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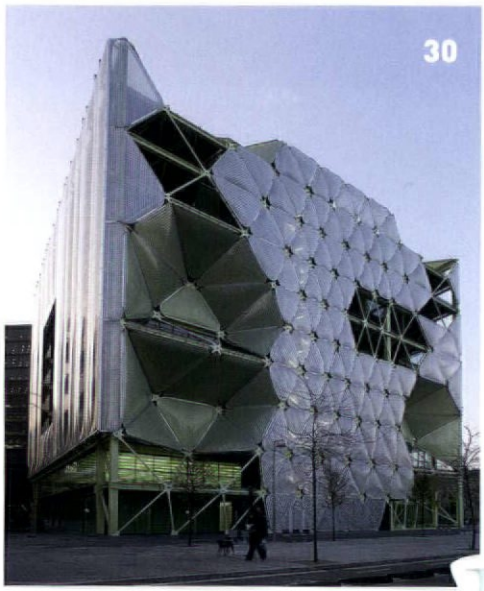

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Cover image of Pixel Building by Studio 505. Photography by Ben Hosking.

Summer Soiree

FORM's festive event provides insider tips

FORM magazine celebrated its July/August Living Spaces issue and the end of summer in style with its "Insider Trading" event at the Design Within Reach showroom in downtown Santa Monica. Guests were treated to exclusive industry information about Italian cabinet company Modulo Cucine and Design Within Reach, while mingling among the showroom's iconic pieces. Water was provided by Fiji Water, and cocktails were courtesy of PAMA and IZZE Beverage Company. FORM thanks its readers for their support and a fabulous season-ending event!

Photography courtesy of Lyanne Natividad

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EDITOR'S NOTE

You can't judge a book by its cover. Maybe not, but I'm not sure the same holds true for buildings. Nowadays, you can tell quite a lot about a structure by what is wrapped around it. And more and more, a building's skin isn't merely "wrapped" around it. Façades are becoming an integral part of the design and crucial to a structure's sustainability. Building skins are being asked not just to protect, but to perform, and a slew of new techniques and materials are helping them to do just that.

Carly Hebert

This issue will examine some of the progressive new techniques and materials that will continue to shape our skylines. Michael Webb takes a closer look at the fascinating new Media TIC building and it's interactive façades (page 30), while John Gendall talks to three firms who are taking an important role in pushing façade design forward (page 34). And as performance is key, we've asked the engineering firm Thornton Tomasetti to share its top five solutions for building a more sustainable skin (page 14). But our interests aren't limited to a building's exterior surface. Our Showroom column (page 10) explores exciting options for interior surfaces, and our Workbook section (page 18) offers compelling examples of how a little bit of color goes a long way in defining a structure, both inside and out. While maybe you can learn a lot about a book—or building, or magazine—by its cover, there's always more to the story. I encourage you to flip through the pages and see for yourself.

Caren Kurlander
Editor in Chief

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Interior Motives

Materials that lend surface value to your projects

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Chalet, the latest introduction by Italian manufacturer Cerdisa, combines high-performance porcelain tiles with the warm look and natural grain of wood. The tiles, distributed in California by SpecCeramics, measure 8" or 5.5" x 32" and start at $5/sq ft. The option of a non-slip grip surface makes them suitable for outdoor use. specceramics.com

WALKON TILE

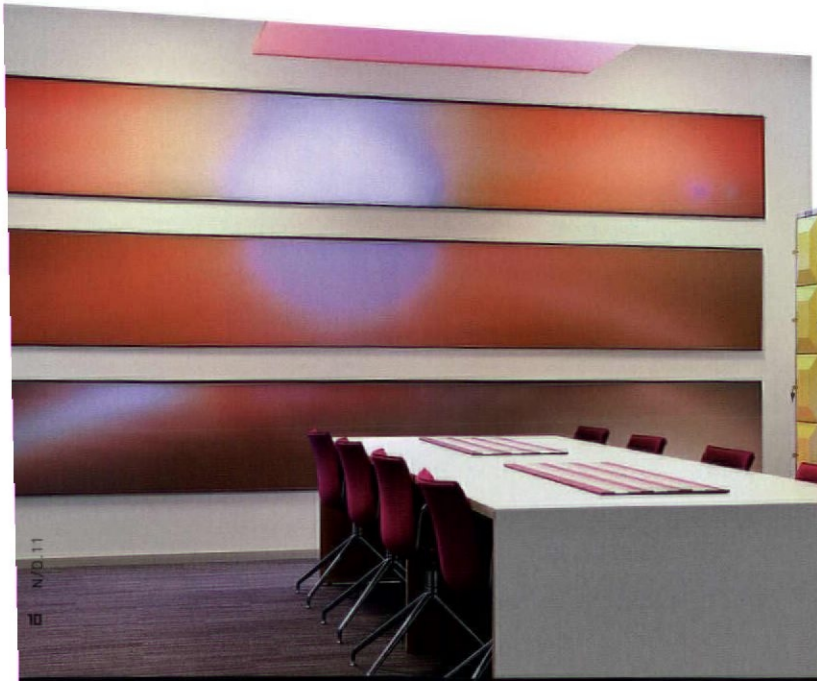
WalkOn Tile's new **Spanish Atelier** line offers the durability of porcelain, while giving the appearance and sheen of raw silk. The ultra-thin Spanish tiles measure 17.32" x 34.80" and just 4.3mm thick for walls and 10.3mm thick for floors. Priced around $16/sq ft, the tiles were inspired by classic wallpaper motifs and add the same rich feel to a space. walkontile.com

