America gets its first cross-laminated timber manufacturer

New York opens a paradigm net zero public school

In this issue:

SPOTLIGHT ON CULTURE

A SHINY FACADE REVS UP L.A.'S PETERSEN AUTOMOTIVE MUSEUM

NEW EATERIES APPEAL TO MUSEUMGOERS AND THE GREATER PUBLIC

SNAP
ARCHITECTURAL NEWS + PRODUCTS

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381 Enormous Windows...Hurricane Resistant and NPS Approved. Conventional wisdom says that when windows are this big - over 10 feet tall - they can either meet hurricane impact requirements or satisfy National Park Service standards for historic replication...but not both. The Cigar Factory, built in 1881 and one of Charleston’s last remaining Victorian-era industrial buildings, now features 381 windows that meet the code and earned NPS approval, thanks to Graham Architectural Products.

Learn how Graham met this challenge: www.grahamwindows.com/SNhistoric
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NEW GEOMETRIES
Halo+ (top left) offers two types of smoke detection as well as monitoring of heat, humidity, and carbon-monoxide levels. The Cu-Beam LED fixture (top right) marks Dyson’s entry into yet another field. Domestically made cross-laminated timber (left) is to debut in a Portland, Oregon, structure.
WHY DRI-DESIGN?

Dri-Design’s Tapered Series panels can add a unique and original element to any façade. This distinct system is truly striking when combined with Dri-Design’s unlimited color palette in painted aluminum and many other material options, including stainless steel (pictured), VMZINC and many more. The tapered series, while attractive, still maintains Dri-Design’s true dry joint rain-screen technology, sustainability and ease of installation.

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All in a Word

CULTURE HAS so many meanings that it’s difficult to define. It can be a lineage that you’re born into, a piece of art that you view, or a way of life that you create. It is also subjective: An activity that one person might consider full of cultural value, someone else might not.

In this issue of SNAP, we concentrate on another aspect of culture—our experiences with the built environment. We start with the Petersen Automotive Museum in Los Angeles (page 14) and move on to the new Chelsea flagship store for Barneys New York (page 16), whose location, form, and interior reference the retailer’s storied history. We visit museum cafés (page 20), which arts institutions are using to attract the larger public as well as patrons. Finally we arrive at the first net zero school in the northeast United States, P.S. 62 in Staten Island, New York (page 44), which many educators hope will become the paradigm for educational facilities.

Elsewhere in the issue, we look at products that are the nuts and bolts of the building trade: wood (page 26), plumbing fixtures (page 30), and concrete and masonry (page 40). We also offer a roundup of finds from the most important recent trade events (page 10), including the International Builders’ Show and the Kitchen and Bath Industry Show (page 72).

I’m looking forward to hearing your thoughts. Feel free to send them to me at taraskaj@bnpmedia.com.

Julie Taraska  
Editor
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NYCxDesign Festival Expands Programming

**SINCE ITS ESTABLISHMENT** three years ago, NYCxDesign, New York’s annual citywide design festival, has gone supersize. Municipal organizations and the local design community now stage nearly 600 events at 200-odd venues.

The 2016 edition of NYCxDesign, which is supported by the NYC Economic Development Council and marketing and tourism agency NYC & Company, will run longer this time, from May 3 to 17. In addition to showcasing New York’s design industry through a smorgasbord of exhibitions, lectures, trade shows, and open studios, the festival will incorporate a wider net of independent events such as WantedDesign, BKLYN Designs, Collective Design, the Frieze Art Fair, and the International Contemporary Furniture Fair (ICFF). The programming will broaden, too, to encompass interactive, graphic, and urban design as well as architecture, furniture, and lighting.

One of this year’s most significant additions will be a temporary pavilion complex at Astor Place, in Manhattan’s East Village. Multifaceted talent Harry Allen will serve as creative director of the structures, which will feature an installation by architecture firm Snarkitecture and an interactive bar created by DuPont Corian in collaboration with industrial designer Joe Doucet. They will also contain a booth Allen himself is creating with Ecovative, a manufacturer specializing in mushroom-based material. “I am most interested in prompting new design,” says Allen of his plans for the overall space. “Hopefully some innovation will happen.”

Other new attractions include NYC Design Talks, a series of live discussions with industry professionals such as the architect Rafael Viñoly and the developer Michael Shvo. Also launching is an innovative, cross-disciplinary awards program open to all NYCxDesign participants that will complement the annual product awards at ICFF.

But events will not be geared solely to professionals, according to Ilene Shaw, the Design Talks organizer. With the festival and the series, she explains, “we are creating a design awakening within the public realm. We want both to enhance awareness of what designers and architects do.”

—Anna Fixsen

**Lunera Bows IoT-ready Bulbs, Connected Software**

**AIMING TO OFFER** companies a low-cost way of creating a smart lighting network, Lunera Lighting is introducing sensor-filled versions of all its plug-and-play LED replacement lamps, including those for CFL, metal halide, and high-pressure sodium bulbs.

Slated to debut in late April, the self-contained lamps with Sensable Technology will respond individually and in real time to motion, heat, and three types of light. Although the bulbs may be used alone, they also will be Internet of Things (IoT)–ready, meaning they will be able to communicate wirelessly with each other through an open-source ZigBee mesh network.

To manage the network, Lunera is introducing ST Connect, a proprietary software that can serve as its control hub. Managed with a dashboard app, the program collects data from the lamps and sends it, via an LTE modem, to a cloud service for analysis, measurement, and verification. (The company has secured a gateway partnership with an unnamed third party for the modem and cloud services.) ST Connect also allows the information to flow in the opposite direction to effect single or

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**NYCxDesign Festival Expands Programming**

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**COMING TOGETHER** A bus shelter poster (left) advertises the citywide festival NYCxDesign. The annual event is increasing in length and breadth, covering more design disciplines and adding a new discussion series and awards program. The Susan group of LED replacement lamps (bottom) are among the bulbs offered with Lunera’s SensAble Technology, which allows the lamps to respond in real time to motion, heat, and various types of light.

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universal changes in light settings, schedules, and responsiveness.

Lunera CEO Tom Quinn describes the lamps and software as “a simple, inexpensive, and minimally disruptive way” for small-to-midsized companies to deploy a smart network without having to rip out walls or hire a facilities manager. “We’re adding sensors, wireless connectivity, and microprocessing power to a space without touching its infrastructure,” he explains.

The system can cost as little as 50 cents a square foot to install (that’s “one tenth the cost of deploying a traditional lighting control system,” Quinn points out). Near-immediate payoffs include increased energy efficiency and financial savings, particularly in regard to demand-response and rate charges, two pressing power issues in Lunera’s home state of California.

In the future, Quinn can see adding additional sensors to the bulbs, as well as creating cross-system applications for the network, such as asset tracking and responsive HVAC programs. And that’s where the possibilities really open up, he explains.

“Building systems tend to be silos,” Quinn says. “But once we have our network of sensors informing about light, why can’t they inform the adjacent systems of the findings? Why wouldn’t I tell the HVAC system there is no one in the room, so might as well let the temperature adjust up a few degrees?” Quinn pauses. “Now, that really would be something.”

—Julie Taraska

Two MAD Exhibits Explore Bertoia’s Jewelry, Sonic Work

HARRY BERTOIA may be best known for the Diamond chair, an airy icon of scultped wire. But on May 3, New York’s Museum of Arts and Design will debut two exhibits showcasing some of the Italian-born sculptor and designer’s less familiar talents: his jewelry and his forays into sonic art.

In the early 1940s, when wartime rationing forced him to finesse his metalsmithing on a small scale, Bertoia crafted hundreds of decorative pieces with melted-down scraps of metal. Bent, Cast, and Forged: The Jewelry of Harry Bertoia will feature these investigations of form and material—mostly produced while he was a student attending Michigan’s Cranbrook Academy of Art—alongside several monotype prints.

The other show, Atmosphere for Enjoyment: Harry Bertoia’s Environment for Sound, will document the designer’s 1960s and ’70s exploration of the relationship between sculpture and sound. Fascinated by the range of tones that emerged when pieces of metal hit metal, Bertoia created dozens of what he called sonaments: interactive, kinetic bundles of metal rods that produced tones when agitated by wind or human touch. He ultimately produced 11 LPs of the music drawing on material from the 400 or so tapes he made.

The exhibit will also feature an immersive four-channel sound installation that John Brien created with Bertoia’s recordings.

Several interactive sonic sculptures made by the subject’s son Val will add to the exhibit’s visual and aural appeal. —Rebecca Seidel

Dyson Enters into Architectural Lighting

INDUSTRIAL-DESIGN manufacturer Dyson, maker of vacuum cleaners, fans, and hand dryers, is expanding into a new category: architectural lighting. The company’s first effort, the Cu-Beam, will be released this summer.

Offering a CRI of 82 and 88 lumens per watt, the suspended LED fixture will come in uplight and downlight versions that respectively provide ambient and focused illumination.

Designed by Jake Dyson, son of founder James, the Cu-Beam leverages the heat-pipe technology the younger Dyson introduced in 2012 with his self-released CSYS task light. The Cu-Beam combines that technology, which allows LEDs to run at lower temperatures and last longer, with single high-powered LED and a custom-engineered lens that directs light without compromising output.

