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POPPIN’S QT PRIVACY LOUNGE CHAIR
PAGE 12

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SNAP 82
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FUN TIMES
A sensory-play tunnel (shown) from Landscape Structures suits children of every ability. Poppin’s QT Privacy Lounge Chair (above) is a semi-private cocoon for quiet studying. Art of Board turns reclaimed skateboard wood into an artisan tile wallcovering (left).
The Learning Channel

**THE BEST K-12 SCHOOLS** are energy-efficient, healthy, and connected to their communities. That’s understandable, given that classrooms are where our most precious and vulnerable citizens spend the bulk of their days. Even for preschool environments, architects specializing in education are being asked for buildings which don’t just use non-toxic materials and reduce energy costs, but also serve to teach students about sustainability.

In this issue, for example, we chronicle a net-zero energy school in Arlington, Virginia, designed by the firm **VMDO**, where the rooftop performs double duty as a science lab, giving students hands-on access to real solar panels (page 48). Meanwhile, a private pre-K in Brooklyn, places such a high value on social spaces, that the parent-run cooperative asked BFDO Architects and 4Mativ Design for a floor plan to help with that critical task (page 20).

To deepen our understanding of ways that building materials are being integrated into curriculums, we turned to expert JoAnn Hindmarsh Wilcox of Mahlum Architects, an honoree of the AIA’s Committee on Architecture for Education every year from 2014 through 2017 (page 68). Her insights span trends from the growing use of glass partitions to the increase in out-of-school learning spaces where our most precious and irreplaceable, given that classrooms are sustainable, connected to their communities.

Lastly, a glimpse of our education-themed New Products (pages 12 and 13) offers a lesson in the multipurpose furnishings needed for these agile learning spaces. Now, there’s something we’d like to share with the rest of the class.

**KELLY L. BEAMON Editor**
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A Palm Springs Show Explores Lina Bo Bardi’s Crossover Appeal

IN THE WAKE of a limited reissue of her 1951 Bardi’s Bowl Chair two years ago by Italian furniture company Arper and a recent traveling exhibit about her, the late Italian-Brazilian architect Lina Bo Bardi is again in the spotlight in the show Albert Frey and Lina Bo Bardi: A Search for Living Architecture at the Palm Springs Art Museum.

As part of a broader Getty-led initiative to examine artistic exchanges between Latin America and Los Angeles, the show displays houses, 3D models, and objects by the two architects to highlight a cross-pollination of ideas in their work. They never met but were loosely connected when Bo Bardi translated Frey’s article for Domus. Curators adopted that magazine article’s title for the show, which runs through January 7, 2018. — E.K. Hudson

Beazley Designs Award Nominees Are On Display

THE PUBLIC CAN NOW weigh in on this year’s Beazley Designs award winner. Works by finalists are on display at London’s Design Museum, and visitors can cast votes for the winning entry online. Nominated works span everything from objects to fashion to architecture and graphics. The nominees range from big firms such as Adjaye Associates to upstarts such as Dansbanan, a trio of women architects whose plan to build free public dance spaces for girls (they feature the firm’s site-specific wireless speakers, which users can activate with smartphones) is shortlisted. The exhibition runs until January 18th when the overall winner will be announced. — EKH

The Headquarters That LEGO Built

LEGO HOUSE, the toymaker’s Billund, Denmark, “experience center” has opened. The 122,000-square-foot building, which looks like 21 giant stacked LEGO bricks, houses a store; three restaurants; four playground spaces; conference facilities; and exhibit space. For LEGO fans, the structure designed by Bjarke Ingels Group (BIG Architects) also bears a satisfying resemblance to a 774-piece model kit the company brought to market when the building opened. “For me, the LEGO brick embodies the notion of systematic creativity,” said architect Bjarke Ingels, BIG’s founding partner. — EKH

BRICK HOUSE
Volumes in BIG Architects’ new headquarters for LEGO echo the toymaker’s hallmark brick shapes.
“It’s a fun material because it’s very flexible to design with and doesn’t drive costs up.”

Joe Buehler, AIA, LEED AP BD+C, TEAM A

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Charcoal - Energy Star - Cool Color

Moving Everest Charter School, Chicago, IL
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Architect: Team A
General contractor: Novak
Installing contractor: WBR Roofing
Profiles: 7/8-in. corrugated, 7/8-in. perforated
Color: Charcoal

See us at METALCON - booth 1431
These furnishings add versatility in educational settings.

1. **CASCADE TWO-SIDED WHITEBOARD**
   - **Manufacturer:** Smith System
   - **Performance:** This cart holds two columns of back-to-back tray storage and two erasable, magnetic whiteboards. The 70” tall, mobile unit is welded together from durable 18-gauge steel, available in 18 finishes.
   - **Price Range:** $$$
   - **Applications:** Ideal for classrooms where storage and wall space are limited.
   - **SmithSystem.com** (SNAP #200)

2. **RECHARGE**
   - **Manufacturer:** Allsteel
   - **Performance:** Multiple benches (each 98” long with space for two) can be positioned end-to-end or linked via seat-height connector tables in this seating by designer Chris Adamick.
   - **Price Range:** $$$
   - **Applications:** The furniture line features integrated three-prong USB ports, making them well-suited to educational environments from universities to libraries.
   - **AllsteelOffice.com** (SNAP #201)

3. **RICE GRASS + RADIUS PANELS**
   - **Manufacturer:** Community Playthings
   - **Performance:** These 36 ¾” x 24” PETG partitions, framed in solid maple with a clear nontoxic finish, attach to the company’s shelves, arches, and gates to define spaces.
   - **Price Range:** $$$
   - **Applications:** The rounded-edge panels offer a dividing system that allows for supervision, while also affording separation of space for specific uses, such as naptime.
   - **CommunityPlaythings.com** (SNAP #202)

4. **QT PRIVACY LOUNGE SEAT**
   - **Manufacturer:** Poppin
   - **Performance:** Upholstered in 100% contract-grade woven polyester fabric, this 21” w x 34” h seat can serve as a privacy booth, available in seven colors.
   - **Price Range:** $$$
   - **Applications:** Sturdy commercial-grade fabric and fiber-fill upholstery are designed to deflect sound waves and encourage focus. A convenient electrical charging port at its base makes it practical for a student lounge or any public space.
   - **Poppin.com** (SNAP #203)
5. PROSPECT SOLO SPACE
MANUFACTURER: Herman Miller
PERFORMANCE: This aluminum enclosure is offered in three configurations (two, three and four panels) measuring 54” tall and 5’ 6” in diameter, and is lined in sound-absorbing acoustic pads that can be used as tack boards.
PRICE RANGE: $-$-$ $$ APPLICATIONS: For schools and work spaces, this unit offers semi-private space.
HERMANMILLER.COM (SNAP #204)

6. RECLAIMED SKATEBOARD WOOD TILE
MANUFACTURER: Art of Board
PERFORMANCE: Recycled skateboards are used to make these 7-ply maplewood tiles. They can be solid-mesh-mounted by the square foot and installed with standard mastic and sanded grout.
PRICE RANGE: $$ APPLICATIONS: This colorful tile wallcovering is ideal for learning centers or a library (shown)—a visual lesson in sustainability.
ARTOFBOARD.COM (SNAP #205)

7. NENDO PAPER TORCH
MANUFACTURER: Takeo (paper manufacturer) and AgIC (electronic printing)
PERFORMANCE: This interactive flashlight is made using AgIC technology that prints electronic circuit boards onto paper by Takeo. It works with two lithium coin batteries.
PRICE RANGE: $-$-$ $$ APPLICATIONS: Sold in batches of 50, this light is perfect for maker environments and schools where lessons are hands-on.
PLUSSTYLE.JP/DOT/ PROJECT/PAPERTOUCH (SNAP #206)

8. BROOKLYN AC LED TASK LAMP
MANUFACTURER: LUX LED Lighting
PERFORMANCE: This touch-activated elongated desk lamp has a color temp of 3000K, two integrated universal sockets, two USB ports, three brightness levels, and weight-based stability.
PRICE RANGE: $ APPLICATIONS: Developed for contract and residential use, the lamp comes in black slate and brushed aluminum.
LUXLEDLIGHTS.COM (SNAP #207)
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Case Study: School Design

Head of the Class

Challange: Transform a ’70s-era charter school into a state-of-the-art learning center.

Solution: Build an energy-efficient replacement with a profile and materials that reference the school’s folks-y roots and land stewardship.

Aspen Community School
Woody Creek, Colorado

The Aspen Community School’s sprawling 25-acre campus occupies a spectacular piece of property with 360-degree views of Roaring Fork Valley, one of the most affluent regions in Colorado nestled among rolling hills.

In 2014, Scott Lindenau, FAIA, design principal for Studio B Architecture + Interiors in Aspen and Boulder was tasked with giving the K-8 charter school a complete overhaul. The firm won an $11.5-million contract to build a site that included classrooms, a community building, and a gymnasium.

Blending In

Studio B Architecture designed the one-story structure (above) to be partly buried to minimize its profile against the landscape. A material palette of wood and natural finishes indoors echoes the surrounding countryside (right).

“One of the biggest challenges was the existing campus built in the ’70s by hippie parents who loved the community,” says Lindenau. “As the school evolved, it became more important to have a new facility because nothing was up to code.”