COSENTINO

Made from 75% recycled materials, the **ECO by Cosentino** line of countertop surfaces is expected to reuse the equivalent of 60,000,000 glass bottles a year. The durable, non-porous material doesn't require sealers, gains points toward LEED certification and comes in four sizes, beginning with 12" x 12". Prices range from $68 to $118/sq ft, depending on thickness and color. ecobycosentino.com

PHILIPS & KVADRAT SOFT CELLS

A unique partnership between Philips and Kvadrat Soft Cells means a merging of acoustic control and ambient lighting. **Luminous Textiles** fuse Kvadrat's patented textile panels with Philip's colorful LED lighting technology, creating a multitude of interior possibilities. Standard panels start at 28" x 47", and custom sizes are available. Prices on request. philips.com; softcells.com

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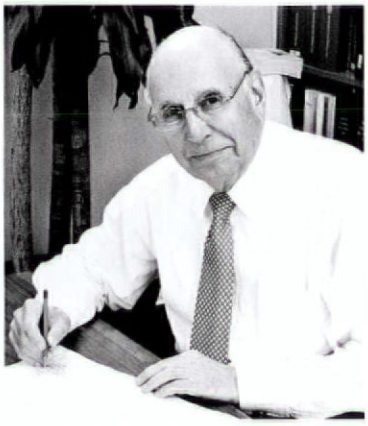


Curtain Call

Engineer **Gordon Smith** started in the skin business when curtain wall was just big windows. Still working nearly 60 years later, he shares his up close-and-personal take on the industry's technical and artistic developments.

How did you end up as a curtain wall consultant?
While I was studying civil engineering at Yale I worked for a family-owned company called ALBRO Metal Products Corp. I worked in the field as an installer. When I graduated I worked in the factory and eventually worked my way up through engineering, estimating, and operations to president. In 1975, I started the Gordon H. Smith Corporation Exterior Wall Consultants.

What were curtain walls like back then?
Curtain walls were really just expanded storefronts—mullions were cut to length in the shop and assembled in the field. There was very little shop assembly. Quality control was poor due to variations in temperature, moisture and cleanliness. In the early '60s manufacturers began to explore doing more shop assembly and there was a gradual trend toward "unitized" systems.

In 1958, I personally designed a unitized system for the then new State Department Building in Washington D.C. The design called for the usual steel sticks assembled in the field and wrapped in aluminum. I decided to make a frame of aluminum delivered to the site one-story high and one-lite wide. This eliminated a tremendous amount of field work and we achieved substantial economies. We could control tolerances to 1/32" and most of the sealant was applied in the shop. I came up with this idea literally in a bar after a date. The guy at the plant said I was crazy and we had a hard time selling it in Washington D.C. I had to get ALCOA and two engineering professors from Yale to back me up. I believe it was the first unitized system, but I can't confirm it.

Since the 1950s what do you consider the major developments to be?
In the early '50s most systems used "mill finish" aluminum, meaning essentially unfinished. In the late '50s anodizing became popular and then hard-coat anodizing was introduced so you could get bronze and black finishes.

That must have completely changed the face of the modern city.
It did. But the problem was maintaining a consistent color. It depended on the purity of the metal, the consistency of the alloy, the acid-bath concentration, and the electrical power that's applied. Architects put pressure on the manufacturers to solve the problem. The industry responded by developing "organic coatings" in a wide variety of colors, and they're still in use today. They offered great uniformity and are warrantied for up to 20 years against finish failure such as blistering, peeling, fading and chalking. They can also be repaired in the field. This cannot be done with anodizing. One of the problems with these coatings is that their application releases large amounts of VOCs (volatile organic compounds). The alternative coatings don't have the same longevity. So while they might be initially the preferred environmental choice, the fact that they have to be replaced more times during the life of the building makes them overall a worse environmental alternative.

"[Architects] wanted to draw their dreams and they asked the industry to help realize them."

When I was a kid, the sealants we used were oil-based, acrylic, butyl and thiokol. Now the sealants of choice are silicone. They are warrantied up to 20 years but are known to have served in excess of 30 years without failure. With the introduction of silicone and its excellent longevity and adhesive strength came the birth of structural silicone glazing. Whereas before the glass was held in mechanically with glass-stops, now it could be glued directly onto the aluminum support members. Architects can now design very slick buildings where you don't see the supports at all.

Discuss custom vs. mass-produced curtain wall.
In the early days standard systems were all there was. You could change the color and had a choice of metal vs. glass spandrel. As you might expect, the palette was not sufficient to satisfy the architects.

Gordon Smith is the founder of GHSC and can be reached at ghsmith@gordonhsmithcorp.com.

They wanted to draw their dreams and they asked the industry to help realize them. Some manufacturers developed what I call a "chassis" that you could customize with the shape of the metal trim, the spacing of the mullions, and a variety of colors and coatings. Still, there were architects that didn't want to use a standard chassis and they challenged the industry to meet their demands. In most cases, the industry has risen to the challenge and those are the most exciting projects for me. Today we have curved, shingled, faceted, and sloped walls as well as double skins.