Jake says that folding his namesake company—founded in 2004—into Dyson proper made sense. “All the Dyson engineers look to solve the problems that others often ignore, whether they be vacuum bags that clog or LED lights that lose brightness unnecessarily soon,” he explains. The younger Dyson feels the move is a good cultural fit—Jake spent years perfecting his lamps’ LED technology, much as his father did with 5,127 prototype vacuums—and is interested in the research and development support the privately held company can provide.

“Since joining the wider business,” Jake says, “I’m constantly learning and having my thinking challenged by Dyson’s team of 2,000 engineers.” Although Jake is continuing to develop his lighting—Dyson proper is taking over the production and distribution of CSYS—he is looking ahead, noting, “I am also working on technology that may not debut for five to ten years.” —JT

ALL IN THE FAMILY Jake Dyson’s Cu-Beam downlight combines his proprietary heat-pipe technology with a single LED and a custom-engineered lens that focuses illumination without sacrificing efficiency.

RENAISSANCE MAN Harry Bertoia playing one of his sonambient sculptures (left); a necklace and brooch (center and right) that the designer created from scrap metal during his Cranbrook Academy days.
Contemporary Curve

Jefferson County Western Health Center, Midfield, AL
Owner: Jefferson County Department of Health
Architect: Birchfield Penuel & Associates, Birmingham, AL
General contractor: M.J. Harris Construction Services, Birmingham, AL
Installing contractor: CSC Roofing, Birmingham, AL
Profiles: Tite-Loc curved, Reveal Wall Panels
Colors: Cardinal Red, Sierra Tan

“The curved roof in Cardinal Red and the Sierra Tan metal wall panels complement the other materials and really create a contemporary appearance...”

Tom Kidwell, senior associate and project architect, Birchfield Penuel & Associates

CASE STUDY

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Finds from this year’s first crop of trade fairs

1. **ODE**
   - **MANUFACTURER:** Herman Miller
   - **PERFORMANCE:** These 36-watt LED table, floor, and surface-integrated lamps use touch technology to turn on and off and switch between two light settings.
   - **PRICE RANGE:** $$$
   - **APPLICATIONS:** Diffusers beneath the spun-steel shade soften the pools of illumination, rendering it suitable for task and ambient uses. Comes in two colors and five heights.
   - [HERMANMILLER.COM](http://HERMANMILLER.COM) (SNAP #200)

2. **SOLARBAN 90**
   - **MANUFACTURER:** PPG
   - **PERFORMANCE:** This clear, low-E glass offers a solar-heat-gain coefficient of 0.23—a 15 percent improvement over sister product Solarban 70XL. It also has a 51 percent visible-light transmittance and 2.22 light-to-solar gain.
   - **PRICE RANGE:** $$$
   - **APPLICATIONS:** Ideal for daylighting commercial buildings of all kinds.
   - [PPGIDEASCAPES.COM](http://PPGIDEASCAPES.COM) (SNAP #201)

3. **CÔR HOME AUTOMATION SYSTEM**
   - **MANUFACTURER:** Carrier
   - **PERFORMANCE:** This all-in-one solution allows users to remotely monitor and manage security, fire, and HVAC systems.
   - **PRICE RANGE:** $$$
   - **APPLICATIONS:** Able to link 64 sensors, 250 Z-Wave-enabled devices, and 16 cameras, Côr suits single-family homes or small buildings. Also offers professional monitoring option.
   - [CARRIER.COM](http://CARRIER.COM) (SNAP #202)

4. **VEE TILE**
   - **MANUFACTURER:** Kirei
   - **PERFORMANCE:** Made from recycled PET plastic, these 19 7/10-inch-square tiles retain up to 36 percent of an interior space’s ambient noise.
   - **PRICE RANGE:** $$$
   - **APPLICATIONS:** Installed via adhesive, mechanical fasteners, or aluminum moldings, the Class C fire-rated tiles suit offices, schools, healthcare facilities, and hospitality spaces.
   - [KIREIUSA.COM](http://KIREIUSA.COM) (SNAP #203)
CREATE ENDLESS POSSIBILITIES
WITH PLANTERS UNLIMITED
5. **VERGE LVS-SERIES**  
**MANUFACTURER:** Bradley  
**PERFORMANCE:** This stain-, scratch-, and heat-resistant basin provides individual fixtures and handwashing space for up to three users.  
**PRICE RANGE:** $  
**APPLICATIONS:** Class A fire-rated, the basins are offered in 15 shades and numerous Greenguard-certified materials, including composite quartz and bio-based resin.  
**BRADLEYCORP.COM** (SNAP #204)  

6. **NIGHTSIGHT**  
**MANUFACTURER:** Zumtobel  
**PERFORMANCE:** This modular family of plug-and-play outdoor LED fixtures uses two types of luminaires to illuminate surfaces and set target accents.  
**PRICE RANGE:** $$$  
**APPLICATIONS:** Created for urban environments, the fixtures come in five light-projection types and two color temperatures. They mount on masts, walls, floors, and ceilings.  
**ZUMTOBEL.COM** (SNAP #205)  

7. **SERIES 430**  
**MANUFACTURER:** Verpan  
**PERFORMANCE:** Designed in 1967 by Verner Panton, this multipurpose stacking chair with a powder-coated, stainless-steel frame never went into production...until now.  
**PRICE RANGE:** $$$  
**APPLICATIONS:** Suited for hospitality, residential, and retail settings, the chairs can be upholstered in wool or velvet Kvadrat textiles.  
**VERPAN.COM** (SNAP #206)  

8. **LINED HANDRAIL**  
**MANUFACTURER:** Organic Lighting  
**PERFORMANCE:** This IP40- and IP68-rated stainless-steel handrail features dimmable LEDs that are cool to the touch.  
**PRICE RANGE:** $$$  
**APPLICATIONS:** The ADA-compliant, indoor/outdoor system offers a choice of LED color and intensity options as well as handrail diameters and angles.  
**ORGANICLIGHTING.COM** (SNAP #207)
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SNAP 190
Douglas Robertson: Our Man in L.A.

Principal, House & Robertson Architects
Culver City, California

**WHAT WAS YOUR FIRM’S ROLE IN THE PETERSEN AUTOMOTIVE MUSEUM?**

Kohn Pedersen Fox (KPF) did the initial design concept and renderings for the museum, which is in Los Angeles. As executive architect, we worked to preserve the design intent and make sure all hewed to it as the project went through construction.

**TELL US ABOUT THE MUSEUM’S FACADE.**

The ribbons create an enclosed volume at various points and roll over the top of the building, almost like an awning. The outside face is a nondirectional-finished stainless steel called Angel Hair, by Zahner. The red corrugated rainscreen, also by Zahner, is a textured, coil-coated aluminum. Using this standard material in a novel way gave the client a bigger bang for the buck.

**WHAT WERE THE CHALLENGES IN WORKING WITH A 1960s BUILDING?**

The building had been abandoned at one point so there was remedial work to be done. Plus there was the weight of the stainless-steel ribbons on the facade, which had not been constructed with that load in mind. To remedy that, we had to strengthen the building by adding shear walls and framing on the roof.

**WHEN IT COMES TO CULTURAL PROJECTS, ARE YOU SEEING ANY TRENDS?**

I think institutions are more and more clarifying their mission through design. For example, the Petersen museum wanted to tell the story of the automobile in Southern California, and one of its stated directives was to use the building to mark the entry to this part of L.A.

**DO YOU HAVE A FAVORITE CAR IN THE MUSEUM?**

Yeah, the blue Bugatti on the ground floor. It’s gorgeous.

---

Since cofounding House & Robertson in 1996, **DOUGLAS ROBERTSON** and partner Jim House have overseen more than 10 million square feet of construction. The firm specializes in Los Angeles–based projects, including the CNN Hollywood renovation and the Kings–Lakers Training Center.

**100**

The weight, in tons, of the steel ribbons on the facade.

The architect (above) stands by the facade of the 204,230-square-foot Petersen Automotive Museum in Los Angeles. The new exterior features stainless-steel ribbons suspended by structural steel outriggers that are connected to a corrugated red metal rainscreen.

PHOTOGRAHY: NATHAEL RILEY PHOTOGRAPHY
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BARNEYS NEW YORK
CHELSEA FLAGSHIP, NEW YORK

Retracing Its Steps

PROBLEM: Design a contemporary flagship store that references a retailer’s storied past in a nearby location.

SOLUTION: Open up the space, add sculptural details, and unify the layout with a grand staircase reminiscent of the original store’s.

A LUXURY RETAILER known for its hip fashion offerings and extravagant window displays, Barneys New York returned to its roots this February with a new flagship in Manhattan’s Chelsea neighborhood. Designed by Steven Harris Architects in partnership with interior designer Lucien Rees Roberts, the emporium stands on the block it occupied when it started out in 1923 and where it welcomed shoppers through 1997. Spanning five floors and 55,000 square feet, the store stretches across a great swath of pavement, announcing its presence with a 170-foot stainless-steel marquee and two vast display windows.