The students, teachers, and administrators wanted the new design to reflect the heart of the original school, which was very rooted in the landscape and in the arts.

“The solution was to design a school that uses environmentally friendly materials like cedar and Douglas fir on the walls and ceilings,” he says. “Wood has a certain warmth to it and we didn’t want to lose that.”

The site itself evoked feelings of nostalgia. For that reason, the architects came up with a building profile that would leave views
of the landscape unobstructed—a one-story structure that’s partially buried to make it very low profile. “The school almost becomes a land form so that it doesn’t interrupt the skyline and the stunning views from the valley,” Lindenau says.

Meanwhile, whereas the old building was dark with small windows, the new one enjoys natural light and improved ventilation as a result of generous glazing.

“We used Kalwall in the classrooms and [in the clerestory windows] of the roof lines to build light into the interiors,” he says. The team also installed higher ceilings and taller windows in classrooms to circulate fresh air.

To make up for the fact that there are very few trees on site, Studio B wrapped the west elevation with a 12-foot-long trellised walkway that filters natural light at sunset.

To add energy efficiency where the ’70s-era building previously had none (and lower the school’s building maintenance costs), the architects employed lots of LEDs and low-E glass that lets in light, but limits UV rays, among other solutions. Meanwhile, generous glazing on the west and south elevations is a highly efficient way to let light into the interior. In everything, the team aimed for LEED-certified performance, using less energy and water, and reducing greenhouse gas emissions.

The materials palette inside satisfied a simple equation: durable, eco-friendly, and fun. One example: wall panels of Homasote, a 98-percent-recycled fiberboard that is soft enough to serve as a bulletin board where kids can pin up drawings. In some cases, the panels also clad the ceiling (as in the music room) because they’re dense enough to absorb sound. The 8,000-square-foot gym is built from glued laminated timber, which Lindenau describes as stronger than steel and offers more stiffness than traditional lumber. Studio B also chose reclaimed carpet tiles to cover most of the floors.

At the heart of the school is a community room-cum-amphitheater (above) occupies space at the center of the floorplan. Bleachers built from cement board conceal storage and offer a place to socialize and practice the school’s stage productions.

The firm also wanted a no-maintenance exterior, so they selected weathered cedar siding outside the K–4 classrooms. “We’re just going to let that go natural,” Lindenau says. On the exterior of the administration wing, his team installed cement board panels that are mold- and moisture-resistant, and throughout the building they used an aluminum-clad window system, which doesn’t need frequent painting or staining.

“We preserved the school’s history, while bringing it into the 21st century,” he says.
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MAPLE STREET SCHOOL  
BROOKLYN, NEW YORK

Social Scene

PROBLEM: Turn blank space into a lively, social hub for Brooklyn preschoolers.

SOLUTION: Direct the flow of traffic from adjacent classrooms and the entry to a central area with an open kitchen modeled after New York food trucks.

THE TWO-, THREE- AND FOUR-YEAR-OLDS enrolled at Maple Street School in Brooklyn are expected to develop more than cognitive and fine motor skills. Parents at the cooperatively owned preschool also want their children to learn positive ways to socialize.

Before the chance to expand in a second location one block away, the school drove home these social lessons entirely with meal routines. But a new second-floor location in a LEED-certified, mixed-use building by Marvel Architects offered the chance to also enlist design as a teaching tool. Maple Street asked Barker Freeman Design Office (BFDO) and 4Mativ Design Studio how the space could promote their social program. Specifically, it needed to support frequent “café time”—social gatherings centered on snacks.

“We had all these conversations about this café activity and started brainstorming about how the kitchen could be configured to add an element of fun,” says BFDO principal Alexandra Barker.

Barker’s team responded with an agile plan for the 3,300-square-foot space: three interconnected classrooms arranged around a central open area containing cubbies, play space, and a kitchen with a twist. “All the children pass through this communal gathering space to store their belongings before entering classrooms. So, a kitchen in the center is a natural gathering point,” Barker says. To make it fun, the team brainstormed a few social settings Brooklyn kids could identify with and came up with one: “Food trucks are familiar places for informal gathering in Brooklyn,” Barker says.

Having made that connection, the architects built the classroom equivalent—complete with a galley kitchen, service window, Plexiglass menu boards, and a drop-down counter that sits two feet high, the perfect height for tiny customers to pull up to (diner-style) for snacks. The compact kitchen is enclosed on either side by locking doors for the children’s safety, but remains open via the service window overlooking the comings and goings in the shared common space.

With café time handled, BFDO turned to the rest of the school’s wishlist of natural

BUSY BEES
With its doors open, one of three classrooms (top, left) feels joined to the central room where children enjoy café time. In the common space (above) also used for drop-off and pickup, architects created a playful peg wall to occupy students while parents sign in.
light, views, and outdoor play space.

Compared with the first street-level location, the new second-floor site could accommodate a row of glass window doors with transoms to take advantage of tree-lined views and ample light along the northeast wall where two of the three classrooms sit. Oval apertures at child and adult heights punctuate sliding pocket doors that can partition the classrooms from each other—and from the shared space—or roll back to combine the rooms. The material palette inside is simple, spare, and appropriate—maple flooring, doors, and furnishings.

Roof access allowed for an outdoor classroom and play area with rubber tiles underfoot and a combination of cedar and perforated aluminum safety fencing.

Since pre-k bathrooms are public spaces where teachers passively supervise potty-training, architects envisioned another way design could help: They enclosed them in blue-tiled walls that stop well below the ceiling and have a pass-through cut out over the lav, allowing a partial view inside and use of the sinks from the classroom-facing side of the wall.

SEE AND BE SEEN
Passive supervision is a key feature of the potty-training bathrooms with cutouts over sinks (above) and the kitchen’s service window (top right). The rooftop play area’s rubber tiles make up a pixelated graphic of islands in water (right).
If it looks too good to be true

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**SUNSHADES, ZIP LINES**, and roller massages are words one might associate with resorts or cruise ships, but these actually describe an inclusive playground in Woodbury, Minnesota. Madison’s Place, named for a child lost to spinal atrophy, was a passion project for her mother, Dana Millington, who raised $830,000 over 12 years to build it.

Noticing that the local playgrounds were inaccessible to disabled children—and that she couldn’t even push Madison’s wheelchair onto one due to sandy ground—Millington consulted with play specialists and with manufacturer **Landscape Structures** to plan a sensory-play experience suited to children ages five to 12, of every ability.

The manufacturer’s bucket seat zip line, called the ZipKrooz, offers a 50-foot thrill ride while the Xylofun Panel beckons budding musicians to play its bars. Sight- and hearing-impaired children were considered, too: There’s a learning wall with braille and slides that don’t generate static (which can interfere with cochlear implants and hearing aids). Oodle swings accommodate four to six children at once and are specially designed for transfer from a wheelchair or walker. And Roller Tables feature the manufacturer’s Tender Tuff-coated steel rollers and arched overhead handrails to help kids slide across its surface, affording them sensory stimulation via deep-muscle pressure. Finally, 4-inch-thick rubber flooring and a series of ramps and connecting decks ensure safety and easy access for children—whether on feet or on wheels.—Sheila Kim

**LEARNING FOR ALL**
Madison’s Place in Minnesota features inclusive-play elements from Landscape Structures to ensure that children of every ability can enjoy it (top). A custom light tunnel punched with stars (above) offers a multi-sensory experience.
OODLE
MANUFACTURER: Smith System
PERFORMANCE: Aiming to promote “active” sitting, this stool comprises three stacking and locking components that make the seat stationary or a balance ball of sorts with 10 degrees of multidirectional wiggle. Molded from high-density polypropylene, the 17”-dia units are offered in five colors.
PRICE RANGE: $$$
APPLICATIONS: Ideal for K–12 learning and recreational environments.
SMITHSYSTEM.COM
(SNAP #213)

ELI
MANUFACTURER: Izzy+
PERFORMANCE: The button-activated sit-to-stand desk comes in five standard and custom base colors, with eight top shapes ranging from rectangular and trapezoidal to arced and six-sided. Surfaces are laminate, whiteboard, or veneer. Mounted dry-erase screen options are also available.
PRICE RANGE: $$$
APPLICATIONS: Not just for workplaces, this height-adjustable modular desk is ideal for classrooms and other learning centers where activities and programming can change on a dime.
IZZYPLUS.COM
(SNAP #214)

VELOSTIRRUPS
MANUFACTURER: Quartertwenty
PERFORMANCE: Providing more than 10 inches of clearance from a wall, this shelf doubles as a bike rack or, with an added dowel rod, a clothing rail. Mounting hardware is available for masonry, drywall, and stud installation. Shelf material choices include maple plywood, walnut, and white oak.
PRICE RANGE: $$$$+
APPLICATIONS: This minimalist, multipurpose bracket system is well suited to residential settings, workplaces, and dormitory rooms.
QTR2O.COM
(SNAP #215)

ULTRA SPEC SCUFF-X
MANUFACTURER: Benjamin Moore
PERFORMANCE: Offering excellent scuff resistance, this latex paint is a one-component product. In other words, it doesn’t require premixing with a second specialty product, as do other scuff coatings, ultimately saving time and money. It’s low-VOC and can withstand repeated cleaning without fading.
PRICE RANGE: $$$$+
APPLICATIONS: The paint is ideal for high-traffic areas in schools such as hallways, stairwells, gymnasiuims, locker rooms, and bathrooms, but also for many other types of commercial settings.
BENJAMINMOORE.COM
(SNAP #216)

Divide and Conquer

WHEN TRINITY EPISCOPAL SCHOOL, a private institution in New Orleans for pre-K through eighth grade, looked for a solution to accommodate different subjects, activities, and class sizes within two of its classrooms, it turned to Tudelü. Founded three years ago, Tudelü developed motorized retractable walls to help create space division and visual or acoustical privacy within larger, open areas—but with a more aesthetically pleasing, minimalist appearance radically different from those old beige accordion walls of yesteryear.