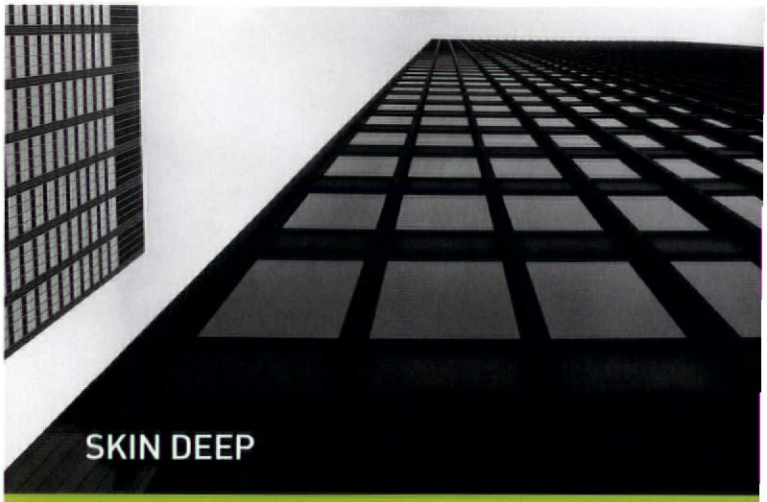
What do you think of self-venting curtain walls?
Self-venting and double-skin walls have gained a real foothold in Europe, where the expectations of thermal comfort are not like ours. This has slowed down its adoption in the U.S. but, as we become more energy conscious, it will become more accepted. We are spoiled. As we go forward, there will be a step backward in comfort.

What other technical advancements are exciting right now?
The use of point-supported structural glass. We are involved in several of these projects right now. Glass can be used structurally as opposed to being attached to a metal structural frame. It can be used as floors, walls and ceiling. We think of glass breaking when you drop it but tempered and laminated glass perform quite differently. The flagship Apple store on 5th Avenue in New York is being completely retrofitted with the latest and largest spans of structural glass from Europe to reflect Apple's leadership in modern technologies.

Now we are involved in projects where the glass has to be resistant to explosions and hurricanes to minimize injury and property damage. The first major building built to the new Miami-Dade County impact resistant building codes is the Carnival Cruise Lines headquarters for which we were the consultant.

And on a personal note—it's fun. Working on buildings with great architects and great developers is a lot of fun.

–Interview by Ann Gray



SKIN DEEP

What is your favorite building skin of all time?
The Seagram Building, without question. It is absolutely iconic. I have not seen anyone that does not drool over it or anyone who can criticize it. When I worked at ALBRO we bid on that project. We were the second lowest bidder but our bid was $1 million high. When the building was bought recently by Aby Rosen I performed the due diligence on the skin. The equipment used to extrude the bronze is not available in the U.S. today. It was sold to an outfit in Europe, and they don't make those shapes anymore.

How do Lever House and the Seagram Building compare?
They are very different. Lever House got its reputation by being a first. It has served aesthetically as a foundation for future curtain wall and has been knocked-off repeatedly. Seagram has not. It stands alone. Why? Bronze weighs three times what aluminum does. At the time, by the pound, bronze cost three times as much as aluminum. That is about nine to ten times the cost in material alone. In addition, Lever House, being stainless steel, requires only washing. Seagram's bronze was originally intended to look like Seagram's 7 that you drink. Today it has darkened, and it requires constant maintenance to look good. It will not be duplicated anytime soon.

ABOVE: The Seagram Building.
Photo by Massimiliano Ruggeri, M.r.©2008.

TOP 5

Members of **Thornton Tomasetti's** progressive building skin practice share their go-to solutions for achieving high-performance facades

We are fortunate to be designing building skins in a time of rapid and innovative developments in technology and technique. Never before have designers and owners had such a wide—and sometimes bewildering—array of choices to simultaneously achieve their aesthetic, economic and performance objectives. Here is a summary of five sustainable technologies that we think are coming to the forefront.

Glass

Glass just keeps getting better. Sputtering technology, driven by sustainability demands, can now create metal coatings on glass that reflect a significant percentage of infrared light while remaining transparent. Since infrared light represents nearly 50% of solar radiation, the "ideal coating" would be a tremendous advancement, potentially providing 50% shading with no effect on the visible spectrum. Also, with the advent of photovoltaics, architectural low-iron glass and antireflective coatings have quietly become the targets of large corporate R&D projects, with manufacturers racing to increase photovoltaic efficiency by developing the highest level of transparency.

ETFE

Systems made of ethylene tetrafluoroethylene (ETFE) have a carbon footprint that is approximately 80 times lower than comparable transparent systems, and they weigh as little as 1-3% of traditional cladding systems. These factors, combined with the system's life expectancy and its capacity to be completely recycled, makes ETFE one of the most sustainable building products available. In addition, the material's strength allows individual panels to be engineered much larger than comparable glazing materials. These characteristics allow for the development of lighter and more efficient structural support systems, while maximizing overall transparency.

Super Insulating Windows

Even the best double-glazed insulated glazing units (IGU) have significantly higher U-values (indicating the rate of heat transmission) than opaque insulated wall construction. To narrow this gap, triple glazing is becoming more common. Triple-glazed units introduce a third layer—a pane of glass or a suspended plastic film—between the outer and inner panes. Additionally, the airspaces can be filled with an inert gas, such as krypton or argon. As a result, center-of-glass U-values as low as 0.1 can be achieved with triple glazing.