The same design team recently renovated two locations—Madison Avenue and Beverly Hills—and its aesthetic echoes in...
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this flagship’s glossy surfaces and neutral palette. Polished stainless-steel-clad columns add depth to the space’s ground level, where leather goods are displayed on biomorphic tables made of granite and marble. Rich stone backdrops and sculptural motifs extend to every floor. But the store’s centerpiece—and its ode to its founding location, just a few feet away—is the spiral staircase connecting the lower level to three of the upper floors.

“The idea for a circular stair was in the air since the beginning,” says Steven Harris. The dazzling staircase that the French interior designer Andrée Putman created over 30 years ago for the original store lingers in the memories of its well-heeled patrons—indeed, marries beauty and brawn. Inspired by the spiraling stairs of Oscar Niemeyer and Luigi Moretti, Harris unfurls his take like a white party ribbon, spanning four stories across it. “He found inspiration from the work of Agnes Martin and Sol LeWitt. I wanted that element to be distinct,” explains Harris, “but still allow shoppers to see across it.” He found inspiration from art in other areas of the store as well: The mirrored columns on the ground floor, for example, evoke John McCracken’s work.

The sense of spectacle about the stair extends throughout the store—though the stairway remains the primary vehicle for the sense of spectacle about the stair reaching full height on upper floors, acting as a handrail with a skirt above for a smoke baffle on lower ones—has two layers of glazing with an interlayer of acrylic. Manufactured by Depp Glass, the panels feature a series of silkscreened lines (some mirrored, some matte gray) that are reminiscent of the work of Agnes Martin and Sol LeWitt. Mirrored columns on the ground floor, for example, evoke John McCracken’s work.

For the actual stair, a self-supporting steel undercarriage covered in fiberglass and then plastered forms the curves of the suspended structure. A sculpted alcove defines the handrails, which are accented by LED Linear’s VarioLED lighting. Stair treads and risers are sheathed in white marble.

“Harris’s team made nearly 60 staircase models—via 3-D printer—before finalizing the design. For the actual stair, a self-supporting steel undercarriage covered in fiberglass and then plastered forms the curves of the suspended structure. A sculpted alcove defines the handrails, which are accented by LED Linear’s VarioLED lighting. Stair treads and risers are sheathed in white marble.”

The glass surrounding the stair—reaching full height on upper floors, acting as a handrail with a skirt above for a smoke baffle on lower ones—has two layers of glazing with an interlayer of acrylic. Manufactured by Depp Glass, the panels feature a series of silkscreened lines (some mirrored, some matte gray) that are reminiscent of the work of Agnes Martin and Sol LeWitt. Mirrored columns on the ground floor, for example, evoke John McCracken’s work.

The sense of spectacle about the stair extends throughout the store—though the stairway remains the primary vehicle for seeing and being seen. “After all,” Harris says, “stores are very social spaces.”

**IN THIS PROJECT**

**VARIOLED FLEX HYDRA LD15**

**MANUFACTURER:** LED Linear

**PERFORMANCE:** This rail lighting’s single-layer, flexible circuit-board material offers a reflective white surface and advanced thermal management. Color temperatures range from 2000K to 5000K.

**PRICE RANGE:** $$$

**APPLICATIONS:** This strip lighting can line stairway contours and railings and illuminate shelving and other interior accents.

[LED-LINEAR.COM](http://LED-LINEAR.COM) (SNAP #209)

**IMAGE-LAMINATED GLASS**

**MANUFACTURER:** Depp Glass

**PERFORMANCE:** Meeting ASTM C1172 specifications, this flat laminated glass can be customized by thickness, size, translucency, and pattern.

**PRICE RANGE:** $$$

**APPLICATIONS:** Laminated glass adds dimension and custom accents to walls, ceilings, and floors.

[DEPPGLASS.COM](http://DEPPGLASS.COM) (SNAP #210)

**BLIZZARD QUARTZ**

**MANUFACTURER:** Caesarstone

**PERFORMANCE:** Consisting of up to 93% quartz, this stone surfacing—part of the Classico collection—retains a cool tactile quality. Polished and matte slabs are available in ¼- and ¹/₁₆-inch thicknesses.

**PRICE RANGE:** $$–$$$

**APPLICATIONS:** Commonly used for kitchen countertops, bathroom vanities, wall paneling, and custom-built furniture.

[CAESARSTONEUS.COM](http://CAESARSTONEUS.COM) (SNAP #211)

**QUILL WALLCOVERING**

**MANUFACTURER:** Maharam

**PERFORMANCE:** With 40+ hours of lightfastness, this 100% silk textile meets all flammability requirements for wall use.

**PRICE RANGE:** $$$

**APPLICATIONS:** The Greenguard-certified covering is suitable for private offices, conference rooms, residential spaces, and other low-traffic areas where ease of cleaning is not a priority.

[MAHARAM.COM](http://MAHARAM.COM) (SNAP #212)

**BRIGHT IDEA**

Recessed in ceiling coves, curvable linear LEDs by Eklipse cast a gentle light upon the women’s ready-to-wear collection on the second floor of Barneys’ flagship.
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MUSEUM CAFÉS

CAFÉS HAVE LONG BEEN fixtures in museums. But rather than serving as mere rest stops—places to recharge with a latte and scone before heading to the next gallery—they’ve evolved into design and culinary destinations in their own right, amenities that can appeal to museumgoers as well as attracting a broader clientele.

To achieve this, cafés must seem like integral parts of their respective buildings yet distinguish themselves as separate entities. They can achieve this balance several ways, including through location, color, and materials.

MODERN CATERER, WHITWORTH GALLERY
The Whitworth Gallery sits in a 20-acre park in Manchester, England. But until recently, the turn-of-the-19th-century Edwardian building didn’t have much of a connection to the landscape outside. A major renovation in 2015 by London-based architecture studio MUMA changed that. Nowhere is the new approach more apparent than in the museum’s café, the Modern Caterer, which is housed in a rectangular glass room that cantilevers into a canopy of trees.

Cultural Exchange

Museums connect with patrons and the general public through new high-profile eateries.

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This Miesian box—located on the museum’s second floor—disrupts its environs as little as possible. It is wrapped in a Schüco double-glazed glass curtain wall, which features a high-performance solar-control coating and custom-pattern mirrored fritting. At the far end of the restaurant, an upward-folding glass wall lets in fresh breezes. Even the mullions serve to highlight the view: Their hand-polished, stainless-steel surface reflects the avenue of trees beyond.

Diners take in the surroundings seated in Hans Wegner’s iconic CH88 chairs, produced by Carl Hansen & Sons; they were chosen for their “elegant profile, stacking ability, and comfort,” says MUMA principal Stuart McKnight. The tables are assembled from a DuPont Corian top and an off-the-shelf base. In selecting the minimal furnishings, “the view from below and outside the transparent café were carefully considered,” says McKnight.

BABETTE CAFÉ, BERKELEY ART MUSEUM AND PACIFIC FILM ARCHIVE

Cantilevered dramatically above a busy pedestrian thoroughfare, its slanted, chile-red walls visible from the street, Babette Café—part of the Berkeley Art Museum and Pacific Film Archive (BAMPFA)—is impossible not to notice. And that was the idea.

The overhang gives the eatery “street presence,” according to Duncan Ballash, principal and president of EHDD, the project’s architects of record. “It helps the café overcome its location on the second floor, which is a challenge for a business looking for walk-ins outside of museumgoers,” he says. The dramatic walls, made of Vogl’s perforated gypsum board, are more than just decorative, EHDD project manager Nick Morisco points out. Together with an acoustic backing, they prevent the “active café noise from spilling into the more contemplative gallery spaces,” he says.

The rest of the eatery’s décor is spare and simple. The Dex-O-Tex epoxy resin flooring is UV-stable and contains an anti-slip additive. Recessed DL-2YP LED downlights from Lucifer Lighting illuminate the dining area, furnished with white Fred tables by Jean-Marie Massaud and Catifa chairs by Lievore Altherr Molina. Ballash says the designers chose the furniture, produced by Italian manufacturer Arper, for its “compact and light profile that fits the café’s constrained footprint”—a long, narrow area that offers views of the street as well as the art galleries below.

UNTITLED, WHITNEY MUSEUM

When New York’s Whitney Museum of American Art decided to move downtown to the Meatpacking District, Renzo Piano Building Workshop (RPBW) was tapped to design the new building. It also was tasked with...
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creating a ground-floor eatery, Untitled, which would be run by famed restaurateur Danny Meyer and his Union Square Hospitality Group (which also manages Gramercy Tavern, Union Square Café, and The Modern restaurant at the Museum of Modern Art).

Instead of having Untitled play up Meyer’s history and culinary reputation, Piano’s studio looked outward for inspiration. Literally: to the southern end of the High Line, the elevated park of converted train tracks beneath which the eatery is located.

“The shape of the building, and consequently the shape of the restaurant, came out of where we are,” says RPBW principal Elisabetta Trezzani. “Mainly, we try to have a relationship with the High Line without being too close to it.” The restaurant keeps a respectful distance from the park but allows patrons to enjoy its industrial beauty. To wit: Untitled’s tilted ceiling directs diners’ eyes up and out onto Gansevoort Street through a facade system of single-pane glass and steel cables from German manufacturer Josef Gartner. The solution was selected, Trezzani says, to “maintain the most transparency possible.”

