, but more recently I have been exploring the integration of Twinmotion to leverage real-time rendering and 360 image to have students create immersive drawings. We experiment with lots of technologies to see how each works, and how they work together."





“I also teach an introduction to construction course in which we recently built a platform called Augmented Tectonics using Unreal Engine. In the course, students study material assemblies and learn how to implement them in design and construction. Augmented Tectonics leverages an immersive environment that allow students to explore lecture content through VR. The self-paced learning environment affords a new perspective of interaction and visualization of the material that was previously only engaged through lecture slides.”

“In some classes, students might start in Rhino or SketchUp and then use Datasmith to import into Twinmotion, or Unreal Engine, experimenting with the tools and possibilities there.”

### Remote Teaching and Learning

“We have also experimented with remote teaching and learning. This was because of the pandemic at first, but also because work will continue to be done and shared remotely. It will become much more common as we learn to create and share information between people in different locations. One reason we have begun to experiment with XR platforms like Twinmotion and Unreal Engine is because they allow us to work on projects collaboratively.”

### From Archive to Online

“I also teach a seminar that is an Introduction to Twinmotion and Unreal Engine for architecture students. This year the course focused on developing a virtual exhibition for the archive of former Architecture School Dean, Robert Metcalf. We explored how to bring his work to life in 3D with real-time visualization software. The students start working independently with Rhino and Twinmotion to sketch out ideas. The course transitions to Unreal Engine and uses Source Control to allow of groups of three students to work collaboratively on a single project.”

“I like how software programs like Twinmotion are developed specifically for architects — to help us do things more quickly and to easily communicate our work and initial ideas. Architects have always spent lots of time rendering their projects. Twinmotion is faster for students, enabling more time to think through design and less time creating the images and animations to share with others. I like the combination of Twinmotion and Unreal Engine, extending the range of what can be done.

Twinmotion is a stepping stone to Unreal Engine for XR projects.”



## CREATIVITY IN ARCHITECTURE

“The newest developments in software really have to be experienced to be believed. The things that can be done in software tools like Twinmotion and Unreal Engine are remarkable. I want everyone to experience some of what I have experienced in applying my talents and interest in architectural creation and visualization in real-time.” —JOHN MARX

JOHN MARX AIA,  
FORM4 ARCHITECTURE,  
SAN FRANCISCO, CA

→| **John Marx** is one of the most creative users of computer software in Architecture. John is design partner at Form4 Architecture, in San Francisco, California. Over the years, he has created some of the most compelling examples of visualization images for his firms’ architectural projects to show to their clients for approval. You can see more of John’s work on the company website: <https://form4inc.com>

Featured here is an example of his creative work — a concept he is developing for an installation at Burning Man. This project could be a building in real life and could also exist in a virtual reality setting for people to visit online. His concept is to create the reverse of a museum. Instead of visiting a museum to view artists’ work on display and then exiting through the gift shop — you would enter through a “gift shop of sorts”. In

John’s concept, this space is one in which you make a gift that will be displayed in the museum, for someone else to see and appreciate and perhaps purchase. This is his concept for his project “The Museum of No Spectators”.

John has produced a number of images to show his concept project, that he describes:

“It is a way of drawing people into the world of creativity, and encouraging their own creativity, not just being a passive spectator of others’ creativity. And online, it will be a way of introducing and encouraging people to explore and use some of the new real-time capabilities of software to create things on their own.”

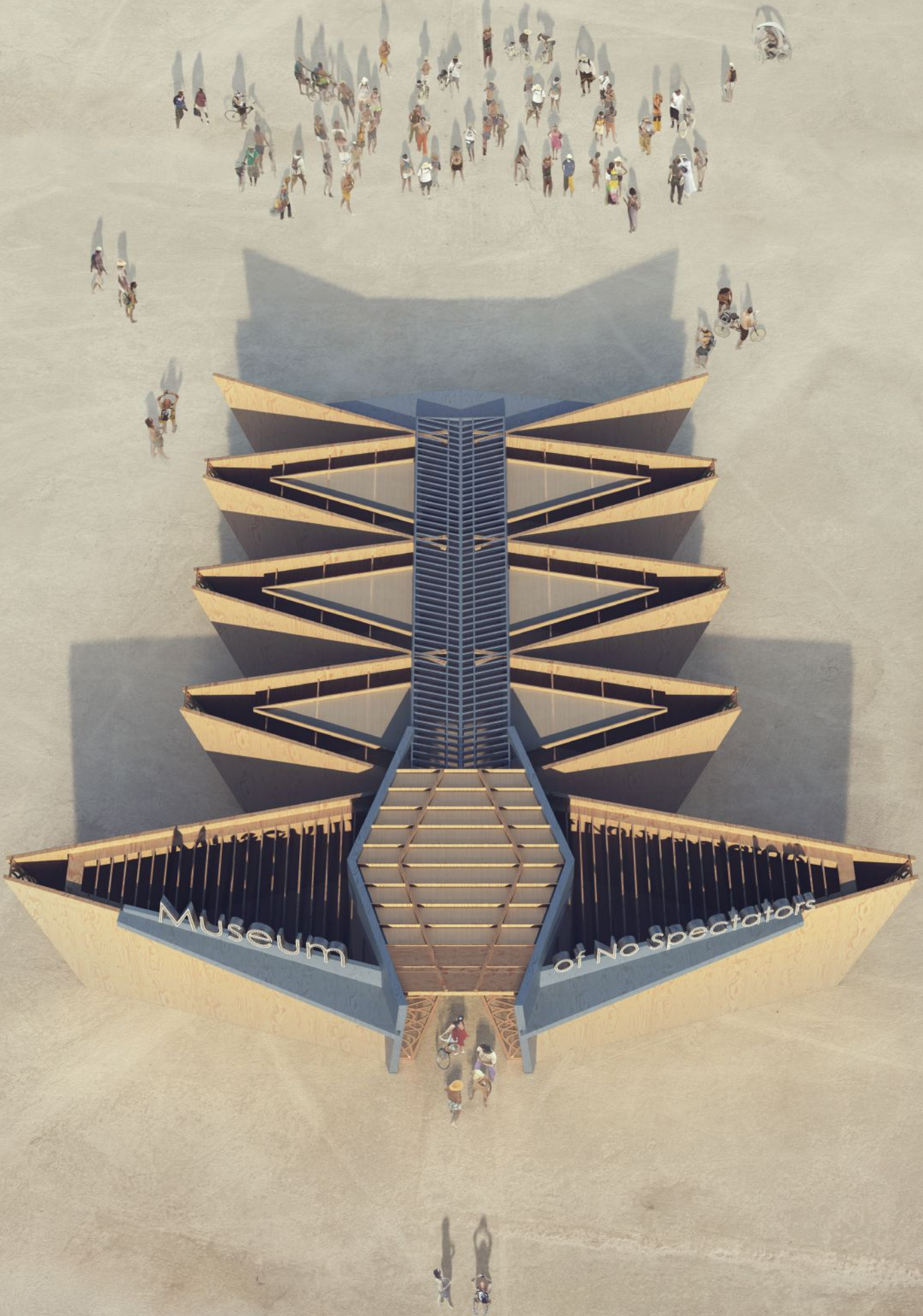
John Marx











Museum

of No spectators

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## FROM PRACTICE TO PRODUCT

“EPIC GAMES IS SO MUCH MORE THAN A SOFTWARE VENDOR — THEIR PRIORITY IS TO GET TOOLS TO CREATORS TO MAKE IT EASIER FOR CREATORS TO VISUALIZE WHAT THEY HAVE IN THEIR MINDS.” —SAM ANDERSON, EPIC

### SAM ANDERSON EPIC GAMES

➤ **A very valuable perspective** is available from Sam Anderson, currently with Epic Games, after working with ShoP Architects in New York for five years.

“I first learned of Twinmotion through some colleagues when I was working at SHoP. I had already been working in Unreal Engine at the time, so I was interested in seeing how the same real-time rendering technology could be even more accessible to architects. The partners at SHoP encouraged research & development and pushing the boundaries in Unreal Engine. A tool like Twinmotion, that further increases the speed and efficiency of creating imagery (and helps the firm to move the project ahead more efficiently) was very appealing.

In addition to designing the building and spaces, ShoP often is creating AR and VR experiences for clients that can assist the client understand the design as well as helping them with project funding and other efforts. One of my colleagues brought in an example of their use of Twinmotion. It was amazing. The leaves were moving on the trees as you walked around looking at the building. In addition, Twinmotion is easier for architects to use than most other visualization programs.

#### **Understanding architecture’s workflow— Collaboration for In-house reviews and Client Presentations**

“I understand the struggles that come with communicating architectural designs and how wonderful it is to use tools that assist in problem solving and communication in architecture. In the past, it could take a rendering a week to complete and was difficult to share with the team.

Being able to easily share my Twinmotion and Unreal Engine work is better. It saves so much time on reviews. Twinmotion is designed to ‘flow’ during the creation and sharing of architectural forms in a more collaborative, efficient way. That saves a lot of time on a project for everyone collaborating on a project.”

“Prior to being with EPIC Games, I had personally used Twinmotion in conjunction with studying new ways of presenting architectural, spatial information for architecture projects. This included 360-degree LED viewing screens, for in-house reviews, as well as client presentations. It is a type of immersion that allows multiple people to share an experience as opposed to one person experiencing the space by themselves on their computer or in a headset, solo.”

It is so rewarding to have someone say “wow, this is incredible” when they are viewing a VR experience that you have created. And they comment how they are understanding the space so much better in VR.

“One goal at Epic Games is to allow for experiences that improve architectural design and can be collaborative. Opening up the authoring of digital environments to more people will have an impact on how more people experience the later built project.”

“I do believe that richer experiences and richer buildings are possible with collaborative authorship that real time toolsets allow. And by ‘richer’ I mean more inclusive, well rounded, more reflective of many people’s points of view of the world and of that particular building’s contribution to the world.” —Sam Anderson, Epic Games



Sam Anderson, Epic Games

# Twinmotion

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→| **Twinmotion can easily produce a range of images from sketches to high-quality photo-realistic images, panoramas, and standard or 360° VR videos.**

→| **Twinmotion brings unprecedented real-time quality.** View and edit your scene in real time at the same high quality as the final rendering. Twinmotion features realistic physically-based lighting and shadowing.

→| **Twinmotion is one setup, for all your media.** Create simple images, panoramas, standard and immersive 360° videos, and shareable lightweight interactive presentations quickly, all from the same Twinmotion scene. And with support for all of the most popular VR headsets, Twinmotion can take you from BIM to VR quickly.

→| **Twinmotion can bring your scene to life with its' smart assets Library.** Twinmotion's library includes not only static props like furniture and rocks, but you can also include ambient sounds, photo-scanned human characters with motion-captured animation, animal characters, and even high-resolution plants that move in the wind; all just by dragging and dropping.

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### THE 5 BEST TWINMOTION FEATURES FOR ARCHITECTS:

by Belinda Ercan, Twinmotion Product Marketing Manager at Epic Games.

→| **1. The Path Tracer**

→| **2. Collaboration with Twinmotion Cloud**

→| **3. The One-Click Sync Plugins**

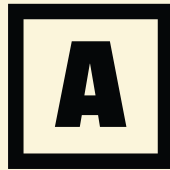
→| **4. The Quixel Asset Library**

→| **5. The Twinmotion to Unreal Engine Bridge**

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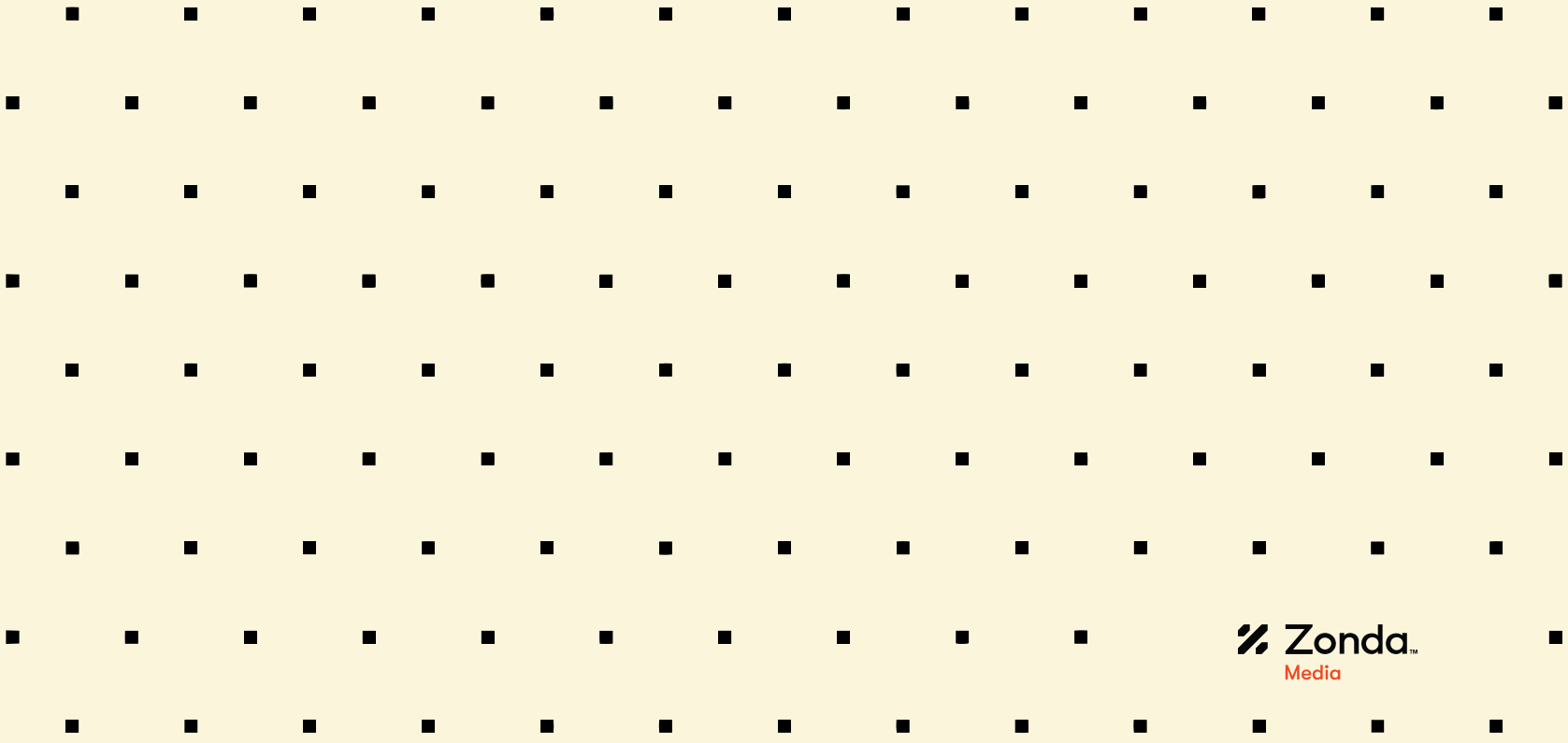