Insulated PTFE

Tent structures have always been tremendously efficient building types due to the simplicity of the construction concept: using fabrics in tension to span large distances without the need for beams or other framing. But they have always been plagued by the thin nature of fabric, which allows for high levels of heat loss or heat gain. Recent improvements in aerogel technology have led to practical methods of creating thermal "blankets" that can essentially be sewn to the underside of the structural PTFE (polytetrafluoroethylene) fabric. This improves thermal and acoustic properties, while still maintaining a certain amount of natural daylighting.

Double-Skin Facades

Double-skin facades first caught the attention of architects for their aesthetic qualities and ability to make signature statements. In Europe they were early recognized for their improved thermal performance. Over the last few years the broader industry has also recognized the performance advantages of double-skin facades, such as improved acoustic isolation, reduced heat loss and increased passive solar heating in temperate climates. To harness these performance advantages and achieve optimal daylighting, the design of double-skin facades requires robust and detailed analysis.

— Mark Dannettel, vice president; Wolfgang Werner, director of sustainability; Edward Peck, senior associate; Nicola Greco, façade engineer

MAKING THE GRADE

ASSIGNMENT:

The project was in response to the one-week workshop Top Fuel 2011: Filters, in which we were challenged to create building walls that act more like skin. We were asked to consider, develop and construct at 1:1 scale, a performative facade mock-up for a mid-rise, live-work building.

STUDENT NAMES AND MAJORS: Mintam Banh, Bachelor of Architecture; Jacqueline Lee, Master of Architecture (+2); Jason Straight, Bachelor of Architecture; Connor Wingfield, Master of Architecture (+2)

SCHOOL: University of Southern California

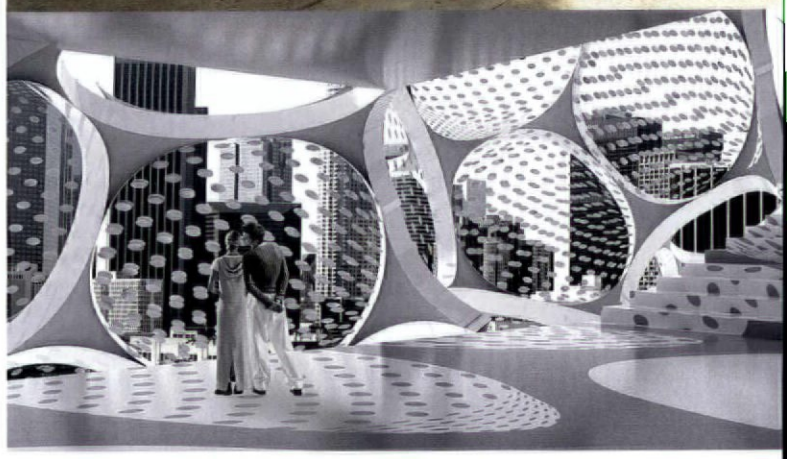
ADVISORS: Frank Barkow, Thomas Auer (invited workshop leaders); Scott Uriu, R. Scott Mitchell, Eric Nulman (faculty workshop assistants); Alice Kimm, Eric Haas, Doris Sung (workshop curators/coordinators)

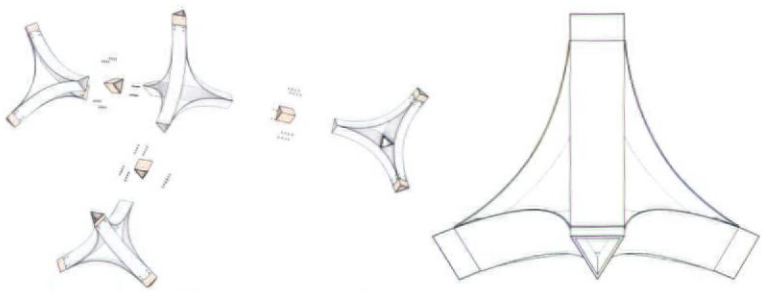
PROJECT TITLE: Wiggle Room

PROJECT DESCRIPTION: Wiggle Room is a pneumatic space frame, where the geometry stems from mutations of a module. While the prototype is made from wiggle wood, the Wiggle Room is envisioned to be made out of sheet metal, allowing for an ETFE membrane to be attached to the frame and have the whole system act as a performative facade.

DESIGN TOOLS: Rhino, Adobe Photoshop, Adobe Illustrator, AutoCAD

INSPIRATION: During the workshop, we were presented with six different types of performative facades, and we were inspired to create a facade that fuses two types (space frame and pneumatic) together.