The restaurant has a strong visual connection not only to the outdoors but also to the museum’s lobby, which is visible through an interior glass wall. Bluestone from Campolonghi Italia and precast concrete panels from BPDL extend from the museum’s reception area into the dining space, reinforcing their relationship. Baswa acoustic ceiling panels, cut to the same dimensions as the steel panels on the museum’s exterior, muffle the chatter of patrons and the clatter of dishes.

The custom white-oak tables, surrounded by Knoll’s red Saarinen Executive Chairs, echo the room’s other wooden elements, the bar top included; they also offer a warmer complement to the gray-plastered walls and floor. Artemide’s Avico dome pendants and iGuzzini’s Le Perroquet suspension lights hang from the ceiling.

RPBW sourced one decorative fixture directly from the Whitney’s collection: a sign from Robert Indiana’s Eat series. Bidding diners to do just that, it would be an appropriate touch in any of the new wave of museum eateries. For as inviting, atmospheric, and eye-catching as these destinations are, they pride themselves most of all on their food.
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Standing Tall

Although used in tall buildings around the world since the 1990s, cross-laminated timber (CLT) has yet to catch on in the United States. But the material—made of layers of wooden boards stacked perpendicularly and bonded with structural glue—could become more visible stateside thanks in part to the efforts of Oregon State University’s College of Forestry, clean-technology nonprofit Oregon Best, and D.R. Johnson Wood Innovations, the first U.S. sawmill to receive ANSI/API certification for CLT production.

Together, the trio is betting on CLT as a way to promote wood as a sustainable construction material. It also hopes to use its production as a means to revitalize rural Pacific Northwest economies dependent on the timber industry.

Cross-laminating timber creates exceptionally strong and stable panels that can be machined to ¼ inch, prefabricated in sizes up to 10 by 30 feet, and shipped ready to assemble. These qualities reduce material waste and construction time, says Todd Black, CLT sales manager for the Riddle, Oregon–based D.R. Johnson. CLT has other environmental benefits as well—for example, it produces significantly less carbon than structural steel or concrete during the manufacturing process and sequesters the element so it stays out of the atmosphere for the life of the building.

Albina Yard, a 16,000-square-foot office building in Portland, Oregon, will be the first U.S. building to include American-made CLT panels. Designed by local firm Lever Architecture and slated for completion in July, the structure utilizes CLT in its floor slabs and main stairs. Lever, whose projects include Framework, the West Coast winner in the first U.S. Tall Wood Building competition, knows that wood’s benefits extend well beyond construction efficiencies. “Timber buildings appeal to people with their natural beauty,” notes Lever principal Thomas Robinson. “They also smell great.” —Alice Liao
**ADVANTECH SUBFLOOR ADHESIVE**

**MANUFACTURER:** Huber Engineered Woods  
**PERFORMANCE:** This foam-to-gel formula fills gaps on irregular surfaces and prevents the differential movement between subfloor panels and joists that causes them to squeak.  
**PRICE RANGE:** $5–$7  
**APPLICATIONS:** Designed for use on residential floor joists, the spray-on adhesive applies quickly, even to frozen or wet wood, and is backed by a 10-year guarantee.  
**HUBERWOOD.COM** (SNAP #213)

**WAFFLE WALLACKE**

**MANUFACTURER:** PlyProject  
**PERFORMANCE:** This lightweight, flexible acoustic paneling is made of bonded layers of foam, high-density fiberboard, and CNC-cut plywood. When applied flat, Wavy has a sound absorption rating between 100 and 400 Hz.  
**PRICE RANGE:** $5–$7  
**APPLICATIONS:** Ideal for acoustic wall and ceiling applications, Wavy is available in sizes up to 38 3/4 by 71 1/3 inches and with walnut, maple, or cherry veneers.  
**PLYPROJECT.COM** (SNAP #214)

**ZIGZAG**

**MANUFACTURER:** Viridian  
**PERFORMANCE:** Made from reclaimed shipping crates, this rough-hewn wood paneling includes boards with heavy patina, weathered paint, and real nailheads.  
**PRICE RANGE:** $5  
**APPLICATIONS:** Available in widths of 4 to 6 inches and lengths of 24 to 36 inches, the roughly 5/8-inch-thick boards can be installed on walls in horizontal, vertical, or herringbone configurations.  
**VIRIDIANWOOD.COM** (SNAP #215)

**TIMBERCUTS**

**MANUFACTURER:** Armstrong  
**PERFORMANCE:** New to the Artistic Timbers collection, these 3/4-inch-thick planks of maple, oak, and hickory flooring feature sawn marks for a rugged appearance.  
**PRICE RANGE:** $5  
**APPLICATIONS:** Available in 10 colors and three widths, the planks can be mixed and matched in residential and commercial applications.  
**ARMSTRONG.COM** (SNAP #216)

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**Sticking with It**

A NEW ADHESIVE from EcoPro Polymers could revolutionize the manufacture of composite wood products. Derived from plant-based materials, the yet-to-be-named, formaldehyde-free resin is the first suitable for particleboard and MDF fabrication. It is also less viscous than the soy-based wood adhesives currently used in hardwood plywood applications. That means the substance can be converted into small droplets without compromising its strength or durability.

EcoPro Polymers’ founder and CEO Hugh Mandal developed the adhesive with support from Oregon State University and Oregon Best, a nonprofit focused on clean-technology innovation. Mandal believes there will be considerable demand for his product, as several health organizations classify formaldehyde as a carcinogen. Its emission is heavily restricted in California, with a federal standard under proposal by the Environmental Protection Agency. Compliance is “a big pain point” for manufacturers, Mandal notes.

Spekly, another Oregon Best–funded startup, will be the glue’s first client, incorporating it into a line of architectural panels to be introduced later in the year. Dirk Wallace, Spekly’s owner and director of product development, says he plans to use the resin exclusively for all the company’s composite materials.—AL

**GLUE TRAP**

Made from agricultural by-products, Spekly’s architectural panels—available later this year—will be the first item to feature the new formaldehyde-free resin by EcoPro Polymers.
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Aquatic Altruism

**THE WORLD HEALTH ORGANIZATION** (WHO) estimates that by 2025, half the world’s population will live in water-stressed areas: places where chronic or seasonal drought, flooding, or water pollution seriously affect the quality of life. To help such households clean their drinking water, plumbing manufacturer **Kohler** has developed Clarity, a low-cost, gravity-fed filtration system.

The gadget is decidedly low-tech. Users pour up to 2.9 gallons of contaminated water into a holding tank. The water then flows through a ceramic filter—which removes over 99 percent of bacteria—and into a 3.1-gallon reservoir, where the now-potable water is stored. Clarity can filter up to 10.5 gallons of water per day, meeting the drinking-water needs of a three-to-four-person family. The $20 ceramic filter lasts up to one year and costs less than a cent per user to operate daily. And it meets the WHO’s interim-level water-quality guidelines, benchmarks which, while not the optimal goals set by government agencies, still ensure basic health and hygiene standards.

Unlike other, similarly scaled filter systems, Clarity doesn’t require electric power or manual pumping. The components nest for easy shipping and can be assembled without tools. Also setting the filter apart is its relatively sophisticated appearance. “Our goal with Clarity is to provide a filter that’s extremely efficient at creating safe drinking water and also becomes a fixture of convenience and dignity in a home,” says Mike Radloff, senior project manager of water technologies at the Wisconsin-based company.

Kohler is field-testing Clarity before its rollout to a set of nonprofit organizations focused on international socioeconomic and ecological issues; think **World Vision, International Development Enterprises** (iDE), and **Water Mission**.

Together, filtration efforts such as Kohler’s are making a difference. In 2015, 91 percent of the world’s population had access to an improved drinking-water source, compared with 76 percent in 1990. Says David Kohler, the company’s president and CEO, “Business success doesn’t matter much if we can’t say that we left the world a better place than we found it.” —**Leslie Clagett**
**Shaping Up**

**The once-clunky** bathtub has taken a sculptural turn thanks to a new mineral-based acrylic. The through-color material—which Duravit incorporates under its DuraSolid brand and Laufen uses in its Sentec products—can be cast into forms with tight contours, crisp edges, and thin blades. Such shapes can’t be achieved through typical production means like polymer thermoforming and metal or ceramic molding.

Bathtubs using this proprietary material are now making their way into the U.S. market. The models are lightweight yet strong—single-wall tubs are just as solid as ordinary double-wall soakers. They are color-stable under UV light and tolerate temperature fluctuations without buckling or deforming. Plus, should a tub get scratched, a light buffing restores its surface.

While the standard palette consists of whites and neutrals, the material can be special ordered in bolder, more saturated hues, some with an aggregate-like appearance mimicking stone. Its velvety finish provides a measure of slip resistance, which opens the acrylic up for other uses—for instance, in shower trays. “This material is something completely new for our company and the market,” says Tim Schroeder, president of Duravit USA. “It’s set to be the new standard for bathrooms.” —LC

**In fine form**
The first wave of tubs available in the U.S. market made from a new acrylic include (clockwise from above left) Duravit’s Cape Cod, Clarke Architectural’s Dune, and Laufen’s Ino.
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![Image of Azon structural thermal barrier technology]

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SNAP 338

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The Big Picture

UNTIL WE ACHIEVE a sci-fi world where invisible plasma shields replace a building’s windows and doors, we will have to accept obstructed views of the great outdoors. Meanwhile, manufacturers continue pushing material and engineering limits to make products as panoramic as they can, with slim profiles and large expanses of glass their latest tactic.