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# Products: A'22 Product Highlights

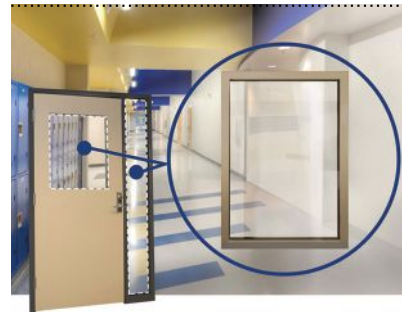
From the 440 exhibitors on the 123,000-square-foot expo floor at the 2022 AIA Conference on Architecture in Chicago, the editorial team at ARCHITECT picked 11 product highlights.

TEXT BY ALEX V. CIPOLLE AND MADELEINE D'ANGELO



## NW Acoustical 645, NanaWall Systems

This daylight-friendly, folding glass door boasts a sound transmission class of 45. Available in custom configurations of up to 12 panels, the unit features acoustically separated aluminum framing and floor-supported systems. It can be specified in a range of finishes and glazing options, and with a swing door configuration to help manage foot traffic. [nanawall.com](http://nanawall.com)



## Matte Black Collection, ASI Group

Can you ever have too much black? This sleek collection offers a noir range of toilet tissue holders, towel dispensers, and faucets. Crafted using durable, powder-coated, matte-black stainless steel, the versatile line also features seamless 18-gauge cabinet doors and 20-gauge cabinets. [americanspecialties.com](http://americanspecialties.com)



## Attack-Resistant Openings, Assa Abloy

Aiming to offer a design solution that supports school safety, Assa Abloy partnered with School Guard Glass for this line of secure openings that can be integrated into new and retrofit projects—including those with wood or hollow metal doors. The range includes fire and exit code-compliant doors, frames, and hardware assemblies tested according to the FBI's Active Shooter Report. [assaabloydss.com](http://assaabloydss.com)

## 3D Acoustic Tiles, Burgeree

These sound-absorbing products are a polyester felt made from recycled materials (Burgeree cites plastic bottles as one source). The tiles come in a variety of shapes from shell to diamond—shape BY-053 pictured here—and dozens of colors. [burgeree.com](http://burgeree.com)



## Hardie Architectural Collection, James Hardie Industries

Developed in response to labor shortages and other industry demands, this integrated portfolio of fiber-cement panels and metal trims provides a low-maintenance option for designers and homeowners. Available in five nature-inspired textures—including fine sand, sea grass, and sculpted clay—these panels are also expected to remain resilient in severe weather. [jameshardie.com](http://jameshardie.com)





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**SmartSide Trim and Siding,  
LP Building Solutions**

The SmartSide ExpertFinish trim and siding are designed with a proprietary lap joint for ease of installation. Created using an engineered wood-strand technology to withstand the elements, the trim and siding come in 16 colors, including redwood red and abyss black. [lpcorp.com](http://lpcorp.com)



**Terra Swing Access Door, Oldcastle BuildingEnvelope**

Envisioned to make "the building exterior more accessible," according to Oldcastle, this high-performance terrace door meets current ADA standards with a 10" kick rail, five pounds or less operating force, and a ½" threshold. Each door also features easy installation—no concrete notching required—and a continuous exterior perimeter seal thanks to its field-installed exterior trim. [obe.com](http://obe.com)



**VertiStack Clear, Clopay Corp.**

This compact stacking sectional door for commercial use requires no overhead tracks, allowing for an open and minimalist ceiling. A new offering from Clopay Corp., the door is available in glass, acrylic, and polycarbonate options in a variety of finishes. [clopaydoor.com](http://clopaydoor.com)

**X-Wall System, Huntsman Building Solutions**

In response to the increasing energy requirements for continuous insulation to reduce thermal leaking, Huntsman Building Solutions has created the X-Wall System. This closed-cell spray foam is installed from the exterior and also functions as an air and water-resistant barrier and a vapor retarder. [huntsmanbuildingsolutions.com](http://huntsmanbuildingsolutions.com)



**Venetian Glass Brick, Glen-Gery**

These glass interior and exterior bricks are shaped by hand by Italian artisans and come in four finishes—natural, polished, frosted, and satin—and five colors, including clear, golden amber, aquamarine, blue sapphire, and smokey quartz. [glengery.com](http://glengery.com)



**⅝" Interior Panel, Pabco Gypsum**

The new ⅝" glass-faced panel completes a full line of interior and exterior products for commercial and residential use by Pabco Glass that are ideal for pre-rock construction. These panels feature a fire-resistant gypsum core encased in a glass-fiber mat and are designed to be mold- and water-resistant, too. [pabco gypsum.com](http://pabco gypsum.com)





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# Opinion: Push for Parental Leave

TEXT BY MELANIE FAIRCHILD AND JESSICA DOLE



Ours is a story too many parents share: Seven weeks after the birth of our children, we had to return to work. The experience was heartbreaking. We were still healing, desperately sleep-deprived, emotionally drained, and the bills kept coming.

At the time, we were at different firms in different industries—account management and human resources—and “maternity leave” consisted of six to eight weeks of short-term disability, covering between 70% and 80% of our usual pay. Returning to work so soon was incredibly difficult, accompanied by pangs of guilt, but what else could we do?

That was more than a decade ago, while in different industries, but in the architecture profession, these policies remain typical, and the U.S. at large is falling behind. Currently, Congress is considering only four weeks of mandated parental and medical leave, a fraction of what federal workers receive (12 weeks) as well as the majority of rest of the globe—12 weeks at a minimum but often more than 24.

So, when we announced on a recent company video call that we had succeeded in overhauling GBBN’s parental leave policy, it was extremely gratifying knowing it will be better for our colleagues. The firm’s new policy includes 12 weeks of fully paid parental leave for birthing parents; six weeks for non-birthing parents;

flexible transitions back to work; and fully paid bereavement leave for pregnancy loss for employees, partners, and surrogates. On that video call, we were met with cheers.

## Architecture’s Deficit

Reliable data on parental leave across the profession is scarce. A 2016 report (“Diversity in the Profession of Architecture”) from The American Institute of Architects pointed to the difficulty of starting a family as a key reason why women leave the profession before rising to leadership positions. A 2021 report from AIA and the Center for WorkLife Law at University of California, Hastings College of Law substantiates these experiences through a survey of 1,346 architectural professionals. It describes how “being a mother, getting pregnant, or just being a woman of a certain age can trigger strong negative competence and commitment assumptions at work.” According to the report, 64% of those surveyed say that women’s opportunities diminish after having children, and 59% report that women’s pay is worse.

Parental leave is connected to disproportionate attrition rates that women experience as they pursue licensure—women account for roughly 50% of architecture graduates but only 20% of licensed architects—and disparities in industry leadership, outcomes that often reinforce gender inequalities. Better parental leave policies can help retain women, enabling them to advance to leadership positions, and help dismantle workplace inequities.

## A Critical Cultural Shift

Parental leave is one step toward a broader cultural shift around work-life

balance and gender norms. The 2018 Equity in Architecture survey of 14,360 architecture professionals found widespread evidence of “flexibility stigma.” More than two-thirds of those surveyed feared that using benefits like family leave would jeopardize a promotion. The data is clear: For this kind of policy to be effective, firm leadership must champion it.

This is one reason why our firm stresses flexibility for everyone. With flexible schedules, hybrid work arrangements, and generous PTO, we hope to reduce the stigma associated with parental leave. The Hastings report offers guidance on how to overcome this stigma.

We also must stress that this is not a “women’s issue.” It is paramount that we call this parental leave rather than “maternity leave.” Communication around the policy is intended to set the expectation that all parents should use it. While we recognize that the experience is distinct for birthing parents, we hope that this policy will expand our understanding of parenting, shifting away from gendered assumptions about women as primary caregivers. The fact that nearly 1.8 million women have dropped out of the workforce during the pandemic largely due to caretaking responsibilities illustrates the power of these expectations.

Excellent resources are available for firms considering expanding parental leave—the Center for Parental Leave Leadership’s case study of Portland, Ore.-based Bora Architects, for one, drills down into the numbers and strategy of the firm’s policy. We encourage you to explore policy options because, while our expanded policy will give us a welcome recruitment advantage in the coming years, we’d be even happier to lose that advantage within an industry where generous parental leave has become the norm.

*Melanie Fairchild is the chief operations officer at GBBN Architects, and Jessica Dole is the GBBN director of human resources, learning, and development.*





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Disruptions in traditional building supplies have upended all building types, with K-12 school construction being no exception. Delays are especially egregious for school district officials trying to reassure impatient parents, children, teachers, staff, and taxpayers that construction goals are being met on a planned, timely basis.

That concern is certainly on the minds of the Meramec Valley School District leaders in suburban St. Louis. District taxpayers had approved a \$17.9 million bond to expand and renovate the 59-year-old Zitzman Elementary School, among other projects. The clock was ticking. However, no one predicted a months-long wait for framing steel.

Then a block of white foam rode to the rescue.

## KENTUCKY FIELD TRIP

"We were well into design when school district CFO Al Kirchhofer, Jr., asked if we'd ever done ICF," explains Mark Reuther, AIA, principal of St. Louis-based Hoener Associates. ICF stands for insulated concrete form, a highly evolved structural system that uses stacked Lego-like white foam blocks to create steel-reinforced, cast-in-place concrete walls.

Hoener Associates welcomed the opportunity to work on their first ICF project. Reuther and school district officials quickly organized an instructional field trip to Kentucky, home to several dozen ICF schools. Reuther and the Missouri team learned many Kentucky school districts now mandate ICF as the basis of design for several reasons, including:

- **Construction Speed.** ICF walls go up quickly and reduce the number of trades required to finish the wall. A 10 to 15% reduction in the construction schedule is typical, a huge consideration for time-challenged school districts. Work isn't delayed by cold winter weather, either.



- **Energy Savings.** Cumberland Trace Elementary School in Warren County, Kentucky, is designed to achieve a projected 15.5 EUI, compared to the national average of 75 EUI for climate zone 4. The school figures to save about \$175,000 annually compared to a typical county school of the same size.

## STORM SHELTER RESILIENCE

These weren't the sole factors in the Meramec Valley School District decision. The state of Missouri requires new schools to include a storm shelter, typically a resilient gym for gathering the entire school population. ICF structural systems are rated to withstand wind speeds up to 250 mph, meeting the standard.

Another factor, of course, is material availability. "The material being available in two to four weeks was important," says Reuther. "You're not waiting on material to get started." The price predictability of concrete also works to the school district's favor. Concrete is

available without the wide price fluctuations of other building materials.

## THRILLED OWNER

Construction on Zitzman School is now about 50% complete. School district leadership is thrilled. "We can't believe this approach [ICF] isn't more common in Missouri. Any time we can improve safety and efficiency, while keeping costs the same or less, that's a win for our district," states John Mulford, the school district superintendent.

ICF is an increasingly common K-12 structural system. In Texas, for example, there are more than 160 ICF schools. Kentucky now counts at least 55 ICF schools. All told, there are well over 300 K-12 schools nationwide.

As for the Zitzman Elementary experience, the way forward seems plain enough to board member Lou Vondera: "It's our hope and goal ... to implement ICF usage district wide on future projects." ■

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# Designers Select: Smart-Home Technology

From detection systems to solar-powered controls, designers share their picks of smart-tech products for single-family and multifamily housing.