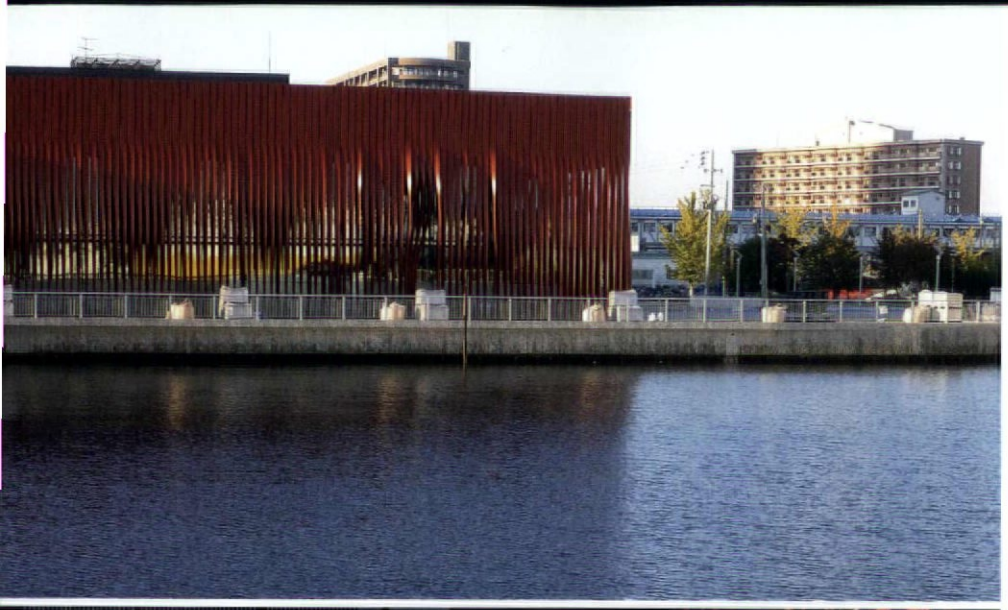


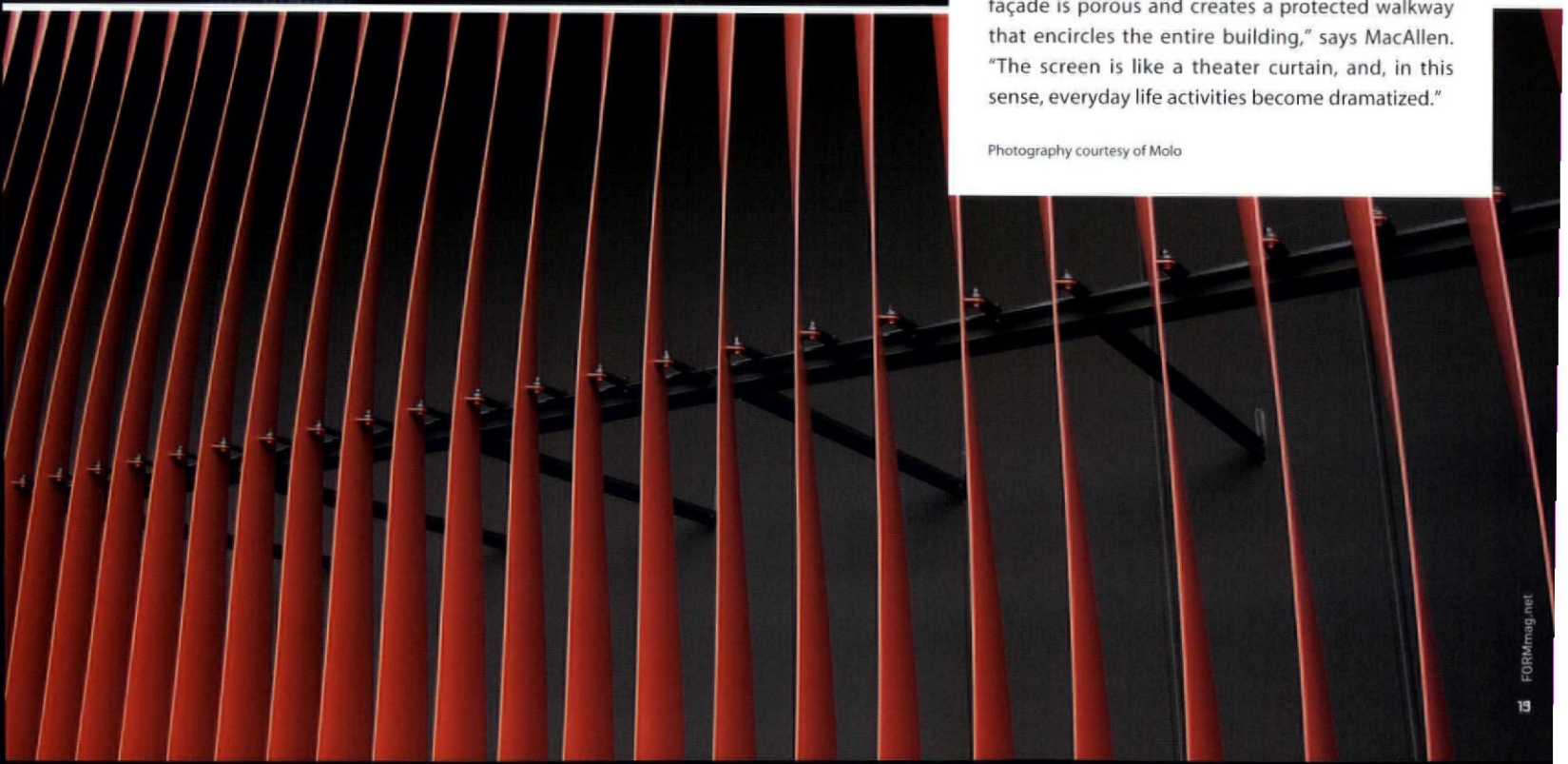


True Colors

Bold hues make a big impact

For Workbook credits, please see page 39.





Nebuta House

Location: Aomori, Japan
Designer: Molo
Website: molodesign.com

"The idea was to make the exterior mysterious and intriguing, but unrecognizable in terms of architectural elements," Todd MacAllen says of the Nebuta House in Aomori, Japan. The project was conceived by MacAllen and Stephanie Forsythe, co-owners and lead designers for the Vancouver-based studio Molo, to house the larger-than-life Nebuta paper floats, which draw crowds every August in the city's annual parade. The architects' solution for giving the building an arresting air was carried out with a single broad stroke.