Working with the school heads, Tudelü fabricated a custom 20-foot-wide wall that separates English and social studies classes when lowered. Faculty can easily operate a key switch to retract the wall into housing that’s concealed within the ceiling for times when the space hosts larger lectures. Both sides of the wall sport graphics of full world maps that are at once both educational and attractive.

All of Tudelü product lines are custom built to fit individual spaces and meet unique needs. Its single and double mass-loaded vinyl walls (which have an STC rating of 31 and 46, respectively) are available in almost any solid color, more than 30 patterns, or a personalized graphic such as artwork, a photo, or logo. Providing even more sound absorption is a felt option in a choice of 31 solid colors. Regardless of the material finish, all Tudelü walls are zippered into the frame, which enables easy removal and replacement should the client get tired of the graphic or color, or if any unrepairable damage occurs. So, if Trinity decides to use these spaces to house chemistry and geometry classes instead, it will be simple to commission and install a new wall that functions as a periodic chart on one side and a polygon guide on the other.—SK

INNOVATIVE WALLS
From top: A New Orleans school incorporated an acoustical wall that retracts into the ceiling to divide classroom space as needed. When closed, the wall features a custom map mural used for social studies classes.
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Micropref Acousticore 519 & 525
Acoustical Panels

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Micropref Acousticore 519 & 525 wall and ceiling panels are unmatched in performance, discrete aesthetics, and structural integrity, and represent an entirely new class of sound-absorbent panels. Engineered to offer superior acoustic benefits, the panels offer seamless integration of acoustic materials into all types of projects.

The core of every panel is sintered resin-reinforced glass wool Soundply™, and several different materials are available, such as wood veneer, vinyl, high pressure laminate, and even painted interior surfaces.

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- Low reactivity to temperature and humidity change
- Fire retardant – ASTM E-84 Class A
- LEED points MR 4.1, MR 4.2 MR 6, EQ 4.4 available
- No added formaldehyde in fabrication
- Custom veneer species, stains and finishes, veneer cutting, & assembly available
Siding Show

**DESIGNED BY** Manhattan-based Luca Andrisani Architects, this 10-unit residential building in Brooklyn is clad in black insulated Galvalume panels by Kingspan, and wrapped in a dynamic screen of copper panels by Hi-Tech Metals.

Set in a clean stack bond pattern, the Galvalume panels vary in size; their height measures either 24 inches or 30 inches and lengths range from 2 to 13 feet. Showing through the square hole punches that perforate screens, their dark color contrasts the subtle gleam of the weathering copper.

“Our primary design move was to clean up the facade by presenting a single plane to the street, like the neighboring brownstone,” says Andrisani. While copper was a logical aesthetic choice, as it effectively mimics the warm coloring of the adjacent masonry building, it also proved to be the best selection in terms of material performance: It is durable, compatible with other building components, and produces minimal run-off.

The screen is composed of 1/8-inch-thick panels of metal, pierced to create an interplay of shadow and light. The facade mixes fixed and operable panels. Located in front of the windows, bi-fold shutters that pivot and slide along trolley rails allow residents to control the view, as well as the amount of light and air entering an apartment. Andrisani says, “The facade is almost alive—it’s always dynamic and changing.” It’s with this quality in mind that the building was given its name: Aperture 538. —Leslie Clagett

**WEATHERPROOFING**
Architects chose a facade of metal panels built to weather well for long-lasting performance.
Mass Appeal

**WITH THIS RESIDENTIAL INFILL PROJECT,** architects Rossetti + Wyss confronted the issue of whether to contrast or conform to the site of this residence. It was flanked by a pair of very rustic farm buildings. The architects addressed the dilemma with a design somewhere between modern and the vernacular by wrapping the new gable-roofed home in dark gray Carat R fiber-cement panels by Swisspearl. Its roof and walls almost appear to be a single element.

The panels are suitable for use on roofs with a minimum pitch of about 11 percent (six degrees), and are coated to resist UV light and weathering. In this project, snow guards are installed on the roof, and contribute a small linear dimensional accent to the plane. Window and door openings were proportioned with regard to the two standard sizes of the panels, 10 feet x 4 feet and 8 feet x 4 feet. And a slight reveal between wall panels is primarily an orthogonal pattern; in places where it angles upwards, it is a reflection of the house’s interior spaces.

To create a subtle variety in the facade, Rossetti + Wyss opted to manually grind the surface of each unit, adding a custom texture to the cladding. As the material is integrally colored, this treatment did not alter the hue of the walls or roof; the structure’s elemental form remains the focus of the design. — LC

**HIGHLINE WALL PANEL**

**MANUFACTURER:** Petersen Aluminum  
**PERFORMANCE:** LEED eligible; some of the 45 available colors are rated by the Cool Roof Rating Council and meet Energy Star requirements. Compliant with AAMA, ASTM, and Florida codes. 30-year finish warranty.

**PRICE RANGE:** $$$  
**APPLICATIONS:** Rib patterns in the 1 3/8"-deep panels give a striking appearance to commercial and residential structures. Available in .032, .040, and .050 aluminum and 22 and 24 gauge steel, the panels can be installed vertically or horizontally.

**PAC-CLAD.COM**  
(SNAP #217)

**CORRUGATED TRUTEN A606**

**MANUFACTURER:** Bridger Steel  
**PERFORMANCE:** 40-year warranty against chalking and fading.

**PRICE RANGE:** $$  
**APPLICATIONS:** With a rustic, Corten-like finish and a true radius corrugated profile, these panels add character to walls and roofs. 2 1/2" wide, rib height 3/4" at 2 1/2" centers; available in lengths from 3’ to 30’. Custom colors available.

**BRIDGERSTEEL.COM**  
(SNAP #218)

**CUMARU RAINDSCREEN SIDING**

**MANUFACTURER:** Advantage Lumber  

**PRICE RANGE:** $$  
**APPLICATIONS:** Installed with concealed fasteners, this siding offers a clean, contemporary look to exterior walls. Available in five species: cumaru, garapa, ipe, massaranduba, and tigerwood.

**ADVANTAGELUMBER.COM**  
(SNAP #219)

**CENTURA SHINGLE**

**MANUFACTURER:** Isaiah Industries  
**PERFORMANCE:** Florida Building Code approved; UL-rated for hail, wind, and fire. 35% minimum recycled steel content; fully recyclable. Lifetime limited warranty, 40-year transferable warranty.

**PRICE RANGE:** $$  
**APPLICATIONS:** Suitable for wall and roof applications, this 29-gauge, G90 galvanized steel shingle has an integrated nail flange to speed and simplify installation. The interlocking shingle is offered in three textures and 15 colors.

**ISAIAHINDUSTRIES.COM**  
(SNAP #220)

Mass Appeal

**WITH THIS RESIDENTIAL INFILL PROJECT,** architects Rossetti + Wyss confronted the issue of whether to contrast or conform to the site of this residence. It was flanked by a pair of very rustic farm buildings. The architects addressed the dilemma with a design somewhere between modern and the vernacular by wrapping the new gable-roofed home in dark gray Carat R fiber-cement panels by Swisspearl. Its roof and walls almost appear to be a single element.

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Score for Safety

FOR QUEBEC’s Stade de Soccer de Montréal, an indoor sports facility, Montreal-based architecture firm Saucier + Perrotte focused on keeping the design minimal and the light natural—a simple plan that won’t interfere with play. The same can be said of their solution for a partition built to separate the playing field from fans in the bleachers and from a high-traffic corridor to the locker room. The barrier is a sturdy but unobtrusive mesh wall that filters natural light into the hallway, stops balls, and allows players entering the field to see the space and the fans ahead of them, says Trevor Davies, project architect. The transparent divider is comprised of four sliding wire mesh doors and a guardrail, all from material frequently specified as railing infill. In this case, the 4,650 square feet of Banker Wire M12Z-17 mesh provided safety, daylighting, and a clear view of the playing field. Angling the barrier also made it feel more like safety netting than a wall. “Instead of being perpendicular to the floor, they’re tilted slightly at five degrees,” says Leslie Lok, a Saucier + Perrotte associate. Despite the softer look, the mesh is robust, thanks to individual wires, which are crimped prior to being woven on a loom. In addition to the security that comes from physically separating the field from areas around it, the fencing’s edges make it a friendly choice for the type of audience-to-player interaction which occurs at games, says Harrison Horan, Banker Wire vice president. —Ashleigh VanHouten
**Up and Away**

**ALONGSIDE THE SKYLIGHT** on the roof of the San Francisco International Airport is a 40-foot mounted retractable rolling aluminum stair. Unseen by most, its design is nevertheless important to the airport’s safety. To maintain and clean the skylight, staff need safe, easy access. The solution was a custom-built ladder, which can slide along the length of the skylight and enable uniform (and reliable) access for cleaners.