Available in standard or custom sizes up to 8 feet tall and 18 feet wide, LaCantina’s Vinyl Folding Door system offers extremely narrow 2 11/16-inch stile and rail profiles; the pieces come in white or tan and with stainless-steel or bronze-finish hardware. If you’re seeking increased visibility where wall meets wall, there is the Direct Glaze 90-Degree Corner window from Marvin, which has a clad corner post only 2 ⅞ inches wide. Factory mulling is available for vertical stacked construction.

Incorporating both windows and doors for a consistent design aesthetic, Jeld-Wen’s EpicVue line features an aluminum-extruded sash for strength and stability. On offer are a variety of configurations, including swinging patio doors and folding wall systems. EpicVue comes in a choice of eight wood species, five stains, and 10 hardware finish options.

Maximum natural light and a seamless indoor-outdoor experience aren’t always what a design requires. But when you want to let the sun stream in, manufacturers continue to open up the view. And that’s no fiction. —Braulio Agnese

LOOK OUT Manufacturers such as LaCantina (top) and Marvin (above) are maximizing views with doors and windows that pair wide expanses of glass with slender mullions.
Increased Transparency

LAST SEPTEMBER, Andersen Windows became the first fenestration manufacturer to comprehensively disclose the environmental impacts of one of its products. The Environmental Product Declaration (EPD) for its Renewal by Andersen double-hung window arrived just weeks after the Institute for Environmental Research and Education (IERE) announced the first Product Category Rule for vertically hung windows, a move that created an industry standard for EPDs in that category.

Andersen’s quickness with the EPD for Renewal was by design. The company, part of the IERE industry team that developed the rule over four years, had already conducted a life-cycle assessment on the window and was able to develop the EPD as the standard evolved, says Eliza Clark, Andersen’s director of sustainability and environmental. “EPDs are resource-intensive efforts,” she adds. “The process taught us a lot.” Renewal is Andersen’s consumer-facing replacement-window line, and thus, in Clark’s words, “a pretty universal product.”

What’s next? Clark reports that among green initiatives on several fronts, Andersen is creating a new position that will focus exclusively on product and supply-chain sustainability. As for future EPDs, Clark expects to eventually have one for every Andersen window series because, she says, embracing environmental transparency “is something we’ve targeted as a key part of our business.” —BA

BALDUR SLIDING-DOOR HARDWARE
MANUFACTURER: Krown Lab
PERFORMANCE: This patented hubless sliding system for interior barn doors can hold panels that weigh up to 400 pounds.
PRICE RANGE: $$$
APPLICATIONS: Available in three stainless-steel finishes (brushed, polished, and black) and in top-, face-, and glass-mount configuration, Baldur suits both residential and commercial uses.
KROWNLAB.COM
(SNAP #221)

ARCADE WINDOWS
MANUFACTURER: Intus
PERFORMANCE: This unplasticized polyvinyl chloride (uPVC), triple-glazed line of windows can achieve a DP70 rating and thermal insulation up to R7.
PRICE RANGE: $$
APPLICATIONS: An affordable, commercially rated uPVC product for multifamily buildings, Arcade offers eight exterior and 33 interior color laminates along with multiple hardware finishes, grille designs, and glazing options.
INTUSWINDOWS.COM
(SNAP #222)

BEARRICADE FOLDING GLASS WALL
MANUFACTURER: NanaWall
PERFORMANCE: Reinforced structural posts and impact-rated laminated glass keeps beasts at bay while enabling openings of up to 38 inches wide.
PRICE RANGE: $$$
APPLICATIONS: Developed for structures in areas with active bears, this product provides peace of mind—along with a panoramic view.
NANAWALL.COM
(SNAP #223)

PERSPECTIVES DOOR GLASS
MANUFACTURER: ODL
PERFORMANCE: Available in dozens of sizes, this entry-door glass series comes in a choice of eight minimalist textures inspired by nature and geometry.
PRICE RANGE: $$
APPLICATIONS: Two styles offer severe-weather-impact options—for hurricane- and tornado-prone regions—while another is available in low-E glass. Several provide visual privacy without filtering out light.
ODL.COM
(SNAP #224)

SOMETHING TO DECLARE
The Renewal by Andersen double-hung window (pictured) is the first fenestration item on the market with a comprehensive Environmental Product Declaration, which quantifies its impact on the planet.

KEY $ = VALUE, $$ = M ID-RANGE, $$$ = HIGH-END
Bridging Technologies

IN 2013, when Leo Villareal created his iconic Bay Lights installation on the San Francisco–Oakland Bay Bridge, the spectacle was lit only temporarily. The reason? The LED fixtures used weren’t able to withstand the environment’s high moisture levels.

Not so for a new, permanent version of the installation, which debuted on January 30. Utilizing Philips Color Kinetics eW Flex Compact lighting, this take features 25,000 individually controllable, fully encapsulated LED nodes protected from water and salt; the white light produced is also four times brighter than that of the original installation.

Other technological advancements helped as well. “We now have longer hybrid cables to carry power and data,” says Saeed Shahmirzai, a senior project manager at Zoon Engineering, the installation’s construction managers. “With the longer cables, we were able to space our fixture enclosures farther apart and reduce their number by 35 percent,” thus saving on installation cost and maintenance. Philips’ cloud-based ActiveSite System also enables remote diagnostics, analytics, and control of the lights, further simplifying and enhancing their management.

Illuminate, the nonprofit arts organization that first envisioned the project, estimates that the updated Bay Lights installation will bring $1 billion in tourism and real estate revenue to the local economy over the next decade.

—Allison Craig
Rainbow Bright

THE FIESTA DISTRICT Improvement Project in Mesa, Arizona, is one of the largest adaptive reuse projects in the state's history. Once a graveyard of abandoned big-box stores, it is now a 1½-mile-long mixed-use urban corridor featuring high-end apartments, tech companies, restaurants, and five public pocket parks. Uniting the corridor elements is a custom street-lighting scheme designed by the Phoenix-based firm Wright Engineering.

Wright Engineering, along with the district’s partners, worked with the city to create a coordinated street and park lighting scheme. During the design process, Wright used the opportunity to bring the latest innovations in LED technology to this urban setting. The outdoor lighting system, which features a variety of fixtures from different manufacturers, has been designed to manage lighting based on the pedestrian and vehicular traffic patterns in the corridor.

Lumascape Lighting provided the core lighting solution: a wireless control system that synchronizes the color rotation of all the elements. As Cliff Tolman, an associate engineer at Wright Engineering, points out, “The synchronization is what made the project complicated—but also what made it work.”

TAPESTRY OF HUES The designers of Mesa, Arizona’s revitalized Fiesta District used a rotating palette of colors to unify various streetscape elements.

SNAP BACK

RENE BIHAN
Managing Principal
SWA Group
San Francisco, California

“Lighting has really emerged as the newest and strongest placemaking instrument for my San Francisco urban-design projects. LED is still a nascent technology, and it seems like the sky is the limit in terms of new and emerging ways of using it to animate and enhance public spaces.”

SNAP FACT

LED fixtures now make up more than 50% of all new public outdoor lighting sold.

SOURCE: THE SMART OUTDOOR LIGHTING ALLIANCE

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The Overly Evolution metal wall and roof system is without raised batten or standing seams and exposed fasteners. The system consists of a hidden drain channel, compression bar, cover cap and cladding sheets. The smooth, contemporary design appears monolithic when viewed from just a short distance. It’s an ‘Evolution’ to all the standard metal wall and roof systems available throughout the history of the industry.

Applications

The Overly Evolution system can be installed on sloped roofs and vertical walls. Panels can be curved and/or tapered for barrel vaults and domes or spherical shapes. The system features hidden fasteners and an internal drainage component which removes any moisture that migrates into the system and skillfully designed joints which allow for expansion and contraction. The system is the exterior exposed component of a wall/roof composite assembly. Several composite assemblies are available ranging from thin to thick as determined by aesthetic preferences or as necessary to meet performance requirements such as thermal, structural and fire ratings.

Materials

- Aluminum Alloy 3003-H14, Standard Thickness 18 gauge (.040”)–16 gauge (.050”) available in painted K500 finishes, brushed and mill finishes
- Stainless Steel type 304 and type 316, 24 gauge (.024”)–20 gauge (.036”) available in 2B, 2D, #4 and several custom directional and non-directional finishes
- Titanium Grade 1, gauges .018”–.024” available in standard mill or matte finishes
- Zinc, gauge .028”–.032” available in natural or pre-weathered finishes
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System Design Data

- Width of Compression Cover: 2.75”
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- Maximum Length of Panels: 40’
- Compression Extrusion Thickness: .056”
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SNAP 21
Cast in Concrete

**BEST KNOWN FOR** its medieval architecture, the Polish city of Toruń has added a thoroughly modern concert hall to its collection of UNESCO-protected landmarks. Designed by Spanish architect **Fernando Menis**, the new 235,052-square-foot structure takes inspiration from the past, inventively using red brick—the city’s historic building material of choice—for visual and acoustic impact.