The structure, which was built in collaboration with d&dt Architects and Frank la Rivière Architects, is laid out simply, with an open floor plan made possible by the carefully arranged steel frame. "The steel structure ties into the window mullions to carry the building," explains MacAllen. "It's solid steel and custom-made." Inside, surfaces are kept dark and understated to set off the fantastical Nebuta lanterns. Outside, the architects wrapped the building in 40-foot-tall vertical steel ribbons. The ribbons were built in a factory, coated with a two-part epoxy in a vivid red shade inspired by local lacquerware and then brought to the site, where they were lifted into place and fastened at multiple points.

Subtle variations in the strips catch and reflect light differently, and, at points around the building, they sweep back allowing people to walk through. The twists and angles in the ribbons energize the appearance and highlight specific views. "The façade is porous and creates a protected walkway that encircles the entire building," says MacAllen. "The screen is like a theater curtain, and, in this sense, everyday life activities become dramatized."

Photography courtesy of Molo

Mocha Mojo

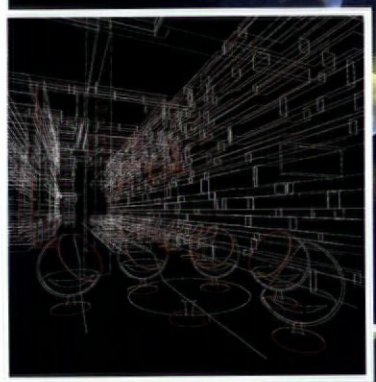
Location: Chennai, India
Designer: Mancini Enterprises
Website: mancini-design.com

"The place is nothing but color," Niels Schoenfelder, principal architect of Mancini Enterprises, says of the Mocha Mojo coffee house his firm designed in Chennai, India. And, indeed, every inch of the 3,500-square-foot interior is saturated with color. An industrial self-leveling resin floor shines blue, and, rising up from there, bands of varying widths and depths project out forming dynamic, sculptural walls. The rhythm continues to the ceiling, where sky-blue paint and a white beam framework keep the eye moving about the two-story cafe.

"The entire space was modeled in 3D and then printed layer by layer as a plan for the carpenters to assemble the bands," says Schoenfelder. "It was constructed band-by-band entirely by hand onsite." The unorthodox application of simple materials—including MDF board and acrylic emulsion paint for the walls and ceilings—results in a bold visual impact.

"The client's brief was a 1970s retro-inspired design," explains Schoenfelder. "We started with the psychedelic all-over wallpapers of that time and translated those into a 3D-wallpaper/lightface." Recessed fixtures bounce light off the bands and into the room, highlighting the Lego-like stacks. "The concealed lighting makes the color work, but it's the color that gives density to the concept."

Photography courtesy of Mancini Enterprises



Armstrong Senior Housing

Location: San Francisco, CA
Designer: David Baker + Partners
Website: dbarchitect.com

"We tend to use bright colors in deliberate applications in our buildings, as color is one of the most cost-effective ways to make a big design move," says David Baker, FAIA, LEED AP, founding partner and principal with the San Francisco firm David Baker + Partners. The firm's recently completed Armstrong Senior Housing project is no exception. Designed with four levels of one-bedroom apartments above ground-floor retail and common areas, the 131,800-square-foot complex brings affordable senior housing to San Francisco's Bayview District as well as a healthy dose of lively color.

"The call for bright color came from the community," explains Baker. "They were looking for something to enliven the neighborhood." They also wanted hues that would reflect the area's historically African-American population. Inspired by Ghanaian mud cloth and Dutch wax-resist fabrics, the architects scanned in a series of these textiles and then abstracted a design from the traditional patterns in a warm palette.

"To get the pattern onto the elevation," says Baker, "we drew metal suspension joints onto the drawings and then placed them in the stucco to create the edges of the color fields. The contractor and the painting team then worked from a color-keyed elevation to paint each section the appropriate color." The painted "quilt" sets off the circulation sections of the cement plaster façade, while galvanized steel pop-out bays have built-in furnishings to offer the residents places to gather.

Photography by Brian Rose

Dynabyte

Location: Stockholm, Sweden
Designer: PS Arkitektur
Website: psarkitektur.se

"Dynabyte thinks that working should be joyful and fun," says Peter Sahlin, senior architect with PS Arkitektur in Stockholm, "and they wanted the interior design to express that." Since Dynabyte is an IT consulting firm, the architects looked to their computers for inspiration in designing the company's 4,300-square-feet offices. "The palette comes from the HTML colors that were available in the very early days of the Internet," explains Sahlin. "We picked out seven of those colors."

Given the unusual rooflines of the top-floor attic space, the architects kept the ceilings and walls white and opted for graphic bursts of colors elsewhere. In the open library, shelves—each one painted in one of the seven hues—wrap around one corner. "It's an incredibly inexpensive way to make a big visual impact," he says. In conference rooms, custom-made ASCII-artwork was turned into wallpaper in another nod to the company's virtual trade. "The colors: blue, green and yellow, inspired the three rooms with sea, forest and city themes." To anchor each of the rooms, the corresponding hues were painted on the floors.

"Creativity is closely linked with joy and playfulness," says Sahlin. "The mind can be lured into creating marvelous things with outside challenges both visual and spatial."