Harsh weather made a durable finish critical. The ladder’s manufacturer, O’Keeffe’s, has developed such site-specific custom designs for more than 75 years. (They were among the first to make a deeply serrated square rung for improved foot traction, for instance.) The fact that their ladders are also made from non-spark, high-strength aluminum for a lighter structure with a better strength-to-weight ratio above the skylight was a plus for specifiers. So was the fact that it requires less maintenance than steel. “The airport is near the bay and exposed to wind, water, and salt,” says O’Keeffe’s spokesperson Diana San Diego. “Our product is rust-proof and resists corrosion.”—AVH
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Sound Decisions

WHEN THE AMERICAN SOCIETY of Interior Designers (ASID) set out to develop its new 8,500-square-foot headquarters in Washington, D.C., controlling noise was as important to the new office as the layout. ASID called on a leading workplace expert, Perkins+Will, to help it craft an efficient and forward-looking office. “ASID knew, as an organization whose mission is to promote the importance of the interior design profession, that its space should operate as a living laboratory where innovative approaches to wellness, sustainability, and workplace could be tested,” says David Cordell, a Perkins+Will associate principal on the project team.

Noise-control strategies were among the attributes put to the test as acoustics can impact occupant comfort and productivity—a key factor in the WELL Building Standard, which ASID was striving for certification in. The team devised a plan that progresses from more public and group-oriented spaces at the front to a series of work zones toward the back, and the latter transitions from communal tables and open-plan workstations to quieter focus and private-huddle rooms deeper within the space. Treatments to aid in sound control differ in various zones depending on the level of privacy required. For instance, the most acoustically isolated spaces, the huddle rooms, incorporate Eggers Industries solid-core wood doors with Zero International gaskets and drop seals. Furthermore, Perkins+Will boosted speech privacy by eliminating ducts, which can carry sound, between these rooms, and using sound masking in the corridor just outside. Throughout the rest of the spaces, sound is absorbed by upholstered wall panels, Shaw Contract and Interface carpet-tile flooring, and Armstrong ceiling tiles with NRC ratings from .80 to .95.

One need only look at the project’s LEED and WELL certifications to see that these strategies, along with the many others implemented, are effective: The rating systems are evidence- and performance-based, and ASID’s new headquarters is, it was announced in June, the first project in the world to achieve Platinum-level certifications for both.—Sheila Kim
Hush Modes

**USING TEXTILES TO DAMPEN SOUND** is nothing new, but up until the last several years, acoustical fabrics were traditionally opaque and heavy in appearance, relegating them mostly to wall, ceiling, and divider applications. Then in 2011, textile extraordinaire **Annette Douglas** changed the game by inventing the first translucent fabric with acoustical properties, thus opening the floodgates for designers to experiment with noise-controlling, light-transmitting drapery. Now in 2017, a handful of major contract fabric mills have built on Douglas’s breakthrough research to offer acoustical sheers in a wider range of colors, patterns, and openness.

A company that embraced this discovery early on, **Carnegie** has to date released eight semi-transparent, sound-absorbing window coverings—from Alphacoustic to Zetaacoustic—by the **Creation Baumann** brand. Constructed with 100 percent **Trevira CS polyester**, the textile line boasts NRC ratings from .25 to .60 depending on the style and how it’s installed. Even more impressive, its Reflectacoustic not only allows light transmittance while absorbing sound, it also reduces solar heat gain.

Another brand making waves in this arena is **Designtex**, whose acoustic sheers have similar properties and appearance as Carnegie’s, with the exception of **Glace**, which introduces a geometric pattern. Composed of 94 percent **Trevira CS polyester** and 6 percent polyester, it sports a tone-on-tone grid of large polka dots in five neutral colorways. And **Wolf-Gordon**’s foray into acoustic sheers brings everything full circle: its three curtain fabrics produced by **Vescom** are blended of Trevira CS polyester and polymer, have an NRC rating of .50 or .60, and were designed by Annette Douglas herself, the original inventor.—SK

**TOPO TILES**

**MANUFACTURER:** Kirei

**PERFORMANCE:** Part of Kirei’s EchoPanel series, Topo Tiles are made of felt that contains at least 60% recycled PET plastic and boasts an NRC rating of up to .85.

**PRICE RANGE:** $$$

**APPLICATIONS:** Topo Tiles are modular and come in two different designs—Barcode and Pixel—that create depth on the walls.

KIREIUSA.COM (SNAP #226)

**ECOACUSTIC TIMBER BLADES**

**MANUFACTURER:** Unika Vaev

**PERFORMANCE:** These solid-wood blades are PEFC and low-VOC certified and offer an NRC rating of .70 to 1.00. They can be cut in the field to accommodate sprinkler and other ceiling elements.

**PRICE RANGE:** $$-$$$  

**APPLICATIONS:** Timber ceiling blades are available in five different profiles and in 24”-square or 24”-X-48” formats. The wall series is available in a choice of four blade profiles mounted onto a 1-x-9’ panel backed with black acoustic scrim.

UNIKAVAEV.COM (SNAP #227)

**MULTIFLEX FIBRAL BAFFLES BLACK**

**MANUFACTURER:** Rockfon

**PERFORMANCE:** The baffles are Class A fire rated and composed of Rockfon stone wool, which is Greenguard Gold-certified for low VOCs and cleanable. Each baffle delivers anywhere from 1.9 to 9.5 Sabins.

**PRICE RANGE:** $$

**APPLICATIONS:** With a smooth black surface and three available widths—12, 18, or 24 inches—these baffles are well suited to most light industrial, workplace, museum, and other commercial settings with soaring ceilings.

ROCKFON.COM (SNAP #228)

**ACOUSTIC TILE PLANK**

**MANUFACTURER:** BAUX

**PERFORMANCE:** Composed of the brand’s special blend of wood wool, cement, and water, the product is environmentally friendly, moisture-regulating, fireproof, and low-emitting. Depending on installation, it provides an NRC of .40 to .60.

**PRICE RANGE:** $$$-

**APPLICATIONS:** These modular planks are available in 19 different colors, two dimensions, and can be cut to size as needed in the field, enabling them to be installed on most walls and ceilings.

BAUX.SE (SNAP #225)
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Making Waves

**WHEN ALLFORD HALL MONAGHAN MORRIS (AHMM)** was tapped to design 61–67 Oxford Street, London, the brief was to replace several buildings of disparate architectural styles with a single, seven-story, mixed-use building that could meet the needs of three types of tenants.

To fulfill this brief, the architects designed a wavy glass wall for the exterior that would appear as a single element, but deliver different levels of visual and thermal comfort for the various tenants within.

The simple and effective solution lay in varying the building’s glazing at different points—a fix which is not uncommon, but thoughtfully executed here. Twenty-foot-wide, single-glazed panels wrapping the ground and second levels, for example, allow for maximum visibility into retail spaces. Above, 10-foot-wide double glazing fronts offices; and five-foot bays of double glazing wrap the uppermost floors occupied by one- and three-bedroom duplexes. Bedroom windows had to be inoperable to keep out street noise. The architects balanced that measure with south-facing elevations that have access to a terrace through sliding doors.

Meanwhile, the apartments’ north- and east-facing elevations have floor-to-ceiling window walls to allow natural light into each space. To add a rainscreen without covering up the glazing, architects relegated it to the building’s courtyard-facing side; they’re made out of white terracotta panels and cover the entire elevation on all floors.

Together, these moves helped AHMM deploy the standout profile the retailer needs in this competitive shopping district. Says **AHMM director Simon Allford**, “As you walk past it, the building changes from reflective to solid mass to vitrine.”—Sharon R. Boone
While transmitting 5% of visible light, structural panels have a U value of 0.08/0.45 W/m²K and a solar gain coefficient of 0.04, and a solar gain coefficient of 0.04, making them an ideal choice for schools.

**TRANSLUCENT WALL SYSTEM**
- Manufacturer: Kalwall
- Performance: These 4”-thick structural panels have a U value of 0.08/0.45 W/m²K and a solar gain coefficient of 0.04, while transmitting 5% of visible light.
- Price Range: $5
- Applications: Lightweight and glare-free with superior thermal performance, these panels are durable and are available treated for graffiti/vandal resistance, making them an ideal choice for schools.

**HYBRID ALUMINUM/WPC**
- Manufacturer: Geolam
- Performance: This wood polymer composite is made of recycled aluminum, resin, and wood and contains no chlorine, CFCs, PVCs, formaldehyde glues, or solvents. With an 8:1 ratio of wood to plastic, it’s also three times lighter, four times more stable and eight times more rigid than alternative WPC profiles.
- Price Range: $5
- Applications: Can be bent to different radii and directions, unlike wood, which can only be bent in the direction of the fiber.

**CROSSTRAK SLIDING DOORS**
- Manufacturer: Wausau
- Performance: Tested to withstand high-rise wind loads and achieve ratings up to AAMA AW-100 (Architectural Performance Class) as established by the North American Fenestration Standard. These panels span up to 8” x 10”, feature a rigid aluminum frame 6” deep, insulating glass, and a polyamide thermal barrier for energy efficiency.
- Price Range: $5
- Applications: Ideal for residential balconies. Options are available for use with Juliet balconies and outside-track doors.