The **CKK Jordanki** concert hall features a pale concrete exterior with cuts in the facade that offer glimpses of the cavernous interior. Menis covered the ceiling and walls of the building, which includes an auditorium, meeting rooms, and public areas, with a mixture of concrete and crushed brick: a technique he calls **picado** (Spanish for “chopped”). While the mosaic-like surface is a stunning reinterpretation of Toruń’s traditional brick, it mainly serves, Menis says, “to help design excellent acoustics.”

The architect has spent the last decade perfecting the process, which he devised for the **Magma Arte & Congresos** center in Tenerife, Spain, employing a blend of volcanic ash and concrete. In Toruń, red brick was substituted for the ash, resulting in a product that increases the sound absorption of regular concrete. The shape of the **picado** slabs—combined with the auditorium’s height-adjustable ceiling—allowed Menis to fine-tune the acoustics of the concert hall so well, it could support a wide range of performance styles: theater and chamber music, opera and rock. Combined with the building’s dramatic appearance, the result is a space meant to delight the eyes as much as the ears.

—Alison Zingaro

**SOUND IDEA**
To improve acoustics and add interest to the **CKK Jordanki** concert hall (above), Fernando Menis applied a blend of concrete and brick fragments to its interior (left) and exterior.
Electric Avenue

SNOW-PRONE CITIES spend millions annually removing the white stuff, not to mention the added expense of weather-related infrastructure repairs. But now a special type of conductive concrete that heats up to melt ice and snow has the potential to help lower maintenance costs while keeping streets and sidewalks safer.

Created by Chris Tuan, a civil engineering professor at the University of Nebraska–Lincoln, the concrete contains a blend of steel fibers, steel shavings, and low-purity carbon particles. Electrodes extract electricity from a power source, and the embedded metal elements in the concrete distribute the energy through the material as heat. While the technology was previously considered too expensive for real-world applications, this new formulation reduces the cost by utilizing industrial-waste versions of the elements recycled from metal-fabrication shop floors. The result, says Tuan, is “the most cost-effective design that meets strength and durability requirements” to date.

Tuan’s concrete has been used on the Roca Spur Bridge in Omaha and in parking ramps in Harbin, China. The Federal Aviation Administration is currently evaluating the material for high-traffic areas of tarmac, where snowplows and deicing equipment can be difficult to maneuver. If all goes well, the agency plans to implement the technology on the tarmac at its technical headquarters in Atlantic City.

Although Tuan says paving entire roadways with the concrete is still cost-prohibitive—the material is two and a half times the price of regular concrete—he anticipates that it will be used more widely for smaller applications like driveways, bridges, city ramps, and parking lots. —AZ

WARM-UP
A new, lower-cost formulation of electrified concrete (in testing, above) could automatically melt snow and ice on runways, driveways, and bridges.
Little by Little

Slowly but surely, Virginia and the Carolinas are rebounding from the recession.

BY J. MICHAEL WELTON

Although on the upswing in North Carolina, South Carolina, and Virginia, manufacturing is not exactly booming in the South Atlantic states.

“Manufacturing accounts for 8 percent of Virginia’s total employment,” says Brian Kroll, senior economist at the Virginia Economic Development Partnership in Richmond. The state’s industry grew 0.4 percent over last year, led by transportation equipment, including Volvo trucks manufactured in Radford. But building products have played a role, too. Take Trex composite decking in Winchester. “They’ve expanded their facilities by 120 million square feet and added 36 jobs,” Kroll says of the company.

North Carolina’s manufacturing sector also continues to grow, albeit at uneven levels. “Although we’re strongest in aerospace and aviation,” says Phil Mintz, executive director of the North Carolina Manufacturing Extension Program, “even our traditional industries such as furniture manufacturing are undergoing a revival.”

The state’s building-products market, however, isn’t having such luck. “What’s holding us back is that younger people are continuing to rent” rather than buy a home, says Jay Watt, director of marketing at National Gypsum. “So we’re seeing a lot of multifamily units, and they use less material than single-family homes.”

In 2015, the manufacturing sector accounted for 86 percent of the capital investment made in South Carolina. Although the automotive industry has been the biggest driver, it’s not the only one. “Since 2011, building-product manufacturers have announced seven economic development projects in South Carolina,” says Jeremy Cauthen, communications manager for the state’s Department of Commerce. “These investments total more than $85 million and have created 220 jobs.”

It looks as if that good ol’ Southern hospitality is paying off after all.
The state’s manufacturing sector employed 231,600 in 2014, an increase of 0.5% over the preceding decade.

In 2014, Virginia’s manufacturers exported $16.25 billion worth of goods—85% of the state’s total amount.

Sources: Virginia Economic Development Partnership, National Association of Manufacturers

The 2014 gross domestic product of North Carolina was $455.9 billion, the ninth-largest GDP in the United States.

In January 2014, manufacturing employed 10.9% of North Carolina’s workforce.

Civilian aircraft, engines, and parts are the Tar Heel State’s most lucrative manufacturing sectors, accounting for $1.2 billion in 2014 (3.8% of the state’s output).

Sources: Economic Development Partnership of North Carolina, North Carolina Department of Commerce, National Association of Manufacturers

Since 2010, the state’s manufacturing employment has increased by 13.1%, to 26,800 jobs.

South Carolina leads the pack in the production and export of tires, accounting for more than 28% of the nation’s market in that segment.

Today there are approximately 150 building products manufacturing firms operating in the Palmetto State.

Sources: South Carolina Department of Commerce
Where Zero Is the Top Score

An ultra-energy-efficient building defines a new paradigm for New York schools.

BY JOANN GONCHAR, AIA

THE AMBITIOUS environmental agenda of a new elementary school designed by Skidmore, Owings & Merrill (SOM) on Staten Island, New York, is obvious from the first encounter. Almost 1,600 photovoltaic (PV) panels cloak the 68,000-square-foot, two-story structure, covering the south facade, extending over its roof, and cantilevering out to float above a playing field. These PVs, along with about 400 more sheltering a parking area, are expected to generate 662 megawatt-hours of electricity per year. This energy should make the building—named P.S. 62, the Kathleen Grimm School for Leadership and Sustainability at Sandy Ground, after a longtime deputy chancellor for education—the first net zero energy school in the Northeast.

What constitutes a net zero energy building? The industry is still debating this, with the U.S. Department of Energy proposing a standard definition and measurement guidelines just last fall. But at the most basic level, a net zero energy building (often called a zero net energy building or simply a zero energy building) is one that over the course of a year produces at least as much energy from renewable sources as it consumes. So far, only 39 nonresidential projects have documented their performance in the U.S., verifying that they are zero energy, according to a tally released in early 2015 by the nonprofit New Buildings Institute. Eight of those are K–12 school buildings.

If these figures make net zero seem like a high bar, a school in New York presents an...
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especially tough challenge. The city’s density makes it difficult to find a site that allows sufficient roof space or unshaded and correctly oriented facade area to mount PV panels—the most viable renewable-energy source for net zero aspiring projects, explains E. Bruce Barrett, vice president for architecture and engineering at the city’s School Construction Authority (SCA). But in 2010, when the SCA’s capital planning and real-estate group presented Barrett with a 3½-acre site in a residential neighborhood in the city’s most low-rise borough, she immediately thought that “if there was ever an opportunity for us to do a net zero school, this is it.” Later that year, the SCA won approval from the New York City Department of Education and city officials to move forward with the building and selected SOM’s Education Lab as its architects in early 2011.

From the get-go, P.S. 62 was considered a pilot project—one that would help improve and inform SCA design guidelines, explains Chris McCready, a SOM managing director. The potential for positive impact is considerable, since the city’s 1,600 public schools represent 37 percent of municipal greenhouse gas emissions, points out Roger Duffy, a design partner.

But Duffy, McCready, and the team had their work cut out for them. They knew that even in its quasi-suburban setting, the school would need a vastly reduced energy appetite in order to meet all its needs with the 34,000 square feet of PV panels that would fit on the school structure and over the parking area. So they aimed for a facility that would use only half the energy of a typical New York City school—a particularly ambitious goal since the city’s school buildings must comply with the stringent Local Law 87, which is already 30 percent more efficient than the energy standard ASHRAE 90.1.

The design team tackled this target with extensive energy modeling, developing a set of tightly integrated tactics, both passive and active. One of the most consequential is the daylighting strategy, which in no small part influenced the building’s configuration: the roughly square plan is organized around a long and narrow courtyard and a series of skylights that admit sunlight into the school’s spacious double-height corridors. The classrooms, which face either north or south, so that the sun coming in through their windows and the associated heat gain are easy to control, also have corridor-facing windows for daylight sharing and ceilings contoured to reflect light. The approach yields classrooms that have as much as 90 percent daylight autonomy—a metric that defines the portion of normal school hours when electric illumination is unnecessary. Building-wide, the average daylight autonomy is 60 to 70 percent.

The architects and their consultants were particularly careful to avoid glare, since they were worried that teachers would pull down
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the window shades, neglect to raise them, and then rely on electric illumination, even during daylight hours. To lessen the chances of this happening, in the south-facing classrooms, they split the exterior windows into clerestories and low-level lites set at the right height for children to look out. The lower windows contain vision glass, but the higher ones include an aerogel that helps diffuse the sunlight.