Photography by Erika Janunger

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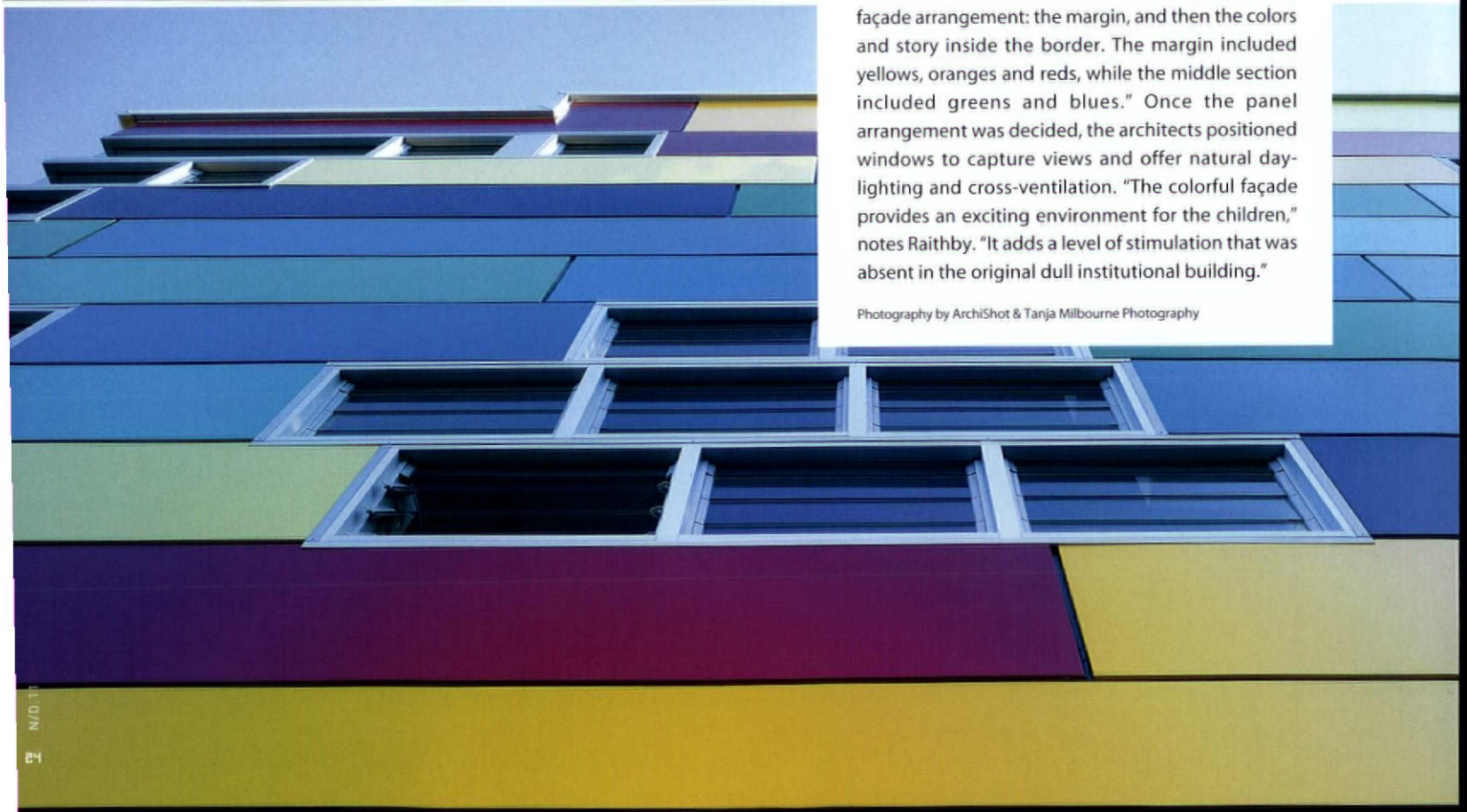

Wahroonga Preparatory School

Location: Wahroonga, Australia
Designer: GGF Architects
Website: ggf.com.au

When GGF Architects was charged with redesigning and expanding a nondescript building housing the Wahroonga Preparatory School, the architects saw it as a chance to make more than just structural changes. "The development of the school's facilities offered the opportunity to not only update the classrooms and add new facilities, but to provide an identity to the school," says the firm's director, Derek Raithby.

As the school shares a site with a church and other buildings on the State Heritage Register, Raithby aimed to give the school a contemporary presence, while still addressing the surrounding historic buildings. First, the architect utilized the existing building's ground floor and then built two cantilevered levels above to expand the footprint. The resulting three-story, 11,500-square-foot structure now houses classrooms, art and music rooms and a library. Next, the firm arrived at a design solution that referenced the historic church in a modern way. The school's façade was clad with pre-finished compressed fiber cement panels in a spectrum of brilliant colors.

"The choice of color was derived from a stain glass window in the adjoining church," explains Raithby. "The stain glass windows were designed by the well-known glass artist Norman Carter. Two main characteristics of the window were used in the façade arrangement: the margin, and then the colors and story inside the border. The margin included yellows, oranges and reds, while the middle section included greens and blues." Once the panel arrangement was decided, the architects positioned windows to capture views and offer natural daylighting and cross-ventilation. "The colorful façade provides an exciting environment for the children," notes Raithby. "It adds a level of stimulation that was absent in the original dull institutional building."