**Sarah Broughton, FAIA**  
Principal  
Rowland + Broughton  
Aspen, Colo.

## Xtralis: Vesda System

xtralis.com



"This state-of-the-art system is not only an aesthetic benefit, but functionally it is an upgrade as it detects additional hazardous and combustible gases. [With more sampling locations,] it can also detect smoke from a fire quicker."

## Ketra: HomeWorks Automation System

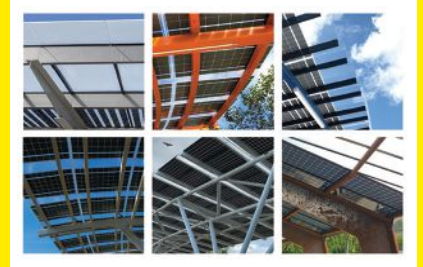
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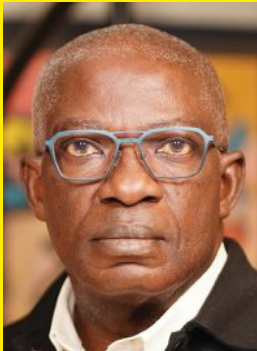
"Using tech to emulate the changes in natural light benefits human health in all climates, and especially in places where people are inside for longer periods of time. This whole-home system is compatible with Ketra and Ailisse."

## Lumos Solar: Vision Module System

lumussolar.com



"Made in the U.S., these solar panels integrate into glazing to create a cohesive aesthetic. The lower profile panels are modular with glass edges and have varying densities, allowing for custom layouts and a level of opacity appropriate for the design."



**Victor Body-Lawson, FAIA**  
Founding Principal  
Body Lawson Associates  
Architects & Planners  
New York

## August Home: Smart Lock Pro

august.com



"These keyless locks are installed inside doors for a clean look, making the owner's phone the de facto key. The door is always open: It detects where you are, unlocks before you arrive, and can be controlled from anywhere."

## Building36: Water and HVAC Detectors

building36.com



"This smart-home solution offers capacity to connect with varied apps and devices, including sensors to protect homes from water damage and to detect potential HVAC system issues."

## Verkada: Camera and Sensor

verkada.com



"Smart residences now benefit from doors and access systems that replace cameras with smart locks and geofencing integrated into the door itself or its smart-lock product. The client buys one product rather than separate ones, eliminating costs of wiring and alterations."



**Panji Grainger**  
Partner  
Buro Happold  
New York

## Ecobee: SmartThermostat

ecobee.com



"These temperature controls gather real-time data, can be Amazon Alexa-integrated, and include a smart thermostat and security integration. Architects and owners can use this to start predicting energy needs based on custom factors."

## Latch: Guest and Delivery Management

latch.com



"We're seeing smart security and door access and sensor products for high-rise living, a focus for our design teams. This product helps manage guest and delivery access, and can expand to a full-building system for data-gathering."

## Kode Labs: Smart Building Software

kodelabs.com



"This integrator software links smart technologies to reduce utility expenditures and ensure homes are as sustainable as designed. Real-time data of how homeowners use their properties help designers understand and even better predict energy needs and operational carbon."

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# AIA Architect



RUTH YARO

## A Career of Firsts

**Kimberly Dowdell, AIA, envisions new possibilities for the profession.**

As told to Greg Menti

*When Kimberly Dowdell, AIA, is sworn in as AIA's 100th president in 2024, she will be the first Black woman to ever hold the office. Raised in Detroit and currently based in Chicago, Dowdell was the 295th Black woman to become a licensed architect in the United States. Currently the marketing principal at global design firm HOK, she was president of the National Organization of Minority Architects from 2019 to 2020. We talked with Dowdell about her time leading NOMA and what it's like to be a trailblazer in the field of architecture.*

I firmly believe that leadership is a practice similar to how architecture is a practice or law is a practice or medicine is a practice. I don't believe in perfection, but practice helps one to get closer to the goal of excellence.

NOMA has given me a lot of practice. I was national president for two years, but it's actually a six-year term. I was president-elect for two years, then I had two years in the driver's seat as president, and I'm

currently the immediate past president until the end of this year. It's a lot of time on the executive committee and helping to make key decisions for the organization.

One of my biggest takeaways from NOMA was learning more about my own resilience as a leader. I certainly didn't know that I was going to be the sitting president when a global pandemic struck. I had to take everything in stride. One of the most important things I did was send a weekly note to our members during the uncertain times of the pandemic. After sending my last note several months into [the pandemic], I got so many messages back from people saying how those notes really helped them stay connected and gave them a level of comfort [knowing] that someone was awake at the wheel.

My experience leading NOMA through the early stages of COVID-19's sweeping impact around the globe taught me how important it is to hear from leadership. Whatever that means in 2024, whether

we're navigating an economic downturn or something else completely unexpected, I intend to be communicative about how the AIA can be supportive of all our members, including those at different size firms, in different regions, and at different stages of their careers.

It's so meaningful to be the first Black woman to be AIA's president because it really seems to resonate with people, and not just people who fit my specific demographic. At the AIA Conference on Architecture in June, some people were a little misty-eyed and that made me misty-eyed. It was an "I'm not crying, you're crying" situation. It clearly means something to people.

Being a trailblazer harks back to my campaign slogan, which was "Envision new possibilities." People who couldn't see themselves as an AIA president now can, and equally as important, people who couldn't see someone who looks like me in that role can now see that—even if they don't look like me. **AIA**



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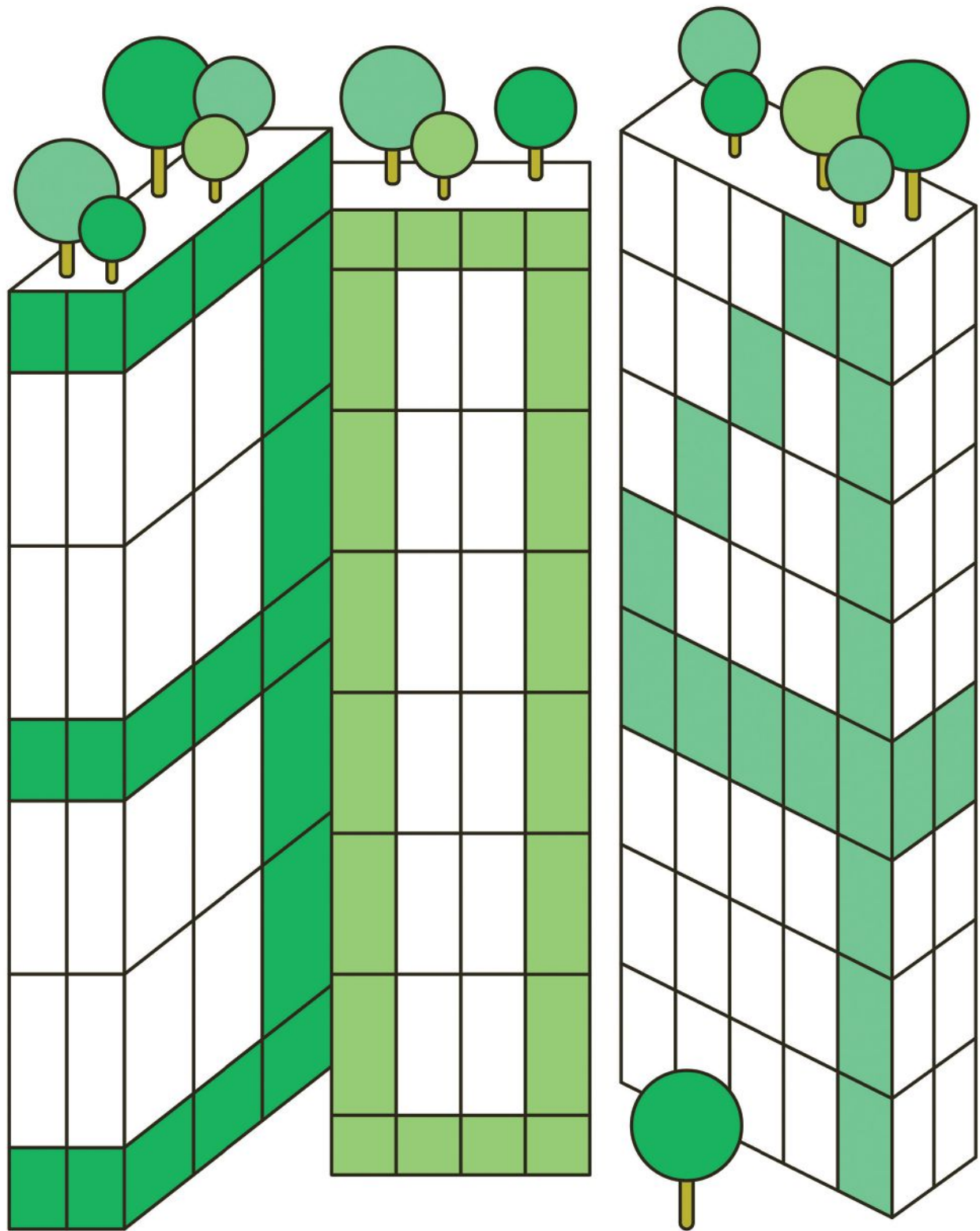


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## An Increase in Sustainability

By Michele Russo

More than 30% of firm leaders report that the share of their projects designed to meet a sustainability rating system will increase over the next two years. Another 51% report that their share of such work will stay steady, and only a small percentage expect decreases. Most of those reporting decreases are sole practitioners and small firms. The largest reported growth in

sustainability-related design is at mid-sized firms and in education and health care projects. Overall, the share of design work dedicated to these sustainability rating systems (e.g., LEED, WELL) is highest at the largest firms and those located in the West. **AIA**

Source: AIA Work-on-the-Boards survey of firm leaders, June 2022 (visit [aia.org/abi](http://aia.org/abi) for more information).



# Power Surge

## The smart, sustainable, and sudden shift toward building electrification and the smart grid

By Patrick Sisson

Eastern Washington University's Catalyst Building, tucked into the South Landing neighborhood of Spokane, Wash., is a Modern shoebox-shaped, five-story collection of offices and classrooms built with cross-laminated timber. Designed to be a living laboratory of sustainability, the building has sadly sat mostly empty due to the pandemic since opening in the fall of 2020. But those looking for data on the power of transformative technologies such as electrification and smart grid systems need look no further. In the time since the building's completion, these technologies have undergone an unprecedented shift from cutting-edge to commonplace.

"Building electrification is the ticket for entry, and where smart grids can meet smart buildings, we can decarbonize the grid," says Michael Frank, vice president of engineering and design for McKinstry, the design-build firm behind Catalyst. "We need buildings to play a big part. We can't get there from the utility side alone."

Frank's work on, and belief in, Catalyst highlights a key shift taking place at the intersection of development, technology, and power generation and distribution, one that's challenging established ways of designing and building. For decades, sustainably minded architects have preached increasingly rigorous and effective means to boost efficiency and cut carbon emissions from our buildings, from LEED standards and passive house design to solar panels and battery storage.

But the future—as a number of intertwining developments in building design, utility policy, and digital building management tools suggest—will consist of homes, offices, and neighborhoods hooked up and collaborating with emerging smart grids that can direct and ration power.

Catalyst, in addition to the nearby Scott Morris Center for Energy Innovation, is part of an emerging "Eco-District" that's pioneering and testing sensors and energy control systems meant to significantly cut energy usage. While this urgent transition may seem like territory for those versed in

technology and energy policy, architects can also lead the way.

"Architects have traditionally relied on their favorite engineers to do the right thing, and put the right technologies in their buildings," Frank says. "But there needs to be a more holistic approach. From the building's inception, architects need to educate future owners about the impact of building design on the larger system."

There are three significant, intertwining trends currently pushing the development world toward electrification, according to Rachel Golden, principal of Carbon-Free

Buildings for RMI, a sustainability think tank: significant funding going toward clean energy technology; a growing regulatory push by cities and states in favor of rapid electrification; and more mainstream awareness of the health impacts of burning natural gas indoors.

"Electrification is the holy grail," adds Breana Wheeler, U.S. director of operations for BRE Group-BREEAM, an international building sustainability standard. "It's really about changing the mindset about what's important in designing buildings. Energy efficiency is critical to the puzzle."

The Catalyst Building at Eastern Washington University, designed to be a "living laboratory of sustainability," is constructed of cross-laminated timber.



BEN BENSCHNEIDER



EWU's Catalyst Building, completed in 2020, utilized cutting-edge technologies like electrification and smart-grid systems that have since become more commonplace.

She points to buildings like The Edge in Amsterdam, a jewel-shaped, glass-encased high-tech office billed by the Dutch as “a new way of working,” and by Bloomberg as “the smartest building in the world,” when it was completed in 2015. London-based PLP Architecture embedded a combination of high-tech sensors within its dramatic beveled form that, together with a custom app for users, dramatically lowers energy usage. Architects will need to understand the technology behind sophisticated HVAC and electrical systems and think holistically around shading, lighting, and building controls to maximize efficiency.

The speed at which electrification is being implemented—with more than 60 municipalities, including New York,

pushing electrification ordinances for newly constructed buildings—has ramped up with increasing government investment. The Bipartisan Infrastructure Law passed last year will direct \$6 billion toward weatherization, electrification of public buildings, grid work, and support for updating and rewriting building codes for more states and cities. The Department of Energy is running a “Cold Climate Heat Pump Challenge” to help push adoption of electrified heating tech in northern regions of the country while also allocating \$20 billion toward its Building a Better Grid Initiative (more than 70% of the nation's existing transmission lines are 25 years or older).