**CLAY-TITE WATERPROOFING MEMBRANE**
- Manufacturer: W.R. Meadows
- Performance: Dual-layer waterproofing made of virgin high-density polyethylene, sodium bentonite, and a protective layer of a non-woven polypropylene.
- Price Range: $5
- Applications: Designed for use below grade, the membrane is equally effective in standard applications. Clay-Tite Bentonite can be used in both vertical and horizontal applications.

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**Street Smart**

**THE PLAYFUL PROFILE** of a new mixed-use building in Portland, Ore., has a serious purpose. The site was curved at the southeast corner, and the projecting boxes allowed architects from local firm Works Progress Architecture (W.PA) to build on as much of the awkward footprint as possible without having to curve the facade itself. A resemblance to a honeycomb is also no coincidence, as boxes suggest the activities playing out within each space. “The facade is an articulation of the building’s uses and a result of the site conditions,” says project architect Lauren Page.

Completed in October 2016, the 10-story, 147,000-square-foot structure (tenants include retail, office, and residential clients) was also designed to interpret the look of the surrounding historic warehouses, which have been converted into creative workspaces. Like the maker community that has transformed the district, the new building’s facade is “a collage of framed unique activities,” Page says.

Together, deep and shallow projections define the commercial spaces where interiors are more communal and open. The projections become more dramatic at the top, which is occupied by more intimate residential spaces; the covered balconies for those units jut out the most. Comparatively, the north and south walls are contiguous swaths of Wausau InVision HR and HRX unitized curtainwall. Low-e, insulating glass the color of metal and coated with a polyamide barrier offers a thermal barrier with solar control. The architects had the window walls’ aluminum panels and frames factory-fabricated as units to ensure the intended appearance and simplify their installation.

The building has earned LEED Gold certification through the U.S. Green Building Council. W.PA specified aluminum frames with an average of 74 percent recycled content (Linetec). Matching aluminum panels were supplied by Firestone.

Seasonal opportunities for natural ventilation help reduce tenants’ reliance on HVAC systems. Operable windows offer fresh air, natural light and views. —SRB
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WHY DRI-DESIGN?

Dri-Design Tapered Series Panels provide the unique ability to use light as an added dimension of design. The distinct, multifaceted aluminum façade at the Ventura College Applied Science Center utilizes the tapered panels to give the impression of many shades, though only painted one color. Even with this unique look, Dri-Design’s signature ease of installation and water management system are maintained, and only a single plane of substrate is needed.

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• Not laminated or a composite material, so panels will never delaminate.
• At Dri-Design, we have a strict policy of recycling and creating products that the world can live with.
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DESIGN: Site
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Up and Running
Five Years of Consistent Growth for Manufacturers in the West
BY J. MICHAEL WELTON

FOR MANUFACTURERS IN Arizona, California, and Washington, 2012 was a turning point. Austerity triggered by the recession had begun to ease, and growth and investments began to steadily increase. “In 2012 we noticed an uptick, especially on the commercial side,” says Matt Thomas, marketing manager at NanaWall Systems in Corte Madera, California. “A year later the residential side started falling into place.”

At Seattle-based LightArt, a 3form company, a shift in strategy to add sales staff and a product line to its existing portfolio of custom work brought the company five consecutive years of growth. “We started to build in a simpler and more cost-effective way and made a product line that took off,” says Ryan Smith, president and creative director.

Prospects for manufacturers in Arizona followed suit, but a little later. “It started to turn around about 2013 and 2014, then accelerated at all manufacturing companies across the state,” says David Garafano, executive director of RevAZ, a program of the Arizona Commerce Authority.

LaCantina Doors in San Diego had survived the lean times by redesigning products and establishing new lines. “Immediately after the recession ended we were growing exponentially,” says Lee Maughan, vice president and general manager.

Looking ahead, California’s businesses seem poised for growth. In Red Bluff, Sierra Pacific Windows is expanding by an acquisition. “When we acquired Hurd Windows, we really started building momentum,” says Stu Brown, director of products and services. Other Golden State manufacturers stand to benefit from an incentive related to buying equipment. “We took the sales and use tax down from 7.5 percent to 4.19 percent,” says Sid Voorakkara, deputy director of external affairs for the governor’s office of business and economic development. And legislators have extended the tax break through 2030. The future looks bright.
ARIZONA

Manufacturing output in the Grand Canyon State is $24 BILLION

The percentage its manufacturing sector contributes to the state economy.

SOURCE: ARIZONA EXPORT FACTS, CENTER FOR MANUFACTURING RESEARCH, 2017; AZCENTRAL.COM

CALIFORNIA

More than 30,000 manufacturers are based here, employing more than 1.4 million people.

The Golden State has the world’s sixth largest economy—bigger than the economies of Russia, Italy, India, and Canada.

SOURCE: CALIFORNIA MANUFACTURERS & TECHNOLOGY ASSOCIATION; CALIFORNIA MANUFACTURING TECHNOLOGY CONSULTING; COMMITTEE ON JOBS, ECONOMIC DEVELOPMENT, AND THE ECONOMY

WASHINGTON

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When Arlington Public Schools (APS) in Virginia approached Charlottesville firm VMDO Architects to build a new elementary school for its expanding student population, the goal was a place “that integrated learning with sustainability,” recalls John C. Chadwick, the district’s assistant superintendent of facilities and operations.

VMDO’s design produced an innovative teaching environment, which not only integrates sustainability into the curriculum but also offers the school’s 650 pre-K through 5th-grade students lively, interactive learning and play spaces. The Discovery Elementary School, which opened in 2015, is the largest net-zero-energy school in the country. This year it was the recipient of the AIA Committee on the Environment’s Top Ten award, and designated a Green Ribbon School by the U.S. Department of Education.

The approximately 98,000-square-foot building features a tiered design that is set into a hillside to minimize its scale. Despite its considerable size, exterior building materials (brick, stone, and colored insulated panels and sun shades) appear to harmonize with the surrounding residential neighborhood, and the building’s energy-saving features (among them 1,710 roof-mounted solar panels, a geothermal well field, 100-percent LED lighting, solar orientation and high-thermal-mass exterior walls) all contribute to its low Energy Use Intensity (EUI).

Discovery was designed for an EUI of 23kBtu per square foot, per year—one-third of the energy use of a typical elementary school in the area—but it actually performs at 18, Chadwick says. And while other elementary schools in Arlington each spend about $110,000 a year in energy costs, this one spends about $12,000 annually.

Sunlight is an integral part of the learning experience. A roof canopy with a cedar soffit runs the length of the building, providing shade and light to the interior classrooms. A roof awning with an oculus built into the main entry channels sunlight onto the ground, creating a solar calendar.
of the school's southern (street) side, serving as its “front porch.” A rooftop solar lab enables students to conduct real-time experiments, the data from which can be tracked via the building’s dashboard, which is accessible to anyone with a wireless device. Meanwhile, a part of the roof that extends out over the main entrance with an oculus turns the entry plaza into a solar calendar. A video made by the school on September 22nd of last year shows the oculus tracing the autumnal equinox.

The result of such interactive architecture is that it encourages behavior on the part of students and teachers that fosters sustainability. (Another of the school’s videos offers a time-lapse look at the dashboard during the August 21st solar eclipse.)

The school’s interiors encourage flexibility and informality, with foldable partitions, retractable garage doors, and furnishings that include bean bags, height-adjustable tables and chairs, reading steps, and a two-story slide. The “Hedge,” which encloses and defines the kindergarten’s indoor common space, or “Backyard,” is punctuated with inset semicircular and round nooks for reading, discussion, and hanging out. But perhaps the most intriguing aspect of the school’s design is the way that its ingenious organization and wayfinding reflect the expanding curriculum of each successive grade level.

Wyck Knox, a VMDO principal and the project architect, explains that astronaut John Glenn figured prominently in the concept. Glenn lived next door to the school’s site when he was the first American to orbit the earth in 1962; he became the oldest person to fly in space when he was on the crew of the space shuttle Discovery in 1998. Chosen by the students, the school’s name is a partial tribute to the space pioneer and U.S. senator. But just as important, Knox adds, is that Glenn was an inspiration for the school’s “expanding world” concept: Students start out in the first-floor kindergarten rooms as Backyard Adventurers, with graphics that refer to trees and animals (nooks are named “Groundhog Burrow” or “Eagle Aerie”). Then, in the first and second grades (also located on the first floor), learners progress through the themes of forest and ocean to the atmosphere, solar system- and galaxy-themed areas for third, fourth, and fifth graders—the last are called Galaxy Voyagers—on the second floor. Knox refers to the concept as “zooming out,” a reference to Charles and Ray Eames’s film Powers of Ten. The result, Knox says, is that “sustainability and learning feed off each other in a really nice way.”

Chadwick is equally enthusiastic. “We’ve achieved more integration of teaching, learning, design and sustainability than I had ever imagined,” he says. “In the best hands, every student, teacher and parent understands how their actions contribute—you’re creating a culture change, and the kids, especially, understand.”
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Continuing Education: Lighting Controls
From Architectural Record

Command Performance

The latest LEDs, coupled with sophisticated sensors and wireless technologies, are changing the role of lighting in the built environment.