The daylighting isn’t all about saving energy, however. In combination with practical materials like vinyl tile flooring, ceramic wall tile, and suspended ceilings, almost all in white or shades of subdued gray, the natural illumination creates a lively and fresh atmosphere. “It changes the whole mood of the building,” says Lisa Sarnicola, P.S. 62’s principal. “It makes the children happy.”

Another critical strategy is the school’s super-insulated and tight envelope, with triple-glazed windows, R-20 walls, and an R-30 roof. To avoid compromising their performance, SOM detailed the handsome, 30-foot-tall precast-concrete panels that clad the east, north, and west facades so that they are anchored only at the top and bottom—an approach that avoids unnecessary penetrations of the air and vapor barrier. “Once you’ve taken care of everything else, infiltration becomes really important,” explains McCready. Although these panels are tall, to simplify their attachment to the underlying structure, they are also pleated, giving them a scale and texture that appeals to children and adults alike.

For indoor climate control, the team opted for a dedicated outdoor air system with energy recovery and demand control ventilation. In the classrooms, perimeter displacement induction units supply conditioned air at a low velocity, which makes the devices both efficient and quiet. The building’s heat pumps are tied to a geothermal system consisting of 80 wells drilled under the school’s athletic field.

Designers considered combining these active technologies with natural ventilation. However, due to security concerns associated with opening the windows and the added layer of operational complexity, they ultimately decided not to pursue a mixed-mode system, says Robert Diemer, a partner with the project’s sustainability consultant,
SNAP 41

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To develop the system for wrapping the building in PVs, SOM worked with the Center for Architecture Science and Ecology (CASE), a research effort the firm runs collaboratively with Rensselaer Polytechnic Institute. CASE studied how best to mount the panels, angling them to produce the maximum amount of electricity while ensuring they wouldn’t shade each other.

To make certain that the school would use less energy than is produced by these PVs, the project team also took a close look at so-called plug and process loads (PPLs)—those loads not related to general lighting, heating, or cooling, or other systems that provide occupant comfort. These PPLs are created by printers, computers, and other devices powered by AC outlets and by equipment that supports activities such as cooking. The team deployed several strategies for keeping PPLs in check. In the kitchen, for example, the design and consultant team worked with both the SCA and the Department of Education’s food service supplier to swap out the typical gas-fired equipment for much more efficient induction appliances. They even reviewed the menu, suggesting that cold lunches occasionally be substituted for hot meals to further cut back on the energy associated with food preparation. While the kitchen accounts for a third of the energy use in a typical SCA school, it represents only 9 percent of P.S. 62’s much lower energy consumption.

Other strategies for reducing the school’s PPLs include the addition of staff workrooms—one per floor—each equipped with a coffeemaker, a microwave, and a refrigerator, among other amenities. The hope is that these rooms will provide a place for teachers to work collaboratively and, at the same time, deter them from bringing their own power-hungry appliances into the classrooms. Additional features of P.S. 62 that should reduce PPLs are printer stations with energy-efficient machines shared among several teachers. This should eliminate the use of individual printers found in most of the city’s classrooms.

Students will also have a part in helping the school reach its net zero goal. Interactive
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dashboards mounted throughout the building offer one opportunity for engagement. Although the screens aren’t fully functional yet, kid-friendly graphics designed by Pentagram will eventually display information such as weather conditions, the amount of electricity generated by the PVs, and the amount of energy used in each space. Sarnicola, the principal, plans to hold weekly energy-conservation competitions between classrooms as a “fun and hands-on way” to motivate children and help them gain environmental literacy.

One unusually tricky aspect of the project was the SCA’s strict procurement rules, which sometimes made it difficult to take advantage of the latest technology. For instance, the perimeter displacement induction units, considered integral to the design, were a proprietary product and therefore required special approval by the agency’s board of trustees. Other elements, such as the PVs, were rapidly evolving, making it a real possibility that the specified panels would be superseded between completion of the bid set and the time that the order was actually placed.

**SUNNY DISPOSITION**

To avoid glare, the south-facing classrooms have two levels of windows: lower-level lites containing vision glass and clerestories with glazing that includes an aerogel for diffusing sunlight. The sloped suspended ceilings help with even distribution.

**SOURCES**

**ARCHITECT:** Skidmore, Owings & Merrill
— Roger Duffy, design partner; Anthony Vacchione, Christopher McCreary, managing partners; Austin Harris, project manager; Jon Cicconi, senior design architect; Carrie Moore, senior technical coordinator

**ENGINEERS:** AKF Group (m/e/p); Desimone Consulting Engineers (structure); Langan Engineering and Environmental (geotechnical)

**CONSULTANTS:** Mark K. Morrison Landscape Architecture (landscape); Brandston Partnership (lighting); In Posse (sustainability)

**GENERAL CONTRACTOR:** Leon D. DeMatteis Construction

**CLIENT:** New York City School Construction Authority

**SIZE:** 68,000 square feet

**COST:** $70 million

**COMPLETION DATE:** September 2015

**PRECAST CONCRETE:** BPD

**GLAZING:** Viraco, Solera, Oldcastle BuildingEnvelope

**SKYLIGHTS:** Acurlite

**ACOUSTICAL CEILINGS:** Armstrong, Chicago Metallic

**CUSTOM WOODWORK:** Eli Resilient Flooring: Armstrong, Pawling

**CERAMIC TILE:** Daltile

**CARPET:** Mohawk

**INTERIOR LIGHTING:** Peerless, Neo-Ray, Fail-Safe, Edison Price, Metalux

**EXTERIOR LIGHTING:** McGraw Edison

**LIGHTING CONTROLS:** Cooper

**DISPLACEMENT INDUCTION UNIT:** Trox

**PV SYSTEM:** SunPower, Panasonic, Advanced Energy Industries, Power-One, Ecolibrium Solar, Unirac

**ENERGY MANAGEMENT SYSTEM:** Schneider, Square D

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To help deal with this problem, the construction contract stated that the owner would provide final direction regarding the PVs before the shop-drawing phase.

As the school neared completion, new and improved panels did become available. But, in an ironic turn of events, the entire manufacturing run was snapped up before they could be purchased for P.S. 62. In the end, the earlier generation of panels clad the building. Nevertheless, the project team says that the installed PVs should be more than sufficient to meet the net zero goal since the energy model includes a comfortable cushion.

Even though the architects are confident that the building will operate at net zero, they say it could take as long as three years to fully commission and fine-tune its system so that it performs as designed. But the project is already having a positive influence—in both large and small ways—on the city’s school design and construction program. Just a few examples of this impact: Printer stations instead of individual classroom machines are now standard for new schools, as are teacher workrooms that include pantries. The induction units that required special approval have been made an option for all design teams. But one of the more profound shifts for which P.S. 62 may be responsible is a new emphasis on natural illumination in SCA projects. Barrett says that her team is now on the lookout for opportunities to insert sidelights and transoms in their projects. Echoing the sentiments of the school principal, Barrett says, “We were just totally awestruck by the daylighting.”

Continuing Education
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Learning Objectives
1. Define net zero energy.
2. Define terms relevant to net zero buildings such as “daylight autonomy” and “plug and process loads.”
3. Discuss some of the strategies that SOM used to make P.S. 62 ultra-energy-efficient.
4. Describe some of the challenges the P.S. 62 project team faced in procuring the latest energy-efficient technology for the building.

AIA/CES Course #K1601A

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Ongoing Exhibitions

Bauhaus Twenty-one: An Ongoing Legacy
Palm Springs, California
Through May 1, 2016
This exhibition at the Palm Springs Art Museum showcases 12 of the most iconic achievements of pre-1933 Bauhaus architecture, bringing the structures into conversation with contemporary architectural visions. Each work, photographed by Gordon Watkinson, appears alongside a project built in this century. For more information, visit psmuseum.org.

The New American Garden: The Landscape Architecture of Oehme van Sweden
Washington, D.C.
Through May 1, 2016
Wolfgang Oehme (1930–2011) and James van Sweden (1935–2013) revolutionized American landscape architecture. Rejecting the well-manicured but perpetually thirsty lawns that had become icons of 20th-century suburbia and corporate campuses, the duo used ornamental grasses and perennials to create living tapestries that required relatively little maintenance. These self-sustaining landscapes, on view at the National Building Museum, exemplified what came to be known as the New American Garden. For more information, visit nbm.org.

HAClab Pittsburgh: Imagining the Modern
Pittsburgh
Through May 2, 2016
The City of Pittsburgh underwent an ambitious program of urban revitalization during the 1920s and ’60s. This exhibit untangles the city’s complicated relationship with modern architecture and urban planning at that time. In this experimental presentation at Carnegie Museum of Art’s Heinz Architectural Center, the architects in residence, Boston-based studio over, under, unearth layers of history and a range of perspectives through archival materials, an on-site architecture studio, and a salon-style discussion space. For more information, visit cmaoa.org.

Pedagogy and Place
New Haven
Through May 3, 2016
Aiming to pinpoint the relationship between physical settings and the pedagogy of architectural education, Pedagogy and Place traces the last century of the Yale program through alumni work and the buildings designed to house the university’s School of Architecture. An auxiliary installation presenting more than 20 architectural schools from around the world further illuminates how spatial relationships and various modes of training have evolved over 200 years. For more information, visit architecture.yale.edu.