In New York and California, both centers of development and investment, a host of

programs from governors Kathy Hochul and Gavin Newsom recently unveiled budgets set to funnel additional billions of dollars toward building electrification. With the government's ability to regulate and the purchasing power inherent in its own sustainable building practices, it can play a pivotal role in helping to set the market.

“What we're finally seeing is the two states that are leading on climate recognizing the importance of buildings,” says Panama Bartholomy, founder and executive director of the Building Decarbonization Coalition. “Their policies are very clear that in this decade, New York and California will be saying ‘no more’ [to] new gas in buildings, so the architects of the world need to come to



an understanding of how to deliver all-electric, efficient buildings by the second half of the decade. There's no way we're going to meet climate goals without doing this, so the architectural community should be prepared."

At the same time, rising electricity costs are hitting building owners hard. Joseph Aamidor, a longtime smart building and real estate technology consultant, says operators and owners face rising electric bills—"you can really destroy your budget by using energy at the wrong time"—as well as a rapid rise in consumption.

In short, modern buildings are moving toward more nodes of electrical usage and need more control, just as climate realities demand a rapid shift to renewable power generation that isn't necessarily as reliable as what we've come to expect from fossil

fuel generation. Numerous states have set 100% clean energy goals, and the Biden administration wants to shift the grid to net-zero carbon emissions by 2035. These significant leaps forward won't land without a blueprint for smart energy use. For these systemic changes to take root in a viable way, a smart grid is essential.

Broadly speaking, this means a grid that isn't a one-way distributor of power, but one that interacts with buildings (and can utilize battery storage for unused energy) to better manage and lower existing energy use; help supply new demands for electric vehicles and electrified homes; and take advantage of a growing network of renewable power generation and home and commercial battery storage. In California, for example, the increasing hunger for more renewable energy sources to slash carbon emissions and meet sustainability targets means the demand for a new generation of smart electrified buildings, which can help balance grid operations and reduce overall energy usage.

"If we want renewable supply, we want flexible demand," says Mary Ann Piette, a senior scientist at the Department of Energy's Lawrence Berkeley National Laboratory, which is focused on building technology, and the CalFlexHub, a working lab for smart grid technology. "We want to demand to use as much of the clean energy when it's available. That's a big driver."

Clean energy is also a driver set to be accelerated by vast investments in new technological areas, including home batteries and more resilient electrical grids. Wood Mackenzie, a global research firm focused on clean energy, predicts \$110 billion in investment on distributed energy resources around the country will begin to realize these savings. The Department of Energy estimates that over the next two decades, grid-interactive efficient buildings could save the U.S. up to \$200 billion in electricity costs.

A number of programs and pilots have shown the promise of this new technology. Whisper Valley, an Austin, Texas-area megadevelopment that runs on solar and geothermal power, will soon add a mixed-use retail development. A number of national laboratories and DOE initiatives have collaborated on the Connected Communities program, a growing network of grid-interactive efficient building communities, including many California college campuses. Across the country, developments like Reynolds Landing in Hoover, Ala., which utilizes smart grid systems, have shown great promise as prototypes for future development. The

62-house setup is outfitted with energy control systems that cut energy usage by 44% compared to an all-electric neighborhood and cut peak energy usage by more than a third. The appeal to energy savings is a key part of the development's marketing—the homes are touted as being 35% more efficient than the standard new-construction Alabama home. Once-skeptical consumers may soon see the financial benefits adding up.

In Ithaca, N.Y., Brooklyn-based climate tech startup BlocPower plans to decarbonize the entire building stock in coming years, utilizing a set of unified design guidelines for retrofits and conversions, as well as neighborhood geothermal and heat-pump networks, to electrify roughly 6,000 buildings. It's the most significant step taken by any city to transform its built environment and will allow Ithaca to reach its goal of becoming carbon neutral by 2030.

As Dom Lempereur, BlocPower's chief of engineering, says, it's the scale, rather than the technological breakthrough, that makes this project most noteworthy. In a decade, using current technology proven with existing case studies, he hopes to transform the city, eliminating significant air pollution and electrifying houses and ideally a large number of vehicles.

"We don't have much room for error," he says. "We'll be working with contractors for years with products they already know. We're not doing research and development with products we don't know."

Scott Shell, FAIA, principal at EHDD Architecture, has worked on a number of electrified and grid-smart buildings, such as the Sonoma Clean Power Co. headquarters in Santa Rosa, Calif. "It's shocking how quickly cities have embraced electrification, which will encourage manufacturers to make better products supporting electrification," Shell says. "What drives the cost of electricity isn't so much generating it, it's the infrastructure that has to be built to transmit it and shift it around. If we can use the smart grid to manage when those peaks occur and reduce those peaks, we can save billions of dollars on costs for apartment renters and homeowners."

While this technological evolution seems to be moving ahead, in many ways, according to Frank, it's returning architecture to some of its earliest principles.

"This is getting back to the traditional roots of architecture and having a more holistic view of what they're doing, creating a building from soup to nuts," Frank says. "Helping clients through this transformation is something architects are, and should be, excited about." **AIA**



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# A Garden of Homes Grows in Reno

Innovative urban infill projects are increasing housing density in Nevada's third-largest city.

By Ben Schulman

Architect Jack Hawkins, AIA, first arrived in Reno, Nev., more than 30 years ago. Despite the city's seedy reputation at the time, Hawkins was drawn to its relatively low cost of living and myriad outdoor opportunities, given the proximity to Lake Tahoe and the Sierra Nevada Mountains. Hawkins set up his firm, Hawkins & Associates in the Midtown District, a short jaunt—but a world away—from downtown Reno's urbanist fever dream of Modernist kitsch, faded Old West grandeur, surface parking lots, and superblock casinos.

The Midtown District is home to an eclectic, diverse group of retailers and restaurants. Virginia Street serves as the main commercial artery, flanked by residential neighborhoods of humble but handsome bungalows. The commercial corridor was nearly abandoned and the residential neighborhoods were struggling when Hawkins arrived, but now, the area is a healthy commercial and residential destination. It benefited from a re-envisioning of Virginia Street to make it more pedestrian-friendly and accessible. At the same time, it became a more appealing prospect for buyers and renters after the

fallout from the 2008 financial crisis drove up housing prices elsewhere.

"Reno has experienced exponential growth after the crash," says Hawkins. "The shattering of the Bay Area's housing prices has been driving people to places like Boise and Reno, and that hasn't stopped."

Even before the financial crisis hit, Hawkins—whose architectural style blends a contemporary and clean Modernist approach with a hint of rusticated lodge—foresaw the opportunity for infill development in Midtown. Newcomers were already starting to arrive in the area, and Hawkins believed that appropriately scaled infill development could become a draw for neighborhood stabilization, retention, and attraction. He believed it was also a challenge to model sustainable practices through various approaches.

"Sustainability is, at its core, an economic issue," he says. "It is not just a material issue."

Hawkins set out to develop a project that could establish a principle of economic sustainability from a land-use perspective, as well as material sustainability, embedded within the architecture of the project itself.

In 2008, he developed Modern on

Cheney, a cluster of four contemporary infill residences on Cheney Street in the burgeoning historic Wells Avenue Bungalow District. Hawkins and his wife have lived in one of the units since their development. Each unit's roughly 1,000 square feet of living space feels more expansive due to the airiness throughout, created by a long span of clerestory windows and glass doors, a clever use of recessed spaces, and a meshing of indoor-outdoor areas offering expansive views of the nearby Sierra Nevada mountains.

The success of Modern on Cheney established a precedent for density in an area of predominantly single-family housing. Coupled with Reno's increasing population and economic growth, Hawkins reasoned that similar style developments could easily take root in the area. Roughly 15 years after his first development, Hawkins is teaming up—as an architect—with a local couple, Piper Stremmel and Chris Reilly, to develop Midtown Garden Homes, an extension of his original idea at a different scale.

"We are looking holistically at incorporating all of the great things about the area and geography," Hawkins says.

This will manifest in a program that mixes a single-family residence and a duplex that meet the street, plus three additional duplexes in back offering units of 400 and 700 square feet. All of the units will connect through interior courtyard garden spaces designed to create an intentional community. Sustainability is baked into the program, including passive solar, minimal duct work, landscaping that acts as a block-level mitigation technique to minimize climate effects, and, potentially, low-cost, vernacular cooling systems—à la "swamp coolers"—that are common in dry climates like Reno's.

Stremmel and Reilly most recently developed The Jesse, a six-room boutique hotel and high-end taqueria and bar on the outskirts of downtown. Situated in a historic building, the hotel is a repurposed and reimagined piece of old Reno. Stremmel, a Reno native, is an artist and entrepreneur who moved away from the city and traveled the world before returning. Reilly works for Tesla by day. Together, they are carving out a niche for unique, forward-thinking development within the city.



Midtown Garden Homes in Reno, Nev., will incorporate a single-family house and four duplexes of multiple sizes.



“It was not our intention to be developers,” Reilly says. “But we loved the neighborhood—it’s our neighborhood—and we wanted to invest in it, too.”

Stremmel sees the different perspectives that each partner brings to the project—she as the boomeranger back to Reno; Hawkins as the neighborhood visionary; and Reilly as the new blood excited by its prospects—as a boon to their combined focus for an outcome that is both equitable and sustainable, contributing to Reno’s reputation as a desirable place to live now and in the years to come.

In turn, Hawkins sees Stremmel and Reilly’s equity approach as more than just a labor of love, but as a mechanism to make the economics behind Midtown Garden Homes work.

“The only reason that Midtown Garden Homes pencils is that the developers can hang onto it for the long term,” Hawkins says. Noting the front-loaded soft costs associated with rezoning concerns, among other development hurdles, Hawkins was strategic in advising the developers to separate the individual parcels that compose the entirety of the project. In the event

of liquidity needs, one part of the project could potentially be sold while the other components are maintained, opening the door for more profit potential down the line.

It’s another way in which sustainability from an economic perspective is built into the design model.

“We all want to make money, but how do we do so responsibly?” Hawkins asks. “How can you increase density with an urban infill project and create a better overall environment at the same time?”

Midtown Garden Homes aims to find out. **AIA**

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

# Relevancy and Impact

**We are the change agents we seek.**

By Dan Hart, FAIA, 2022 AIA President

We are stewards of the built realm and of the profession. As stewards, we have a responsibility to do good while we do well. Being an architect today requires technical acumen; emotional intelligence and empathy; professional integrity; the ability to envision and realize meaningful, positive change; and an overarching instinct and focus to bring it all together holistically.

Society and the profession benefit from civically engaged architects. When the public, policymakers, legislators, and strategic partners understand our full value in achieving the change society seeks and needs, we will thrive as a profession and our society will be better for our efforts and expertise. Our participation on big issues matters. Climate change is one of those big issues—a global one.

Most recently, AIA released a statement on the *West Virginia v. Environmental Protection Agency* ruling by the U.S. Supreme Court stating that we believe this decision is a setback in the climate crisis fight and urging Congress to give EPA the tools needed to allow the agency, and all of the federal government, to meaningfully and holistically reduce and eventually eliminate greenhouse gas emissions.

From energy use to the materials specified, the architectural community has countless opportunities to make a significant impact on reducing carbon across the industry. You have the power to ingrain carbon neutrality into your firm and practice.

We invite you to explore AIA’s resources for a zero-carbon future. Consider signing up for AIAU’s “Embodied Carbon IOI” series. Use ROI on High Performance talking points to spark conversations on the direct and indirect economic benefits of these products and practices with potential clients, civic leaders, vendors, contractors, and other architects. Join the 2030 Commitment to publicly show your dedication and track progress toward a carbon-neutral future. Find inspiration in the COTE Top Ten Award winners.

Read the practice guide on strategies for designing for adaptability, deconstruction, and reuse. Retrofitting, renovating, adapting, and remodeling existing buildings now accounts for almost half of U.S. architecture billings.

Look outside your practice or firm. The Biden-Harris administration launched the National Building Performance Standards Coalition during the January meeting of the U.S. Conference of Mayors. This partnership between 33 state and local governments is dedicated to delivering cleaner, healthier, and more affordable buildings. I urge you to find out if your component or local jurisdictions are participating and get involved.

Last month, CEO Lakisha Woods took to the main stage to address the U.S. Conference of Mayors annual meeting, urging mayors to look to architects and AIA as their partners for progress. I moderated

a panel discussion at that meeting on local efforts to improve building energy efficiency and reduce greenhouse gas emissions. When panelist Mayor Andrew Ginther of Columbus, Ohio, pointed out how helpful AIA Columbus had been for him in navigating some of the city’s long-term challenges related to zoning and climate, I was quick to remind the room of mayors and civic leaders that there is an AIA chapter conveniently located near them. Be ready and eager to accept that call! Even better, initiate the call. Civic leaders are hungry for practical advice.

AIA advocated for the passage of the 2021 Infrastructure Investment and Jobs Act, which includes grant funding for projects that tackle climate crisis and advance environmental justice. Architects can and should shape these projects and partner with city leaders to deliver transformational change. AIA can help you identify grant funding opportunities for your projects so you can rebuild cities in ways that are climate-friendly and equitable.