BY LINDA C. LENTZ AND JOANN GONCHAR, AIA

THE ABILITY TO CONTROL: Electric light in a user-friendly and visually seamless manner became a viable design option for public, commercial, and residential spaces more than 50 years ago with Joel Spira’s invention of the solid-state electronic dimmer in the early 1960s. Initially developed to enhance homes and other interior environments, architectural lighting controls have since developed into systems that are used to create various scenes for retail and hospitality venues, provide security, and conserve energy usage and costs. Today, largely enabled by the capabilities of advanced, high-quality LEDs and digital technologies, lighting controls are being transformed into critical networks that not only effectively illuminate the spaces within and around buildings, they enhance the way these environments are used and inhabited.

In the half century that followed the introduction of a dimmer small enough to fit into a standard electrical wall box by Spira, the late founder of Lutron, the industry has evolved to keep up with myriad innovations and user preferences. Basic technologies such as 0–10 volt dimming—a protocol as straightforward...
as its name, developed first for stage lighting, then fluorescent lamps, and now LEDs—have been supplemented with more robust wired protocols such as DALI (Digital Addressable Lighting Interface) and DMX (Digital Multiplex), both encompassing products from different manufacturers that work together within each distinct convention. According to Arup lighting designer Jake Wayne, DALI is the workhorse that controls most of the typical white architectural lighting in buildings. It's a standard protocol whereby components such as LED drivers can be controlled individually, allowing for the fine-tuning of a particular fixture or small group of fixtures instead of a vast zone. DMX (a digital-communication network created for theatrical lighting) facilitates dynamic color-changing schemes. DMX is also great for new tunable-white LEDs, which are growing in popularity. “So we might start to see more commingling of these two protocols in the architectural environment,” says Wayne.

“Typically on jobs, we end up with two or three control typologies just to address all of the requirements of a space,” Wayne explains. This scenario

NORTHEASTERN UNIVERSITY INTERDISCIPLINARY SCIENCE AND ENGINEERING COMPLEX

BOSTON Payette | Arup

When architects from Payette developed the concept for the Interdisciplinary Science and Engineering Complex (ISEC) at Northeastern University, they conceived its central atrium (opposite page) as being the building’s centerpiece, as well as being a student hub for the expanding campus. They envisioned a dramatic and lively space topped by a generous skylight. But as they developed and refined the scheme, the initial mostly glass roof was transformed into one with three discrete cone-shaped apertures. The aim of this “right-sizing” process, according to Arup lighting designer Jake Wayne, was to eliminate glare in the atrium and ensure quality daylight in adjacent spaces—namely laboratory write-up areas (above). These look onto the atrium from multiple levels through a glass wall. For those times when daylight is not sufficient, the write-up spaces are illuminated with Peerless linear pendants that bounce light off the ceiling. The atrium also has supplemental LED lighting, including Selux spotlights tucked into balconies at its perimeter and Lumenpulse RGBW linear projectors concealed in coves at the base of the skylights. The latter fixture provides a soft glow so that the skylights are always legible, says Kevin Sullivan, Payette president. Although the building’s fixtures are wired, its Lutron Quantum control system’s components, such as occupancy sensors, photo sensors, and switches, are for the most part wireless, a characteristic that streamlined their installation, says Wayne.

BOSTON Payette | Arup

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Responding to the client’s request for a flexible space, lighting designer Suzan Tillotson and her team devised a dynamic scheme meant to engage the New York employees of the advertising agency R/GA, as well as to foster their creativity and well-being. The design revolves around an indirect lighting strategy using 10,000 RGBW PAR38 LED lamps bundled into groups of four sockets. Affixed to a unistrut grid below the existing waffle-slab ceiling—painted white for reflectivity—these custom industrial-style fixtures are distributed at regular intervals throughout the two levels of the 134,000-square-foot space (in both open and enclosed areas), then configured to uplight each ceiling coffer. The lamps, by Ketra, have a high color-rendering index (CRI) and wireless connectivity through which they can be programmed to change color, or color temperature in the white spectrum. Taking advantage of these capabilities, the lighting designers created a circadian-rhythm program, which begins at 2700K in the morning, subtly shifts to 4000K at midday, and gradually returns to a warmer color temperature in the evening. Staff can override this system easily with a tablet to incorporate color or alternate scenes for events. A Zigbee-compliant device from Ketra enables the system to communicate wirelessly with a Crestron DMX master control that also ties into the window shades and a/v equipment—simplifying the operation of all three for the office manager.
requires a central network system that has the built-in intelligence and programming capabilities to manage them. For example, Arup’s recently completed Boston office, where Wayne is based, is a “working lab” installed with several different control typologies. To manage them, the lighting design team is using a central system that controls all the protocols. “Think of it as a server that detects a group of DALI fixtures and knows how to talk to those through the DALI protocol, then recognizes the 0–10 volt fixtures and talks to those through the correct language,” he adds. But once it is implemented and commissioned, all that a facility manager sees is a clean floor-plan graphic through which one can view and modify the scheme. The actual process happens behind the scenes.

These open protocols, and the gateway solutions that integrate methodologies without a hitch, are essential for the adoption of new and existing products and technologies, says Joseph Bokelman, chairman of the Controls Protocols Committee for the Illuminating Engineering Society (IES). Many clients are risk-averse, so “the goal is to remove the complexity.” In this regard, connected wireless systems, which eliminate the need for extensive electrical work, are gaining ground with lighting designers and architects for retrofit installations and multi-tenant buildings, as well as for open office and retail applications where the lighting must adapt to variable spatial configurations.

Like the wired versions, open wireless protocols provide a common language to connect the devices of different manufacturers adopting a particular convention. One such standard, developed by Zigbee, has an alliance of 400 members, including manufacturers of luminaires, switches, and gateways, whose products communicate through low-frequency radio technology. Using a MESH network, the Zigbee system has self-healing properties, so if a route between any two devices is interrupted, it is reconfigured, making this a suitable technology for large and complex programs. “There is really no limit,” says Musa Unnehopa, a Philips Lighting senior director and Zigbee vice-chairman of the board. “You can build sub-networks and, in this modular fashion, grow or shrink a network to fit a particular building.” The Aria Las Vegas hotel is outfitted with 100,000 Zigbee nodes, Unnehopa says. Each guest room is its own network and connects to a central system. “This is how you gradually build up the infrastructure.” At the same time that the lighting industry is moving toward increasingly integrated and interoperable systems, a new layer of luminaire connectivity is poised to have an effect on the built environment.

**SWEDISH MEDICAL CENTER BEHAVIORAL HEALTH UNIT**

**SEATTLE ZGF Architects**

For a new 22-bed behavioral-health unit on two floors of an existing hospital, designers from ZGF wanted to imbue the two central gathering areas—which have no access to daylight—with a natural sense of the passage of time. In order to accomplish this, they developed an illumination scheme based on circadian-rhythm research conducted by the Lighting Research Center at Rensselaer Polytechnic Institute. The lighting subtly changes, with a bright, cool light in the morning that gradually becomes warmer over the course of the day. The aim was not only to provide a comfortable environment, but also physiological benefits for patients who are sometimes admitted for weeks at a time and spend most of their waking hours in these spaces, explains Ed Clark, a ZGF sustainable strategist. To create an installation that would reinforce patients’ natural wake-sleep cycles, they specified high-CRI tunable-white LED downlights from USAI. And to facilitate the desired modifications in color temperature and intensity, they paired the downlights with a 0–10 volt dimming system. For a cove surrounding the main raised area of the ceiling, they chose double-diode linear LEDs (one orange and the other blue) and a separate DMX control system. When first installed, the fades between colors of the downlights were too abrupt, making the environment “like a disco,” jokes Clark. But after reprogramming, the transitions are now gradual and nearly imperceptible, he says.
WIMBLEDON CENTRE COURT

LONDON  Populous | ME Engineers

When the U.K.’s premier tennis venue recently replaced the High-Intensity Discharge (HID) lamps at Centre Court with advanced LED sports lighting, the owner, All England Lawn Tennis Club (AELTC), tasked ME Engineers to revise the controls, which had been installed in 2009 along with the HID and the stadium’s retractable roof. This was to assure compatibility between the new fixtures and controls and to take advantage of the latest LED and control technologies. To do this, the lighting designers upgraded the software for the existing Quantum system by Lutron, which had been providing complete management for all of the lighting elements and such energy-management components as motorized shades. The updated system, which includes a DMX controller that communicates with every fixture individually, can be accessed via PC or remote keypads with an improved graphical interface. It is now possible to more finely tune the lighting during a game, eliminating potential glare (distracting to both players and spectators) and providing the appropriate illumination for television cameras. Custom programs consist of a championship scene as well as additional adjustable settings for the remainder of the year in areas of the building shown in tours of the facility. This system also integrates with the operable roof controls and is programmed to automatically turn sports and seating lights on and off depending on whether the roof is open or closed, although a manual override is available. Outside of the championship, a time clock and remote keypads control the house lighting for the tours and for staff. The manufacturer maintains that this lighting retrofit has been so successful that AELTC is currently considering a similar solution for its Court No. 1.
Photography: © bnim/kelly callewaert

Applications are also finding their way into the workplace, she explains. “That’s where advanced control systems have negative effects, while at the right time it will be beneficial,” she explains. “That’s where advanced controls can play a major role.”