Architecture of Life
Berkeley
Through May 29, 2016
The inaugural exhibition at BAMFA’s new Diller Scofidio + Renfro–designed building explores how architecture—as concept, metaphor, and practice—illuminates various aspects of life, including the nature of the self and the power of the imagination to reshape our world. The comprehensive show spans 2,000 years and features more than 200 works of art in a wide range of media. For more information, visit bamfa.org.

Close Up
Los Angeles
Through May 29, 2016
An oft-looked condition of digital design technologies is the ability to design objects through continuous degrees of magnification. This exhibition at the SCI-Arc Gallery, curated by architects Hernan Diaz Alonso and David Ruy, proposes that technological advances have transformed architectural thought and process. For more information, visit scar.edu.

A Japanese Constellation: Toyo Ito, SANAA, and Beyond
New York City
Through July 4, 2016
This exhibition at the Museum of Modern Art highlights the interconnected web of architects and designers around Pritzker Prize winners Toyo Ito and SANAA. The curator’s provide an overview of Ito’s career and his influence as a mentor to a new generation of Japanese architects while also offering a retrospective of three generations of acclaimed Japanese designers, Kazuyo Sejima, Ryue Nishizawa, Sou Fujimoto, Akihisa Hirata, and Junya Ishigami among them. For more information, visit moma.org.

Beauty
New York City
Through August 21, 2016
The fifth installment of the Cooper Hewitt’s contemporary design exhibition series, Beauty celebrates design as a creative endeavor engaging the mind, body, and senses alike. The exhibition, which features more than 250 works by 62 designers, is organized around seven themes: extravagant, intricate, ethereal, transgressive, emergent, elemental, and transformative. For more information, visit cooperhewitt.org.

Materials Inside and Out
Chicago
Through Summer 2016
Inspired by the working process of architect David Adjaye, this installation at the Art Institute of Chicago invites visitors of all ages to discover how architects use building materials like wood, fabric, ceramic tiles, laminates, paint, stone, and plastics to create form and atmosphere. Visitors can arrange material samples and sketches to create a mood board, considering how color, texture, and cultural context can contribute to a specific feel. For more information, visit aric.edu.

Design for Eternity: Architectural Models from the ancient Americas
New York City
Through September 18, 2016
From the first millennium B.C. to the arrival of Europeans, artists of the ancient Americas created small-scale architectural models for placement in the tombs of important individuals. This exhibit at the Metropolitan Museum of Art sheds light on the role these objects played in mediating relationships between the living, the dead, and the divine. It also provides a rare look at ancient American architecture—much of which did not survive to the present day. For more information, visit metmuseum.org.

Lectures, Conferences, and Symposia

Lightfair International 2016
San Diego
April 26–28, 2016
This year’s edition of the architectural-and commercial-lighting trade show and conference, to be held at the San Diego Convention Center, will include six pavilions of products and offers more than 200 hours of accredited education. For more information, visit lightfair.com.

International Contemporary Furniture Fair (ICFF)
New York City
May 14–17, 2016
North America’s platform for global design, the 28th annual ICFF will feature 750-plus exhibitors of furnishings, textiles, and accessories for residential and commercial interiors. The event, taking place at the Jacob K. Javits Convention Center, will also host a slate of panels with industry experts. For more information, visit icff.com.

AIA Convention 2016
Philadelphia
May 19–21, 2016
Kevin Spacey and Rem Koolhaas are among the keynote speakers lined up for this year’s gathering at the Pennsylvania Convention Center. More than 500 sessions—including some for CEU credit—will be offered to participating architects and designers. For more information, visit convention.aia.org.

Architectural Record Innovation Conference
San Francisco
June 8, 2016
Innovative architecture requires expanding the discipline’s boundaries through design and technology. The spring edition of Architectural Record’s conference—taking place at the Mission Bay Conference Center—brings together key figures who have generated a range of imaginative solutions for the built world. From materials experts to architects practicing outside the field to principals of large firms, the event’s speakers will represent a variety of approaches to problem solving in a rapidly changing world. For more information, visit arinnovationconference.com.
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At the 2016 editions of IBS and KBIS, smart monitoring devices took center stage.

THE BELLWETHERS OF the residential design market, the annual International Builders’ Show (IBS) and Kitchen and Bath Industry Show (KBIS), reflect aesthetic trends and the health of the economy. Nearly 2,000 exhibitors participated at this year’s joint event, held January 19 to 21 at the Las Vegas Convention Center, with introductions pointing to a continued appetite for connected home technology and outdoor living spaces.

Products with new and more intelligent uses of sensors pervaded the shows. Halo Smart Labs’ Halo and Halo+ smoke and carbon monoxide detectors, for example, employ five sensors—including ones for heat and humidity—which distinguish between a real fire and a false alarm; the sensors also determine the fire’s speed and size. When a unit is linked through the Internet and/or a home automation system such as iControl and Iris, it can alert users to the presence of smoke or carbon monoxide via voice commands, LED lights, and even smartphone messages. Halo+ includes a radio chip to rebroadcast National Weather Service bulletins, a potential lifesaver for those in earthquake- or tornado-prone areas.

Smart home technology can also help conserve energy and water. Haiku Home’s Designer Series LED light fixtures not only power off when a person leaves a room but also automatically dim in bright sunlight. The disc-shaped Delta Leak Detection device sits on the floor near common leak points.

If the unit, created by Delta Faucets in conjunction with iDevices, senses water underneath or over it, it will send an automatic alert to the homeowner or building manager’s smartphone or tablet. Tapping into the demand for well-appointed outdoor living spaces, Progress Lighting and Kichler expanded their exterior options, adding LED lanterns, chandeliers, and sconces. The fiberglass-and-concrete Artisan fire bowls by Eldorado Outdoor resemble stone and are larger (up to 48 inches in diameter) and cleaner (thanks to the 12-inch gas- or propane-powered fire ring) to use than the prior options. NuTone’s Haven Backyard Lighting & Mosquito Repellent System is a nature lovers’ dream: Its LED landscape fixtures fitted with cartridges...
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Although off-whites and warm neutrals remained popular for surfacing materials, textures and linear patterns popped up in a handful of booths. Cambria USA developed the boldly striated Oakmoor and Roxwell natural-quartz surfaces in response to architects’ requests, while the Maven tile collection—one of three that interior designer Kelly Wearstler created for Ann Sacks—features lively hand-drawn squiggles and dots. Walker Zanger’s 3-D Kaza Concrete tiles add sculptural interest to interior and exterior walls.

In plumbing, industrial- and pro-style kitchen faucets with pull-down wands trended. Several companies, including Brizo, showed matte-black finishes; brass was another popular option, as seen at Kohler and Rohl Faucets. Niagara also reached a new best in water efficiency with its Stealth ultra-high-efficiency dual-flush toilet, which uses 0.5/0.95 gallons per flush—nearly half the industry standard.
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Finally, there was CertainTeed Gypsum’s Habito, a potential game changer in drywall. Eliminating the need to use anchors or nail into studs when hanging objects, the $\frac{3}{8}$-inch-thick panels can support 33 pounds per screw (or 30 pounds per nail), allowing the user to mount over 120 pounds of cabinetry or electronics with a traditional four-screw bracket system. To demonstrate Habito’s strength, the company even invited show attendees to scale a wall of the material studded with footholds secured by single nails.

And that, in short, was the beauty of this year’s IBS and KBIS. Just when you thought there was nothing left to see or reinvent, both shows proved you wrong.—Alice Liao
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DAVID ROCKWELL got his start in lighting, working as an assistant in a theater; he later spent time as a lighting consultant. But while the interplay of illumination and shadow has always occupied a central role in his interiors, stage sets, and hospitality projects, Rockwell Group tried only once to make a collection of commercial fixtures—back in 2007, for Italian manufacturer Leucos.

Last year, while specifying lights for upcoming jobs, Rockwell and his team had a flash of inspiration. Since the product development cycle for lighting wasn’t syncing with their projects’ timing, why not devise their own series of lights that they could have on hand to customize as needed, and perhaps also sell to a larger market?

Enter Rich Brilliant Willing, a trio of designers who manufacture and assemble contract fixtures in their Brooklyn, New York, workshop. RBW had approached Rockwell Group with the idea of collaborating on lighting “that would be closer to real-life use... something an architect would specify,” says RBW cofounder Theo Richardson. Rockwell took the designers up on their offer, creating a modular metal and glass “kit of parts that could be put together in different geometries,” explains Rockwell Group principal and studio leader Barry Richards, who oversaw the research. Architectural necklaces served as template for the designs, which RBW rapid-prototyped, making suggestions on ways to reduce the pieces’ tooling and assembly costs.

The resulting David Rockwell with Rich Brilliant Willing collection features two sconces and four variants of a chandelier/pendant that can hang individually or together in various patterns. RBW will manufacture the fixtures, which will launch in mid-May and ship in late summer, merchandising them through its website and network of showrooms. The arrangement is ideal for Rockwell Group, according to Richards. “We’ll showcase and promote the pieces,” he says, “but we’re designers, not sellers.”

Partners in Design
BY JULIE TARASKA
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