These opportunities and connections will help us enhance our stewardship so we can collectively shape the built realm in ways that eliminate barriers and create a brighter, fairer, and more sustainable future for everyone. **AIA**



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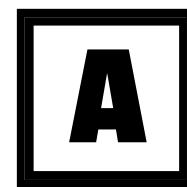
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# alufam

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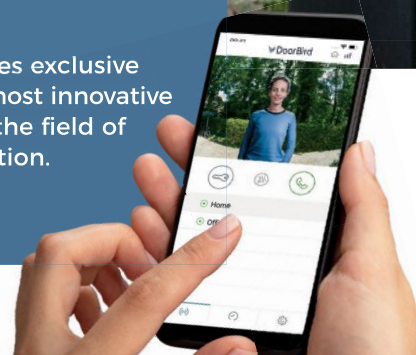
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# 16th annual

## JURY

**Avideh Haghighi**, AIA, associate principal and sustainable design leader, ZGF Architects

**Kat Schneider**, digital design application specialist, associate, IA Interior Architects

**Doris Sung**, AIA, principal, DOSU Studio Architecture; associate professor, director of undergraduate programs, University of Southern California

For the 16th Annual R+D Awards, jury and editorial staff alike were astounded by the diversity of solutions and innovations offered by the 2022 award winners, from digital sustainability tools to re-envisioning the age-old materials of wood, glass, and terra cotta. From dozens of entries, jurors Avideh Haghighi, AIA, Kat Schneider, and Doris Sung, AIA, chose six winners that are shaping the future of design.

# awards

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# LONG RANGE GLASS

University of Michigan, Arcgeometer

Glass is most typically found in acoustic applications as an intrinsically reflective element. One generally does not consider it a versatile performer in acoustically sensitive areas.

With Long Range, however, a team—led by University of Michigan associate professors of architecture Catie Newell and Wes McGee and Zackery Belanger, director of the Detroit-based Arcgeometer studio—looks at shaping glass for broader acoustic qualities. The resulting artifact comprises 64 hexagonal slumped glass pieces arranged in two layers of 32 panels. The manipulation of the glass from flat to increasingly slumped and perforated at the opposite end creates a gradient across the piece from reflection to diffusion to absorption to transmission.

The work was developed over three phases of research. The first inquired about material and process, creating fabrication methods for the controlled slumping of double-layered hexagonal glass panels. Each panel can be perforated with auxetic patterns that vary the acoustic properties. The second phase investigated the acoustic behavior of the components in aggregate using wave-based computational simulations at varying scales, including room-scale. The third looked at surface dimensions, behavioral extents, and the system of assembly for actual implementation.

The scale of the geometric modifications to the base flat panel is varied across the surfaces, with the most aggressive manipulation creating deeply curved surfaces and porous openings. This aesthetic complexity creates distinctive visual forms that match the increasingly unusual acoustic properties of a typically straightforward material.

“By selecting a very dark glass, we were able to amplify the play of reflection and pattern overlap to make a visual register of the formal modifications that in turn generated the acoustic gradients,” Newell says. “Long Range relates shape and scale to acoustic performance and demonstrates acoustic continuity, so it shows that rooms and surfaces have the potential to avoid acoustic treatment altogether,” Belanger says.

The team posits that glass might be suitable for an entire enclosure that could fully encompass the occupants. Such a role for glass suggests it may be even more ubiquitous in our current century than the last. —E.K.

The goal for Long Range is to “recalibrate geometry and sound to one another in a way that is intrinsic to surfaces, accessing seldom-used parts of the acoustic spectrum.”

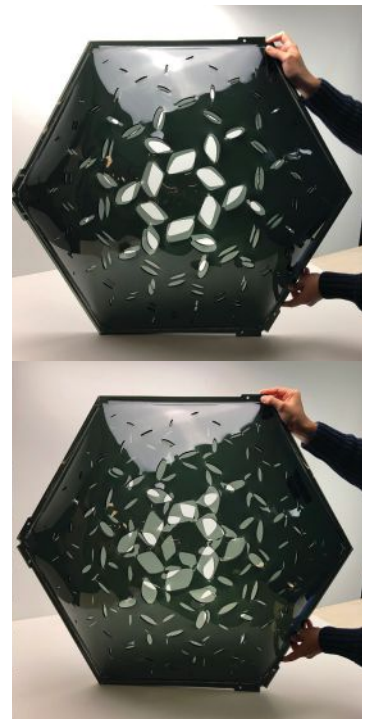
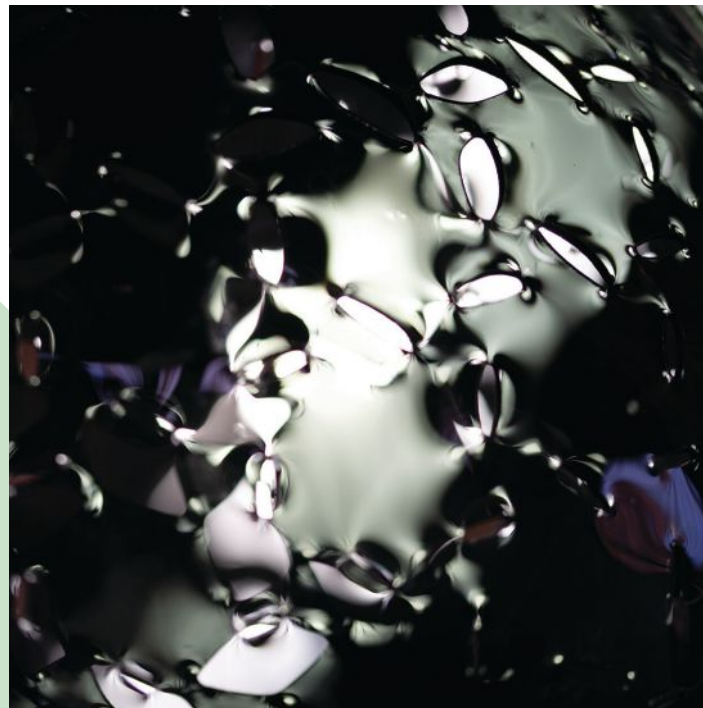
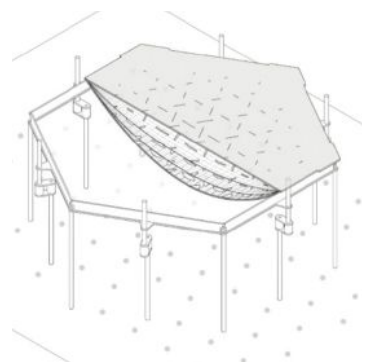
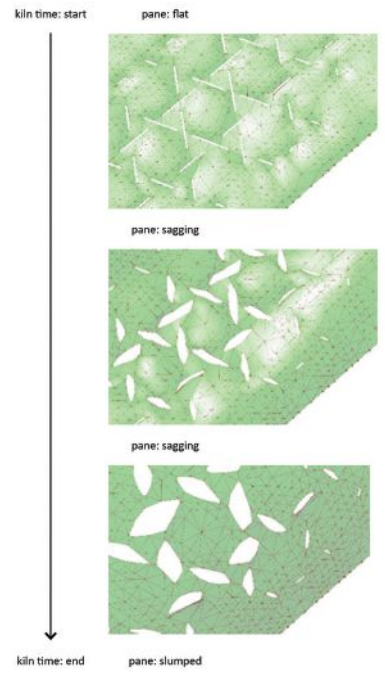


“Form and function are intertwined in a beautiful balance between visual and acoustic performance.”

—Juror Avidesh Haghighi



CATIE NEWELL AND ZACKERY BELANGER







“Although this research is still in its early stages, its significance is in how it rethinks the use of an age-old material in completely new ways. Working with the properties of organic material, taking advantage of what normally is considered by-product waste, and incorporating newer computational fabrication methods, this research challenges our standard pursuit of ‘lightness’ and heavy timber construction.”

—**Juror Doris Sung**

COURTESY AFTER ARCHITECTURE





# TANGENTIAL TIMBER

After Architecture, University of Virginia School of Architecture

Timber is typically deemed useful when it is linear with a regular cross section, but that doesn't mean that logs that are curved, irregular, or otherwise unfit for lumber can't serve a purpose. Kyle Schumann and Katie MacDonald, AIA—two assistant architecture professors at the University of Virginia and co-founders of the newly Charlottesville-based After Architecture studio—along with a team from UVA School of Architecture led by student project manager Abigail Hassell, have sought to demonstrate a structural application for irregular waste, a resource that is globally available but underutilized in construction. According to the team, more than 55% of harvested timber is deemed unusable in construction due to irregularities, including trees razed from construction sites or damaged by disease or weather. This waste is typically shredded for chips or pulp, or simply discarded.

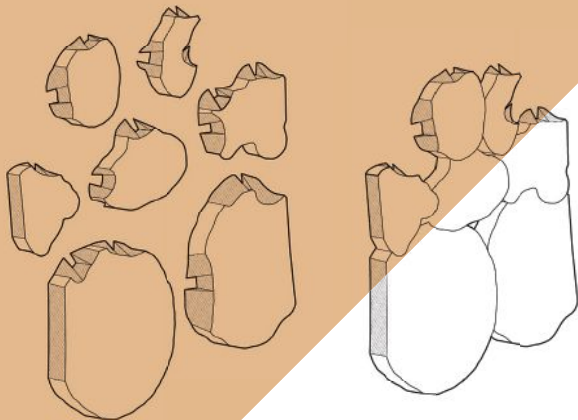
“Tangential Timber: Non-linear Mood Masonry” is a research project that proposes a construction application for non-linear wood—primarily hardwoods but also some softwoods—through the development of a digital fabrication workflow that converts cross sections of logs, called “cookies,” into interlocking, structural blocks that can be disassembled and reused.

The team developed a low-tech, parametric digital imaging workflow to photograph and trace the cookies in 2D and then translate them into 3D models. Cookies are not cut in a fixed size, but rather logs in a range of diameters can be used, and the parametric model is able to adapt the vault design to cookies of any shape or size. The thickness of cookies was standardized—3, 4, and 5 inches—for ease of translation into the digital model and for fabrication.

The digital cookies can then be sorted across a designed form and inscribed with a set of joints. Fabrication requires minimal part reduction with a five-axis waterjet, and CNC routing adds surface continuity across a patchwork of irregular structural blocks. The blocks are joined without binders or hardware, allowing for easy assembly, disassembly, and reuse. The system can be utilized on a wide range of large-scale architectural uses, including structural walls and vaults, as well as nonstructural and decorative uses.

This project began in Schumann's undergraduate spring 2021 architecture studio. Students Hassell, Audrey Lewis, Jacob McLaughlin, Rohan Singh, and Abbie Weissman developed the computational workflow and constructed a small-scale assembly at the UVA Morven Farm's formal gardens.

Funding from various UVA grants and the School of Architecture dean's office will allow the project team to build a physical prototype installation demonstrating these innovative material and construction strategies while working in collaboration with a student-founded sawmilling organization and the university's facilities operations to acquire felled logs and existing timber waste from on-grounds projects.—M.B.



Each cookie is labeled, marked with a T registration mark, and photographed with stacks of 1-inch-tall registration marks and then translated into a digital form using Grasshopper. A custom parametric workflow sorts and fits each cookie in the designed structure. Shingled, dovetail joinery allows cookies to slide into place without adhesives or hardware.

# V-SOLEIL

Architecture Research Office, Heintges

As part of the sixth annual Architectural Ceramic Assemblies Workshop, the New York–based Architecture Research Office collaborated with Heintges Consulting Architects & Engineers and fabricator TriPyramid Structures to explore the use of terra cotta in high-performing building envelopes. The result is V-Soleil, a curtainlike terra-cotta brise soleil inspired by the organic forms of vine structures and traditional diamond-patterned espalier trees.

The V-Soleil system comprises interlocking V-shaped glazed terra-cotta modules measuring approximately 18 inches across that are supported on a double-layer tension net structure, creating a diamond-shaped screen. Depending on a façade's solar orientation, the module can be rotated to optimize its shading capability.

Each module is made of dark brown clay with green glazing. Portions of the clay are strategically exposed for an organic effect but also out of practicality: Due to the module's geometry, the designers had to consider how each would be supported during the firing and glazing process to avoid fusing to the kiln. Working with a glazing specialist, ARO developed a firing support that would intentionally leave selected surfaces unglazed, an important consideration given that each piece would be viewed in the round.

Throughout the six-month iterative design process, the team carefully tested the prototype's form for solar performance, structural stability, and visual impact. ARO and Heintges worked closely with TriPyramid to refine the prototype and to ensure that it could be manufactured economically. The module can be sized up or down to work at different scales and on a range of building types. If a module breaks, it is designed to be removed individually without the need to disassemble the entire system.