Figueiro sees the greatest potential for circadian applications in facilities that operate around the clock such as hospitals, nursing homes, and prisons. But these applications are also finding their way into the workplace. Even the General Services Administration (GSA), which owns and leases more than 376.9 million square feet in 9,600 buildings, could adopt circadian lighting.

With the help of the LRC, the agency has been studying the effects of both daylight and electric illumination on circadian rhythms in a variety of its buildings. The investigations, which combined photometric measurements with occupant questionnaires, attempt to quantify the relationship between certain kinds of light and alertness, mood, and sleep quality.

The project could shape how the agency designs and renovates buildings. “The goal is to make evidence-based changes to our [construction] guidance documents,” says Bryan Stevenson, a GSA high-performance-building program advisor.

If owners with holdings as extensive as the GSA’s were to embrace the capabilities of the latest lamp technologies and harness the potential of intelligent systems, the use of connected controls and their integration into the still nascent Internet of Things could soon become mainstream, say industry sources. “As long as we get the level of technology right, drive down the price, and get people to accept its security and reliability,” says Bokelman of IES, “we will create a platform that will carry us into the future—one that won’t be made irrelevant because it’s ‘just a light.’”

Continuing Education

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Learning Objectives

1. Identify commonly used lighting protocols, discuss their origins and their appropriate applications.

2. Explain how lighting and lighting controls can be designed to enhance building occupants’ circadian rhythms.

3. Describe some of the capabilities and potential uses of so-called “smart” connected lighting systems.

4. Discuss efforts to make the latest generation of lighting system components interoperable.

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Designer Cheryl Kees Clendenon built practical zones into this “greenhouse kitchen” by installing four different surfaces from Silestone. The company’s Charcoal Soapstone and Calacatta Gold from the Silestone Eternal Collection, Silestone Iconic White, and Dekton Makai, all help define areas for such tasks as dining, food prep, and serving. *(SNAP #233)*
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**Product Application**
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London Design Festival

British designers invite the public to a series of innovative exhibitions.

Now in its 15th year, the annual London Design Festival—a citywide program of events, exhibitions and installations—successfully played its role as the glue that binds the city’s multiple, simultaneously held design trade shows each fall. Decorex International, 100% Design, designjunction, Focus/17, and the London Design Fair all occur around the fall LDF dates.

But the thing that sets this festival apart from these other shows is that most of its events are free to the public (LDF organizers were anticipating around 375,000 attendees this year.)

A focus of the citywide event is the Victoria & Albert Museum, which hosts installations by both seasoned and up-and-coming designers. Standouts this year were British designer Ross Lovegrove’s Transmission, a site-specific, nearly 70-foot-long, “three-dimensional tapestry” made with Alcantara, a tactile and sound-absorbent synthetic fabric. Transmission was designed to respond, with color and details such as gold and silver threads, to the

COOL BRITANNIA
Villa Walala, Camille Walala’s colorful outdoor “building block castle” located in Broadgate, an office-retail complex in London’s East End (above). Also on view at Design Frontiers was Mimi Jung’s design for Kvadrat’s My Canvas exhibition of projects by 20 emerging designers (right).
For the trade show designjunction, the industry organization Turkishceramics commissioned designer Adam Nathaniel Furman’s Gateways, a series of four gates in Granary Square that illustrate the history of ceramics in Turkey (above). Ross Lovegrove’s installation, Transmission, a “three-dimensional tapestry” collaboration with Alcantara at the Victoria & Albert Museum (left).
15th century Devonshire Hunting Tapestries that line the gallery in which it was installed. (And visitors could also take in the museum’s current exhibition Plywood: Material of the Modern World, which features objects from airplanes to skateboards and furniture by Aalto, Breuer, and the Eameses—as well as a series of ice-skating shelters, designed for the run of the LDF by the Canadian firm Patkau Architects, in V&A’s John Madjeski Garden.)

The Landmark Project was the outdoor installation Villa Walala, a colorful “building-block castle” of inflated forms clad in vinyl and covered with digitally printed patterns by textiles designer Camille Walala. The designer built it in London’s East End on the grounds of Broadgate, a massive office and retail complex owned by British Land, the festival’s sponsor. Temporarily, the structure offered local workers and visitors a playful, interactive space for socializing.

New to the LDF was Design Frontiers, a group exhibition at Somerset House that included collaborative projects among 30 designers and manufacturers, including Amanda Levete’s dematerialized Glass Cloud chandelier for WonderGlass; Tord Boontje’s light fixtures that use Swarovski’s new, un-faceted crystals; Arik Levy’s “floating” kitchen island, made from a single block of mineral quartz for the luxury surfaces company COMPAC; and My Canvas, in which the forward-looking Danish textile company Kvadrat invited 20 emerging designers to create projects using its Canvas fabric, designed by Giulio Ridolfo.

LDF also hosted Design Districts, like in years past. Brompton Design District, with its cutting-edge temporary exhibitions and furniture showrooms for Italian manufacturers B&B Italia and Molteni, is the best known, but Shoreditch Design Triangle and the Clerkenwell Design Quarter also attracted crowds, as did new additions The Pimlico Road Design District and the Mayfair Design District, which is home to design galleries Galerie Kreo, Gallery FUMI, Achille Salvagni, and Galerie Patrick Seguin. As Ben Evans, director of the LDF, notes, each district “allows you to immerse yourself in the design personality” of the area, and reflects “how varied London’s design story is.”

At the Design Museum, relocated to its new home in the city’s Kensington area last year, Set in Stone showcased eight experiments in marble and limestone, including seating by the Portuguese architect Eduardo Souto de Moura, a slide by ELEMENTAL, the socially-conscious Chilean architecture firm, and objects by Michael Anastassiades and Jasper Morrison. —Pilar Viladas

SCRATCHING THE SURFACE
Arik Levy’s “floating” kitchen island of mineral quartz, a collaboration with COMPAC, part of Design Frontiers at Somerset House.
JoAnn Hindmarsh Wilcox, AIA, LEED AP
Principal, Mahlum Architects

**EXCITED ABOUT ANY PRODUCTS?**
We recently used a slat-sized, glass-fiber-reinforced concrete wall panel, called Öko Skin by Rieder. It’s a high-quality material we used at Northwood Elementary School on Mercer Island in Washington state (shown here). The sandblasted surface gives the material depth and variety, which we used to complement the building’s brick base. And the construction team cut panels to length and drilled fastener holes in the field, which minimized waste and even left the district with surplus stock at the end of the project.

**THAT’S A GOOD PACE TO IDENTIFY TRENDS. WHAT IS THE LATEST?**
An increase in non-toxic materials in schools, but we need to do more. Children are especially vulnerable to the impacts of the built environment, and the places they spend a majority of their day should be as free of harmful materials as humanly possible.

**WHEN DESIGNING FOR STUDENTS, WHAT’S MOST IMPORTANT?**
The student is always at the center of our design process. Their mental and physical needs must be met before learning can take place. We begin by asking how our design will promote the students’ healthy development, so they feel empowered to champion their own education. Student-centered design should incorporate opportunities for them to learn at their own pace; help teachers address individual needs; create a sense of community where kids are encouraged to explore, make mistakes, and achieve; and give students and teachers a beautiful building that honors the work that they do there. There is hidden curriculum in the design of schools which too often can communicate a powerlessness to students.

**. . .AND PROJECTS?**
I fall in love with every project, but our new Arlington Elementary School in Tacoma, Washington, rethinks the basic premise of education design – the classrooms. The district challenged us to grasp the cutting edge of education design in a low socio-economic neighborhood. We provided a core instruction space (600 SF), a project room (1,000 SF), two small-group rooms (150 SF each), a shared large-group exploratory learning lab (3,000 SF), and a connected and contained outdoor learning space (3,000-6,000 SF).

**IF YOU HAD TO BUILD WITH ONE MATERIAL, WHAT WOULD IT BE?**
Glass, because it transmits light, which breathes life into collaborative learning. Glass is even better as movable walls to provide schools the flexibility that is so critical to 21st century learning.
As one of the strongest modular trellis systems available, NatureScreen offers unique enhancements such as integrated LED lighting or printed media panels. It is quickly becoming the benchmark for commercial-grade green walls.

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NEW AND UPCOMING EXHIBITIONS

Chicago Architecture Biennial

CHICAGO

Through January 7, 2018

The second edition of the Chicago Architecture Biennial features works by over 140 architects and designers on the theme of “Make New History.” Consisting of six community anchor exhibitions, two special project sites, installations, performances, talks, and films, the Biennial is a citywide event that encourages visitors to explore Chicago with an architectural eye. For more information, visit chicagoarchitecturebiennial.org.

Archtober 2017

NEW YORK CITY

Through October 31

The annual architecture and design month in New York City kicks off October 1 and will present lectures, films, tours, and exhibitions throughout the city. Previous partners include diplomatic missions, local architecture schools and institutions such as the Historic House Trust of NYC and the Public Art Fund. For the 2017 calendar, visit archtober.org.