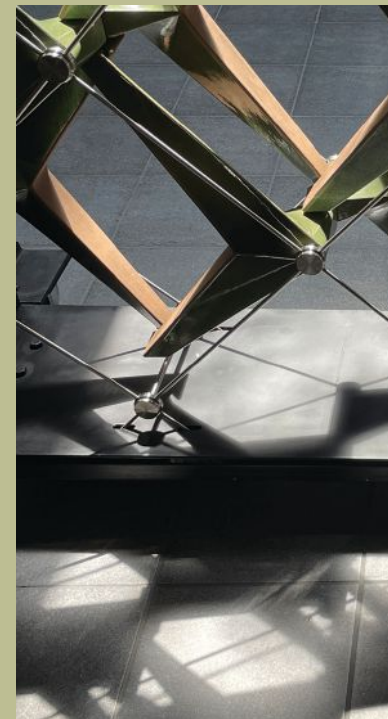
Applied across a large-scale façade—Heintges tested spans up to 54 by 54 feet—V-Soleil appears as an abstraction of natural vines while providing effective shading and minimizing the solar heat load. A thoughtful fabrication process elevates the beauty of natural terra cotta and lends scale, pattern, and texture to a piece of architecture. —M.B.

Depending on a façade's solar orientation, the module's position can change to optimize shading capability. The individual modules were also designed for easy removal in case of breakage.

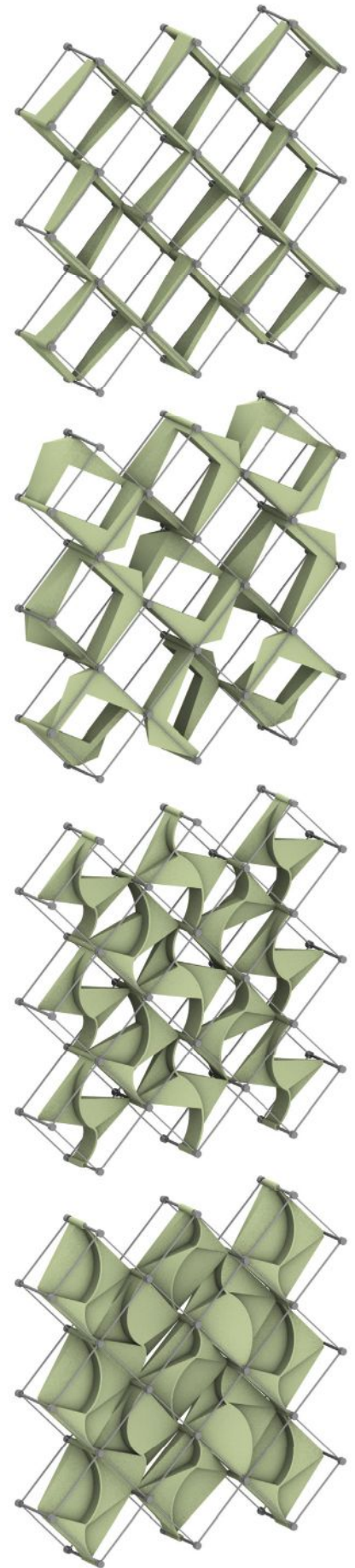
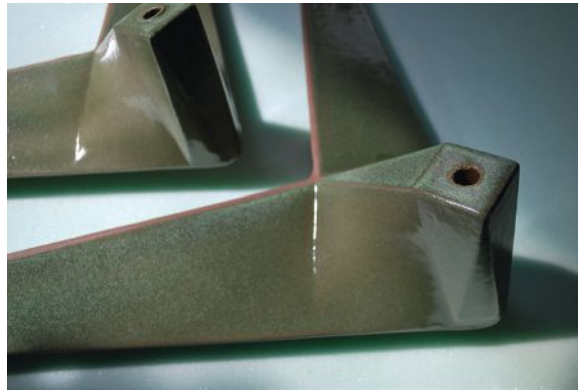
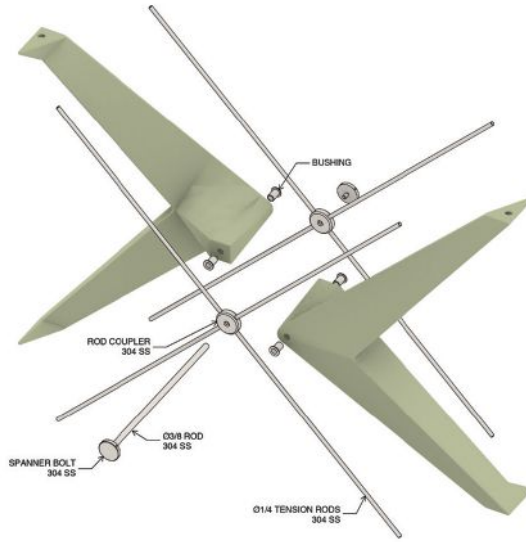


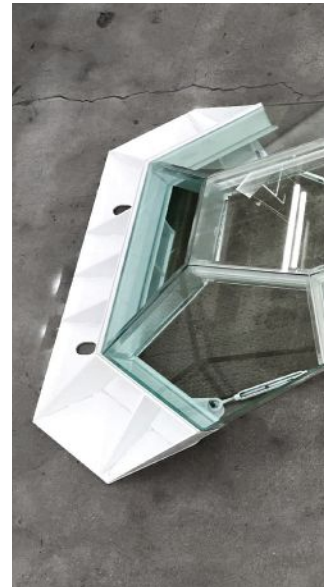
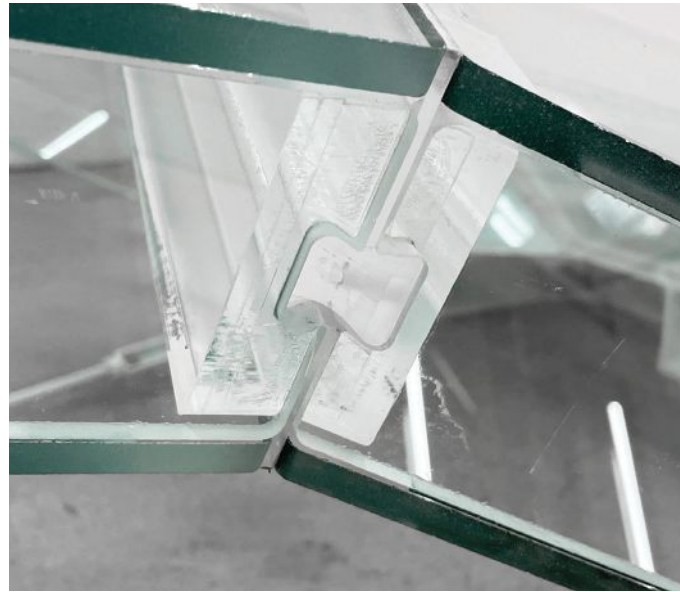
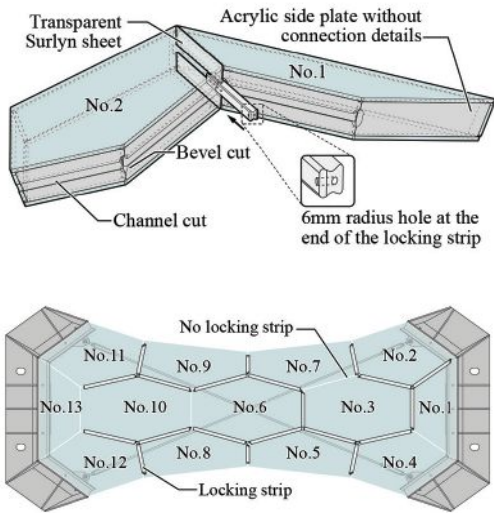
“The deep research and iterative prototyping development behind V-Soleil is so thoughtful and unique. The form and array of the modules are strikingly beautiful, and the analysis of how the terra-cotta forms can be aggregated, altered based on façade orientation, and replaced if needed, perfectly demonstrates the rigor and creativity of the team behind this project.”

—Juror Kat Schneider



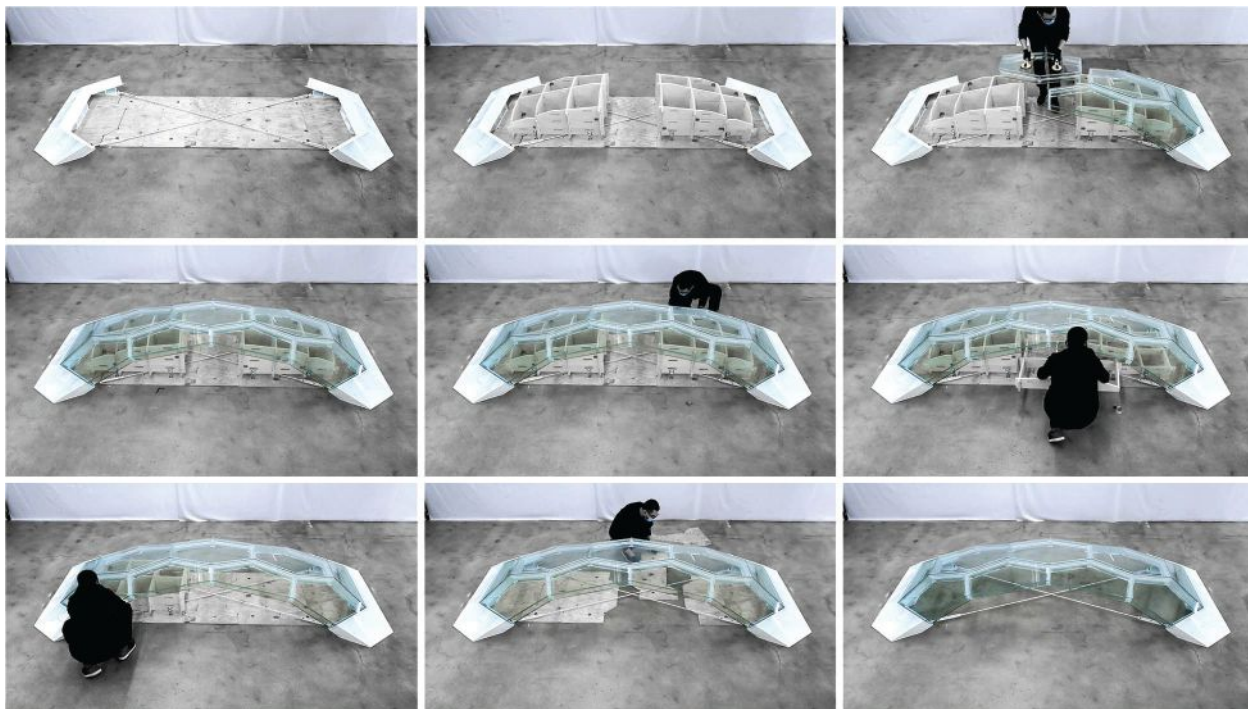
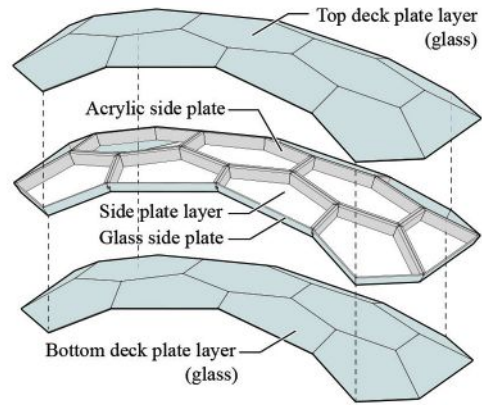
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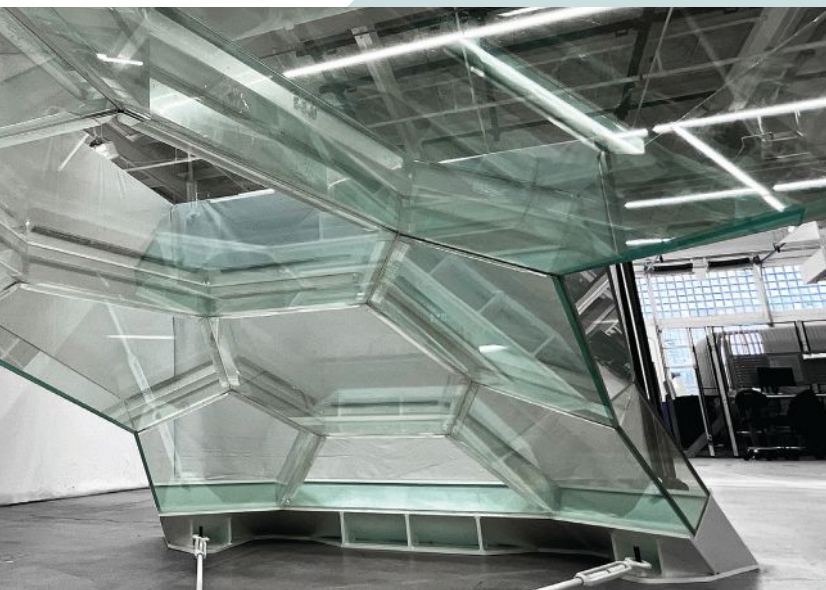
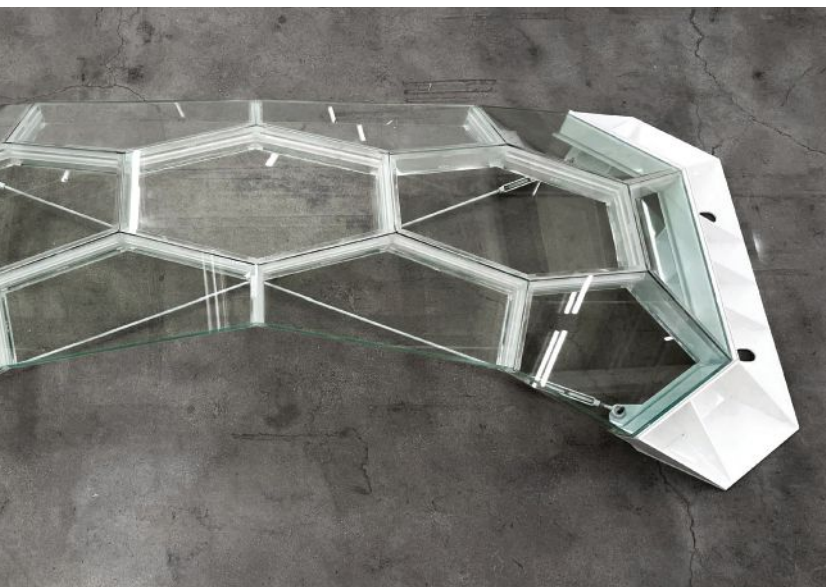




“Eliminating our reliance on heavy structural members by making the glass do double duty is a great strategy on several levels: It reduces unnecessary weight and mass while reducing obstructions to view or natural light. By multiplying the performance value of the glass in consolidated ways, they have made the R+D process more meaningful.”

—Juror Doris Sung





## TORTUCA

**Polyhedral Structures Laboratory at  
University of Pennsylvania**

Glass is the ubiquitous modern material, but its structural qualities remain relatively unexplored.

Enter a team led by project architect Yao Lu and the Polyhedral Structures Laboratory at the University of Pennsylvania. They have developed Tortuca, an ultra-thin hollow glass structure, which spans 10.5 feet with an assembly of 13 hollow glass units. Using polyhedral graphic statics to optimize the structural form, each five- or six-sided piece is composed of a sandwich of two float-glass deck plates held together by either glass or acrylic side plates that vary based on their location within the composition.

While the fabrication requires some high-tech machinery, there's a limited need for labor during assembly. Five-axis abrasive waterjet cutting creates the precisely dimensioned glass panels. Acrylic side plates are created through five-axis CNC milling. Each hollow glass unit can be assembled within an hour by just one person. The pieces are bonded together using 3M VHB double-sided transparent structural tape. The complete structure weighs just 550 pounds and can be assembled and disassembled by a single individual without heavy machinery. The 13 pieces are held together through acrylic locking bars. To date, the glass bridge is limited to supporting its own weight. The team plans to test it under other loading scenarios in the future.

"Our design decisions emphasize the primary role of glass and the purity of the structure," Lu says. "Tortuca is educational, illuminating, and full of possibilities; it's still in the early stage."

The immediate next step will be a physical load test for Tortuca. "With the data obtained from the physical test, we will move to the optimization, fabrication, and construction of a 10-meter experimental glass pedestrian bridge designed using the same modular construction system," Lu says. The team posits that minimizing construction material and using the purest form of each material—glass and acrylic—may potentially preserve natural resources and curb energy demands in building and infrastructure projects.

While the ultimate outcome of these hopes seems less than certain, glass may prove to be a more versatile ingredient in new structural systems. —E.K.

Constructed by the dry assembly of 13 hollow glass units, the Tortuca prototype spans 10.5 feet and weighs 550 pounds. A single person can assemble and disassemble the structure without needing a crane or additional labor.

# KALEIDOSCOPE: EMBODIED CARBON DESIGN TOOL

Payette

According to Architecture 2030, approximately 11% of global carbon emissions come from the embodied carbon in building materials and construction. To meet climate-change carbon-reduction goals, architects and engineers must evaluate the embodied carbon of materials—from building envelopes to flooring and ceilings—as early as possible in the design process.

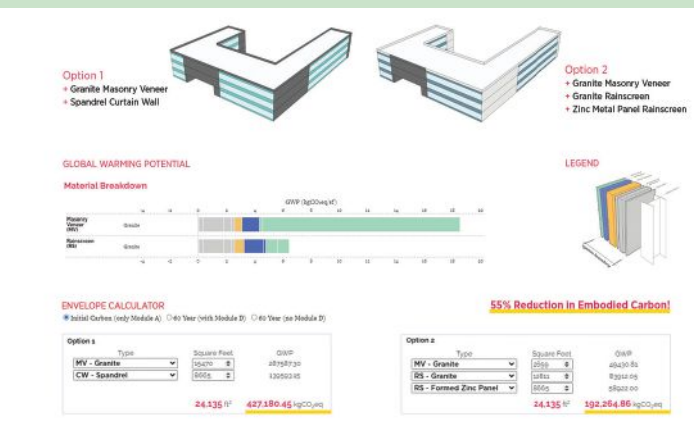
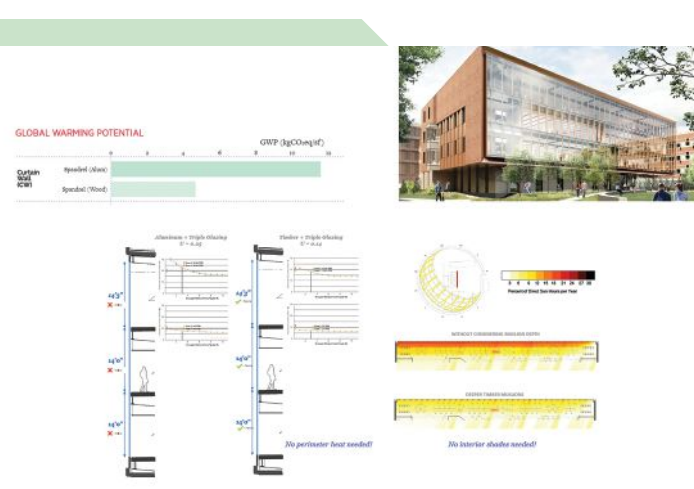
In 2019, Boston-based Payette set out to create a simple and straightforward tool that allows designers to compare typical building systems, even without having a complex 3D model. The result is the open-source web-based tool Kaleidoscope, which was released to the public in 2021 and allows users to compare the embodied carbon across a range of façade and interior systems.

Payette team members—including Andrea Love, AIA, Melanie Silver, AIA, Rebecca McGee Sturgeon, AIA, Olivia Humphrey, Denise Blankenberger, AIA, and Mi Li—began by identifying typical detailing for the most utilized façade systems, developing 3D models of them, and finally running parametric THERM heat-flow simulations to account for thermal bridging and modified insulation to ensure all assemblies achieved the same thermal performance. Next, they used Tally, a life-cycle assessment app (and 2016 R+D Awards winner), and incorporated the data output into a graphic web interface. Payette then evaluated interior flooring and ceiling systems and made this data available as well.

Kaleidoscope allows users to compare assemblies through multiple lenses, such as by removing Module D, or the LCA impacts associated with reuse potential outside the system boundary, given the uncertainty of the end of life of materials. The data can also be viewed based on compliance with Payette’s Material Health Policy, which focuses on eliminating specific chemicals of concern: highly fluorinated chemicals, antimicrobials, flame retardants, and vinyl (PVC, CPVC, PVDC). Designers can compare options and combinations and evaluate global warming potential as well as cost per square foot.

Though Kaleidoscope isn’t intended to replace LCA tools, it makes it easier to bring the conversation about embodied carbon to the beginning design phase when materials are first identified, rather than wait to the end when a detailed BIM model is completed and making changes to the design becomes more costly. —M.B.

With Kaleidoscope, the Payette team created an “early design apples-to-apples comparison of embodied carbon information for different building assemblies.” Users can examine initial system impacts or over a 60-year building life span.



“Kaleidoscope is an incredible and much-needed sustainability tool for our industry that democratizes critical information in an easily accessible and visually compelling format to empower designers to make well-informed decisions at critical stages in the design process.”

—Juror Kat Schneider



Over several iterations of eFargo, the e-games-lab team developed a game with which architects can educate and empower building occupants to reduce the emissions and carbon footprints of cities by making buildings more energy efficient.

## E-GAMES-LAB: EFARGO

University of Minnesota College of Design,  
North Dakota State University

The e-games-lab: eFargo initiative conceptualizes the North Dakota city of Fargo as a board game, where the city and individual buildings can be “played” to reduce carbon emissions and energy use to fight climate change. In the game—developed by University of Minnesota associate professor Malini Srivastava, AIA, in collaboration with North Dakota State University (and initiated as part of her dissertation at Carnegie Mellon University)—architects play a key role, empowering participants through education in how to reduce carbon emissions and energy usage.

More than 6,000 K–12 students and other community members have played. Schools typically reduce energy use by up to 15% within three to nine weeks, with savings continuing even after game play concludes. Participating homes see an average savings of 8%, with winning homes seeing as much as 46% savings.

As they understand the physical issues surrounding carbon emissions and energy usage, students learn to locate problems in their immediate environment and “tag” them as “monsters.” Monsters engage various issues: heating and cooling, water waste, food waste, daylight, emissions, and devices. Game play includes “Waste-a-Watt,” a greedy supervillain who gains strength when energy is wasted but can be captured by players by reducing energy usage. Occupants identify and tag problems through virtual and physical tagging. As players accumulate points, trees are earned and planted in the physical city.

In 2017, eFargo was put to a real-world test when it entered (and won) the nationwide Georgetown University Energy Prize, a competition open to American cities with populations between 5,000 and 250,000 people. The partnership between the research team, the City of Fargo, local utilities, and public school districts successfully lowered energy use and carbon emissions by 11% over two years.

More recently, with seed funding provided by an AIA Upjohn Research Initiative grant, Srivastava and her collaborators are developing a version called “Zero.”

“We are asking community members to tag any buildings in their city with specifics of energy or environmental waste problems that they know about,” she says. “The game becomes a way for the public to communicate with building owners to address the environmental impact they are creating on the public environment.” Hopefully, Srivastava adds, the game will result in the hiring of architects and engineers to help them address and remove these public tags.

We may soon find ourselves “playing” the game with clearly tangible benefits for all. —E.K.

“E-games-lab: eFargo is one of few research efforts that gamifies carbon reductions in the built environment, and it does so through creative characters and storytelling. It has the potential to engage communities of all ages and backgrounds in a simple game with a huge impact.”

—Juror Avidah Haghighi



# Western Red Cedar Finish Options Maximize Versatility

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Pine Street Duplex. Architect: Webster Wilson Architect. Photography: Caitlin Murray, Builtphoto.

## INTRODUCTION TO WESTERN RED CEDAR

Western red cedar (WRC) is one of nature's most outstanding building materials. Renowned for its performance and exceptional beauty, it brings warmth, character, and longevity to homes and commercial projects around the world. Western red cedar, or *Thuja plicata*, is a coniferous softwood tree that grows primarily in the pacific northwest of the United States and Canada.<sup>1</sup> The lumber from western red cedar has a uniform, fine-grained texture with colors ranging from amber yellow to cinnamon red and sienna brown.<sup>2</sup>

Western red cedar has numerous performance attributes that make it suitable for both interior and exterior applications,

but the most important may be its natural insect, rot, and decay resistance, provided by the same natural compounds that give cedar its signature aroma. Western red cedar is also very dimensionally stable, with a very low shrinkage factor and high resistance to warping, twisting, and checking. The wood's low density provides superior thermal insulation because it has a high proportion of air-filled cell cavities, keeping a home cool in the summer and well-insulated in the winter. This low density also makes the material light weight for easier transport and installation.<sup>3</sup>

Because western red cedar is naturally insect and rot resistant, a protective finish is not required to maintain the wood's durability. Building owners can allow their western red cedar to weather naturally or, with the

## LEARNING OBJECTIVES

1. Discuss the exterior applications for western red cedar and the many exterior finish options available, including the level of maintenance required for each.
2. Identify interior applications and finish options for western red cedar.
3. Examine the difference between factory and on-site finishing and application techniques for siding and trim.
4. Explore trends in western red cedar finishing and case studies demonstrating various exterior and interior finishes that were used to achieve a wide variety of design aesthetics.

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application of a protective coating that will ensure maximum performance, they can retain and enhance the natural beauty of the wood by using coatings in a wide array of types and colors. This course will address both options and provide designers with the important information needed to determine which option best suits a project's needs.<sup>4</sup>

## EXTERIOR APPLICATIONS FOR WRC

Western red cedar's natural durability and physical properties make it highly versatile and ideal for exterior applications such as siding, trim, soffits, and decking.<sup>5</sup> In fact, the wood is so highly-coveted that many man-made siding and trim materials attempt to mimic the grain and color of cedar.



Western red cedar siding provides a wealth of options to provide the perfect look for a home, as it can be finished to complement all styles of buildings from modern to traditional to rustic. Bank Barn. Architect: Birdseye. Photography: Jim Westphalen Photography, Birdseye.

### Siding

Siding is one of the most important elements of a building, both for aesthetics and durability. It defines the design and style of a home, complements the surroundings, and protects the building from the elements. While there have been a lot of different materials used as siding over the decades, and new products emerge on the market all the time, one product has remained a constant: western red cedar.