Alex Schweder and Ward Shelley: Your Turn

RIDGEFIELD, CONNECTICUT

October 1, 2017–April 22, 2018

For this combined architecture and performance art piece, Alex Schweder and Ward Shelley will build a 24-foot-high living environment, which will then inhabit, sharing nine basic amenities that, while being used by one, cannot be used by the other. Audience members are invited to engage in conversation with the artists, as well as explore an adjacent gallery, which holds the first survey of Schweder and Shelley’s reverse paintings on Mylar. At the Aldrich Contemporary Art Museum. Visit aldrichart.org.

Beazley Designs of the Year

LONDON

October 18, 2017–January 28, 2018

The 10th annual exhibit on display at the Design Museum provides a preview of the nominees for the best contemporary and innovative designs of 2017. Nominees range from projects by Zaha Hadid Architects and Sir David Adjaye to creations by Zaha Hadid Architects and Sir David Adjaye to explore an artistic dialogue with Los Angeles). For more information, visit beazley.org.

Exhibit Columbus

COLUMBUS, OHIO

Through November 26

The annual exhibition of architecture, art, design, and community features 18 outdoor installations in and around the Modernist buildings the city is famous for. This year’s exhibitors range from award-winning design firms such as Arandalasch, to local university and high school students, unified by the theme of exploring the past, present, and future of design. For further information, visit exhibitcolumbus.org.

ONGOING EXHIBITIONS

Living in America: Frank Lloyd Wright, Harlem & Modern Housing

NEW YORK CITY

Through December 17

Curated by Columbia University's The Temple Hoyne Buell Center for the Study of American Architecture, the exhibition is correlated to The Museum of Modern Art's ongoing Frank Lloyd Wright exhibition. The exhibit in upper Manhattan features two of Wright's housing projects—one occupied by predominantly black residents, the other predominantly white. The exhibition examines racial segregation and socioeconomic inequality, and probes visitors to consider: “How to live in America, together?” Details available at arch.columbia.edu.

Solo Exhibition of Bardula

ZURICH

Through October 21, 2017

In its fourth presentation of Bardula’s artwork, Galerie La Ligne is hosting a solo exhibition of the Paris-based artist’s latest works, which use LED technology to focus on simple geometric shapes like spheres, circles, and squares, as well as complex ones like the torus. For more information, visit galerie-la-ligne.ch.

Ettore Sottsass: Design Radical

NEW YORK CITY

Through October 8, 2017

This exhibit brings together a diverse collection of works by Italian architect and designer Ettore Sottsass, including architectural drawings, interiors, furniture, machines, ceramics, glass, jewelry, textiles, paintings, and photography. The collection is on view at the Met Breuer. For more information, visit metmuseum.org.

Noguchi’s Playscapes

SAN FRANCISCO

Through November 26, 2017

This exhibition will revisit sculptor Isamu Noguchi’s designs for several playgrounds and stand-alone play structures. Through models, sketches, set designs, and archival images, the exhibition will show Noguchi’s visions for new experiences of art, education, and humanity through play. For more information, visit sfmoma.org.

Plywood: Material of the Modern World

LONDON

Through November 12

Featuring a collection of objects that ranges from skateboards to planes, this exhibition explores the many ways that plywood has shaped the modern world. Pieces by Akvar Aalto, Marcel Breuer, and Charles and Ray Eames are highlighted alongside architectural designs and drawings, historical photos, and a Singer sewing machine. At the Victoria & Albert Museum. Visit van.ac.uk.

Found in Translation: Design in California and Mexico, 1915–1985

LOS ANGELES

Through April 1, 2018

This Los Angeles County Museum of Art exhibit examines cultural exchange through the lens of Mexican and American architecture and design. Curated under four main themes—Spanish Colonial inspiration, pre-Columbian revivals, folk art and craft traditions, and Modernism—the underlying current of the exhibition is how place informs the built environment. Architects’ works by Richard Neutra, Luis Barragán, the Eames, and Clara Porset are among the 300 objects displayed. For more information, visit lacma.org.

Albert Frey and Lina Bo Bardi: A Search for Living Architecture

PALM SPRINGS, CALIFORNIA

Through January 7, 2018

This innovative exhibition at the Palm Springs Art Museum showcases a collection of 3D models, drawings, design objects and photographs related to four famous houses by the mid-century architects: the Frey II House and Aluminaire House by Frey, and Casa de vidro and Cirele House, by Bo Bardi. Although the two never met, Bo Bardi translated Frey’s treatise “In Search of a Living Architecture” for Domus. The exhibition, part of a Getty-led initiative to explore Latin American and Latin art in dialogue with Los Angeles, draws parallels between Frey’s and Bo Bardi’s distinct architectural styles, which connect people, nature, building, living, and social contexts together. For more details visit psamuseum.org.

LECTURES, CONFERENCES, AND SYMPOSIAS

Architectural Record Innovation Conference East

NEW YORK CITY

October 19, 2017

Curated by RECORD editors, this conference examines the boundaries of architecture through the lens of technology. With more than 300 architects and designers attending, the conference serves as a connecting platform among American architects as well as an opportunity to earn up to 7.75 AIA LU HSM. Registration information is available at east.aminovationconference.com.

World Design Summit

MONTREAL

October 16–25, 2017

In the inaugural World Design Summit meeting, 50 international organizations will come together to develop an international action plan for fostering the power of design to address pressing global challenges. Participants will produce a declaration and 10-year implementation framework for their designs. At the Palais des Congrès. For more information, visit worlddesignsummit.com.

NeoCon East

PHILADELPHIA

November 15–16, 2017

The design expo and conference comes to the East Coast for its seventh year; this international competition invites architects, designers and artists to propose temporary public art installations to animate five sites along the city’s major waterfront street, Queens Quay, during the winter months. Coordinated by Winter Stations Inc., the theme for this year’s proposals is “constellation.” For further information, visit icebreakers.winterstations.com.

2018 Better Philadelphia Challenge

Submission deadline: October 23, 2017

In celebration of the Benjamin Franklin Parkway’s centennial, the green thoroughfare that links downtown Philadelphia with Fairmount Park, the Ed Bacon Memorial Committee of the Center for Architecture and Design is challenging all university-level students to design the next “parkway” that will create new connections in the city. Visit philadelphiaphia.org.

Call for Ideas: Revitalization of Charles Square Park

Submission deadline: October 12, 2017

The City of Prague is seeking international proposals to update a pre-existing masterplan of a significant municipal heritage site which borders a teaching hospital, and courthouse and is accessible to cars and pedestrians, from landscape architects, civil engineers specializing in traffic, and architects. Successful participants will be invited to participate in further stages of the bid process. See full details at jprzpraha.cz.

Shelter 48: Emergency Life Support Design

Submission deadline: November 11, 2017

In its seventh year, this international competition asks architects and designers to imagine a post-disaster shelter with life-saving capabilities. The competition draws on the natural disasters caused by climate change and searches for a design solution that could be deployed within the first 48 hours following such an incident and then provide ongoing services. Submissions from both professionals and students are welcome. More information available at eleven-magazine.com.

Senior Housing News Architecture & Design Awards 2017

Submission deadline: November 13, 2017

The annual award series honors innovative projects and practices which are specifically designed for seniors. With professional and student divisions, the awards break down into categories including independent living, assisted living and continuing care to reflect the diversity of needs in the senior living industry. For more information, visit shnews.com.

FORM Student Innovation Competition

Submission deadline: November 13, 2017

The FORM Student Innovation Competition offers students a chance to design something to sit, lie, lean on, or play on using Formica brand products. The competition is a twist on Formica’s 2008 contest, FORM: Contemporary Architects at Play, which posed the same challenge to a internationally renowned designers and architects including Zaha Hadid and Bernard Tschumi. Visit formica.com.

INVITATIONS TO CELEBRATE

Architecture as Art

EXHIBITION

Table: The table presentation of photographs organized by the icons of San Francisco’s 20th century art. Select photographs will be displayed in the San Francisco Museum of Modern Art. Visit sfmoma.org.

IDEAS OF INFINITE: THE STORY OF LEVI’S

EXHIBITION


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Beauty and the Bath

CONRAN AND PARTNERS—known for its collaborations with such global household brands as Virgin Atlantic, W Hotels, and Barclays bank, has brought its long insights on how consumers typically use products to bear in a new design for Australia manufacturer Victoria + Albert Baths.

“When we began this product design project, we never envisaged the tub in isolation,” says Conran industrial designer Tim Rundle. By that he means that in addition to considering end users, Conran and Partners also focused on what would make the most of Victoria + Albert’s best asset—a lighter-than-cast iron composite of volcanic limestone and high-performance resins that renders the tub’s hefty shape as an easy-to-install mold.

Its hollowed-out, back-to-wall profile is practical for small spaces such as apartments and boutique hotels, without sacrificing bathing and deck space or style. The Eldon measures 68 ¼” long x 33 ¼” wide x 23 ¾” high. And unlike profiles made of heavier materials, it doesn’t have the usual exposed plumbing. A void underneath the tub affords ease of installation and conceals pipework.

“For us, the key was this back-to-wall installation,” says Tom Burke, new product development manager for Victoria + Albert. “It allows you to get as close as possible to the beauty of a freestanding tub while still being practical and space saving.” —Christine Gordon (SNAP #270)
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