Cedar siding provides a wealth of options to provide the perfect look for a home, as it can be finished to complement all styles of buildings from modern to traditional to rustic. Western red cedar comes in a variety of grades that are divided into clear and knotty. Clear cedar comes in vertical, mixed, and flat grain, which are achieved based on how it's cut. Knotty grades show the wood's

natural features and are often used to provide a warm and rustic look. Cedar also comes in a spectrum of profiles and patterns, which can create very different styles for a home or building. Profiles include bevel siding, tongue and groove, lap siding (also called shiplap), and boards for board and batten. These profiles can be installed vertically or horizontally and will create different shadow and line effects once on the wall. Cedar shingle siding is also available in 8-foot panels, making it easier than ever to install this traditional look.

What's really unique to natural wood siding is the different surface textures that are created based on how the wood is manufactured. For example, a rough texture is created in the milling process by using roughing planing knives, while less pronounced rough-sawn textures come from the blade marks of a circular or band saw.

## GLOSSARY

### Bleaching

Weathering products designed to provide the weathered look of cedar sooner and more evenly than natural exposure to sunlight; they are lightly tinted with either gray or brown pigments, which mute the natural coloration and accelerate the weathering process

### Clear Grades

Western red cedar products that are visually clean and free from defects and usually graded for smooth face exposure; there are only a few, if any, characteristics, which could include an occasional knot or minor imperfections

### Dimensional stability

The resistance of wood to swelling and shrinkage when it gains or loses moisture

### Knotty Grades

Western red cedar products graded to allow more inclusions, meaning there will be knots and other characteristics; they have a more casual, rustic appearance than clear cedar grades

### Pitch

An accumulation of resinous material

### Solid-color stains

Stains that are available in a wide spectrum of hues which obscure the wood's true color but allow some of the cedar's natural characteristics and texture to remain; these finishes are non-penetrating and form a film

### Solvent borne semi-transparent stain

Solvent borne, oil-based, semi-transparent, penetrating stains penetrate the wood surface, are porous, and do not form a surface film like paints

### Surfaced One Side, Two Edges (S1S2E)

A surfacing process that results in a rough sawn face and a smooth back that provides uniform width and thickness tolerances; typically graded from the rough face, it may in some instances be reversible to the smooth back

### Surfaced Four Sides (S4S OR PAR, D4S)

A smooth surface on all four sides that presents a uniformly sized product with a quality appearance; this surface finish is most commonly found on clear grades

### Transparent stains

Sometimes referred to as water-repellant preservatives, these stains do not alter the appearance of the cedar; they only slightly modify the color (tone) of the wood

Designers can choose lumber with one side smooth and the other side rough if a variety of textures is desired.

Many profiles can also be found in engineered cedar siding, which is a category of newer products that is increasingly becoming more popular. Engineered cedar is made of smaller pieces of cedar end cuts that have been finger joined and glued together. These boards come primed and ready for a surface coating. Other products have a cedar substrate or backing with a veneer of clear western red cedar glued on top. Both of these products are extremely stable, durable, and come in long lengths.

Real cedar is pitch- and resin-free so it takes stains and oils very well. What's more, there are some stunning new ways to finish western red cedar now on the market. Products like bleaching stains and weathering products create the gorgeous silvery gray look of aged cedar but add protection from UV rays and the elements. Texturing techniques and finishes can provide a weathered or antique look to the siding. Transparent and semi-transparent stains let the incredible natural luster of the wood shine through and highlight the grain. These stains penetrate the wood and won't flake off or peel like surface coatings. A host of solid-colored stains can also be used to provide excellent protection against UV rays and water but still allow the natural beauty and warmth of the wood to shine through. We will go through each of these options in more detail in a bit.

### Trim

Western red cedar trim boards are generally used in applications such as corner boards, fascia, skirting, and detail around windows and doors. They are available in a variety of grades and textures to complement the home's style. Clear boards have a limited number of natural characteristics and are specified when a "clean," fine appearance of the highest quality is desired. They are available kiln dried. Knotty boards present a more rustic appearance and may be specified seasoned or unseasoned. If unseasoned, they must be dried prior to finishing.

Western Red Cedar boards may be specified in one of three surface textures to



Western red cedar provides a beautiful soffit that can coordinate with exterior cedar siding but can also create a seamless aesthetic with interior cedar ceilings. Ridgewood Residence. Architect: Matt Fajkus Architecture.

enhance design flexibility: rough; surfaced one side, two edges (S1S2E); or surfaced four sides (S4S). Surfaced one side, two edges is a versatile product that is the most popular choice for trim boards. The surfacing process results in a rough sawn face and a smooth back that provides uniform width and thickness tolerances. Typically graded from the rough face, it may be reversible to the smooth back.

### Soffits

Soffits are the underside of an exterior element and are typically not an area that designers give much consideration. Vented soffits are often made of vinyl, aluminum, or steel and provide ventilation and protection from pests, but they are often unattractive. Wood soffits, on the other hand, provide high style and can be used in areas where ventilation is not needed, such as interiors, or outdoors if adequate spacing is provided for proper air circulation. Western red cedar provides a beautiful soffit that can coordinate with exterior cedar siding but can also create a seamless aesthetic with interior cedar ceilings. What's more, the longevity of

transparent stains is significantly greater on soffits (at least 7 to 8 years) because they are more protected from the elements.

### Decking

This course will not focus on decking, as the application has different finish, maintenance, and installation considerations. But you should know that because western red cedar is naturally resistant to rot and decay, stable, cool under foot, and beautiful, it's an ideal choice for all types of decks from raised and ground level decks, which provide the simplest way of expanding living space outdoors, to roof decks and uphill sloping decks, which allow an easy way to access the upper levels of a property. Of course, cedar can be used in many more outdoor applications to tie elements together, such as pergolas, gazebos, covered walkways, fences, and garden benches.

### FACTORS AFFECTING FINISH RETENTION

A number of factors affect the performance of finishes including western red cedar's natural properties, manufacturing characteristics, and construction practices.

### Natural Properties

The most important natural properties of western red cedar are its outstanding dimensional stability, fine texture, pattern of growth, and freedom from pitch and resin. These characteristics contribute to its exceptional ability to accept and retain many different types of finishes.

### Dimensional stability

Dimensional stability is the resistance of wood to swelling and shrinkage when it gains or loses moisture. Light, low-density woods such as western red cedar shrink less than higher density woods. Its excellent dimensional stability is an important factor responsible for the longer life of paints on western red cedar in comparison to other woods.

### Texture

Texture refers to the smoothness of the wood surface after sawing, planing, or sanding. According to the Forest Products Testing Lab, western red cedar is the best softwood species for primer and paint applications.

### Pattern of growth

Pattern of growth refers to the alternating bands of low density, springwood and higher density, summerwood. Together, these two bands constitute one year of tree growth. Western red cedar has a much higher percentage of low-density spring wood than most other conifer species. In addition, pitch or resin, which can interfere with the adhesion or penetration of a finish, can be found in most softwoods but are absent in western red cedar.

### Manufacturing Characteristics

Manufacturing characteristics that can affect finish performance are surface texture, moisture content, and construction practices.

## QUIZ

- Which of the following is a performance benefit of western red cedar?
  - Natural insect, rot, and decay resistance
  - Dimensional stability
  - High resistance to warping, twisting, and checking
  - Low density
  - All of the above
- \_\_\_\_\_ grades show the wood's natural features and are often used to provide a warm and rustic look.
  - Clear
  - Knotty
  - Rough
  - Inverted
- Products like \_\_\_\_\_ create the gorgeous silvery gray look of aged cedar but add protection from UV rays and the elements.
  - Semi-transparent stains
  - Transparent stains
  - Solid-colored stains
  - Bleaching stains
- Light, low-density woods such as western red cedar shrink \_\_\_\_\_ than higher density woods.
  - Less
  - More
  - At the same rate
  - Faster
- Which of the following manufacturing characteristics can affect finish performance?
  - Surface texture
  - Moisture content
  - Construction practices
  - All of the above
- As a rule, \_\_\_\_\_ surfaces provide the best mechanical adhesion of the finish to the wood.
  - Clear
  - Knotty
  - Textured
  - Smooth
- It is best to finish western red cedar when its moisture content has stabilized at the level that will prevail during the service life of the product, which in North America is approximately \_\_\_\_\_ percent moisture content.
  - 10
  - 12
  - 20
  - 25
- Sometimes referred to as water-repellant preservatives, these stains do not alter the appearance of the cedar; they only slightly modify the color (tone) of the wood.
  - Bleaching stains
  - Transparent stains
  - Semi-transparent stains
  - Solid-color stains
- Solvent borne \_\_\_\_\_ contain pigments that provide color—including cedar tones—and greatly increase the durability of the finish by partially protecting the cedar surface from the damaging effects of the sun's ultraviolet rays.
  - Bleaching stains
  - Transparent stains
  - Semi-transparent stains
  - Solid-color stains
- \_\_\_\_\_ are non-penetrating finishes available in a wide spectrum of hues which obscure the wood's true color but allow some of the cedar's natural characteristics and texture to remain.
  - Bleaching stains
  - Transparent stains
  - Semi-transparent stains
  - Solid-color stains

## SPONSOR INFORMATION



The Western Red Cedar Lumber Association represents quality "Real Cedar" producers, distributors and retailers throughout North America. Founded in 1954 and known as "the voice of the cedar industry," WRCLA offers extensive resources to assist with selection, specification and quality standards. For more information, visit RealCedar.com.



This article continues on  
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1. Custom / Less Than 3,000 Square Feet
2. Custom / More Than 3,000 Square Feet
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4. Restoration / Preservation
5. Multifamily Housing
6. Affordable Housing
7. Architectural Interiors (build-outs, interior renovations)
8. Specialized Housing (SROs, shelters, student housing, etc.)
9. Outbuilding
10. On the Boards (any unbuilt residential project not yet completed)

### SPECIALTY ENTRY CATEGORIES (\$130)

11. Kitchen and Bath
12. Universal Dwelling Design
13. Architectural Design Detail
14. New Approaches to Housing and Specialty Homes

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**REGULAR** September 2, 2022, 11:59 p.m. EDT  
**LATE** September 9, 2022, 11:59 p.m. EDT  
(will include a late fee of \$50 / entry)

# Editorial: Hope for Architecture

TEXT BY PAUL MAKOVSKY

One of the highlights at the 2022 AIA Conference on Architecture in Chicago was President Barack Obama's keynote, during which he and AIA president Dan Hart, FAIA, discussed a variety of topics, from his favorite architects and his relationship to architecture to his new Presidential Center and ongoing issues facing the country.

"When you think about iconic buildings, I tend toward the modern," Obama said.

"A building like the Sydney Opera House is hard to beat." Growing up in Hawaii made Obama appreciate the work of tropical Modernist architect Vladimir Ossipoff, who designed the Liljestrand House in Honolulu and the Thurston Memorial Chapel at Punahou School where he was a student.

A longtime Chicago resident, Obama discussed his love of his hometown by sharing lessons learned from his eight years in office, including his ongoing engagement with many of AIA's strategic priorities, including the link between the climate crisis and social justice.

When he was younger, Obama told the audience, he was interested in becoming an architect, but while in college, his interests turned toward social justice.

"My love for architecture never went away," he said, pointing to working with architects like Tod Williams, FAIA, Billie Tsien, AIA, and Dina Griffin, FAIA, on the Obama Presidential Center that they are building in Chicago, which he hopes will be a hub for the community and a transformative piece of architecture. "Our goal is not to build a mausoleum—since I'm not dead yet," he said, "but to create a campus and a living, breathing dynamic institution that can not only speak about the presidency and the times that we went through, but we hope it can become a laboratory and university for social change, where young people can come and can learn about ways they can impact their communities."

While pointing to the impressive architecture of Chicago—such as the Jay Pritzker Pavilion by Frank Gehry, FAIA, at Millennium Park—Obama also used the city as a case study where architecture at times reinforced inequity, citing public housing like Cabrini-Green Homes on Chicago's Near North Side and how it



At the A'22 conference, President Barack Obama spoke about the Obama Presidential Center, a 19-acre campus on the South Side of Chicago scheduled to open in late 2025.

isolated people and reinforced racial segregation. "How do we plan for space and create affordable housing and mixed-use housing, and apply the principles that Jane Jacobs wrote about in creating organic neighborhoods?" he said. "So, that is where good planning and skilled architects are needed."

Obama believes that some of the problems found in major American cities are the result of policy and zoning decisions. "This is an example of where it's not just a lack of funding for affordable housing," he said. "Frankly, some very well-intentioned laws and regulations at the local level, often generated from the left and from my own party, sometimes are inhibiting the creation of affordable housing and empowering NIMBY attitudes that make it very difficult to integrate communities and allow people to live close to where they work." He compared cities in Texas in which housing is more affordable with San Francisco, where a teacher must live an hour away from their workplace. "Some of the most liberal communities in the country aren't that liberal when it comes to situating affordable housing," he said. "That's something that I think we have to spend more time talking about."

Obama urged architects to listen to communities. "The single most important thing I learned and carried through my entire career is listening to people. Turns out you don't learn that much talking, but you do learn a lot listening," he said. "If people feel as if you're actively listening and care about their stories and lives, they will tell you what's important to them and who they are. That applies to every profession, including architecture."



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A close-up portrait of Terri Meyer Boake, a woman with short dark hair, wearing round black-rimmed glasses and a dark blue turtleneck sweater. She is looking directly at the camera with a slight smile. The background is dark and out of focus.

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