Photography by ArchiShot & Tanja Milbourne Photography

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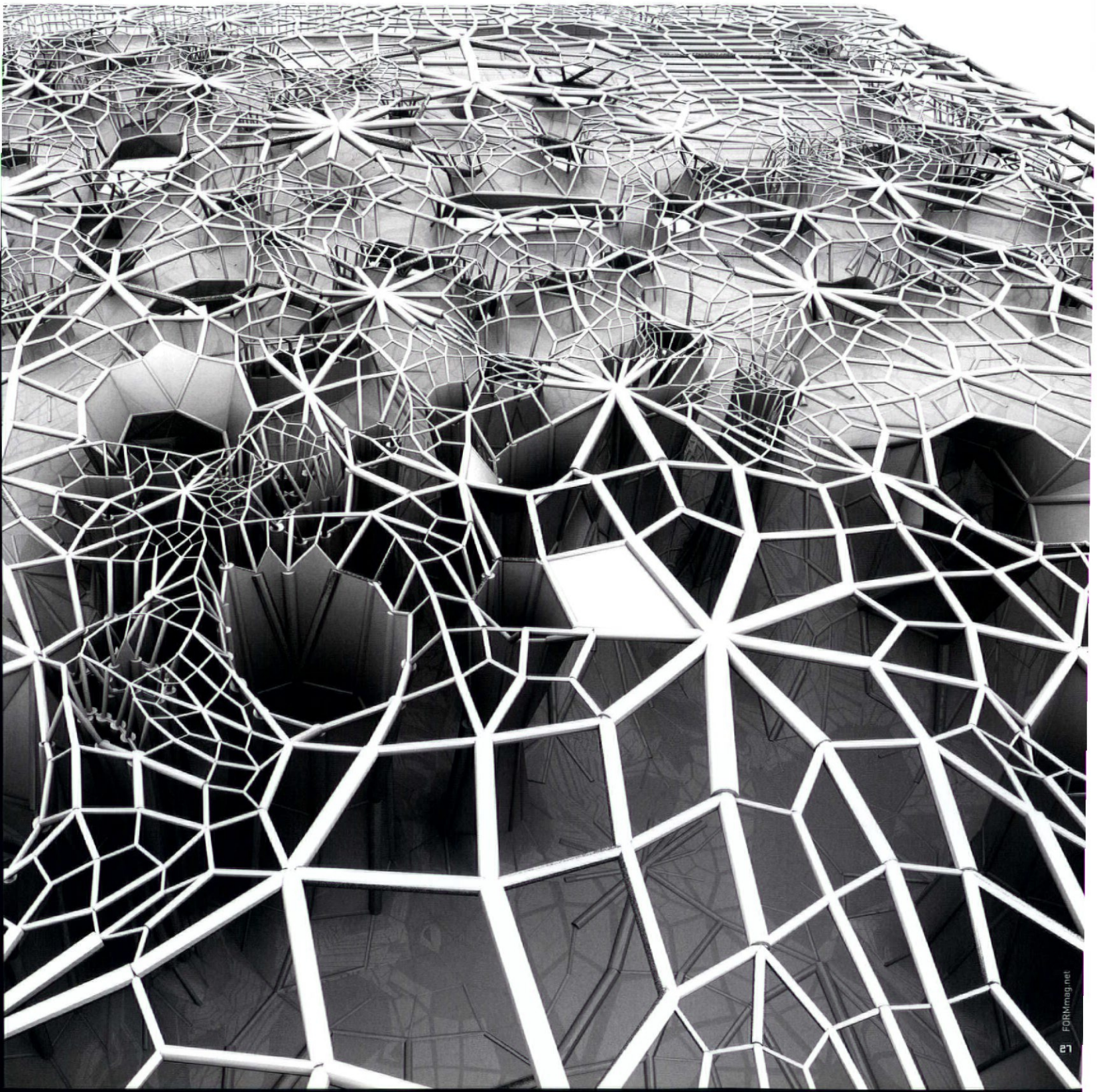
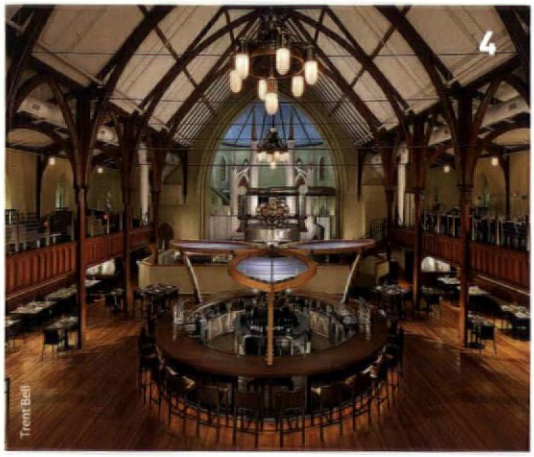
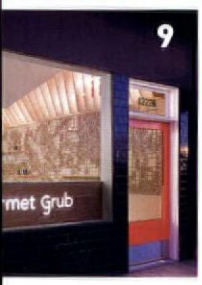


Courtesy of Faulders Studio

THE FOOD NETWORK

With tasteful destinations ranging from space-age to historic, the winners of the **AIA/LA's 2011 Restaurant Design Awards** will leave you hungry for more.





RESTAURANT CATEGORY

JURY AWARDS:

1. Lukshon | Culver City, CA
ARCHITECTURE: MASS Architecture and Design
INTERIOR DESIGN: Ana Henton Design
STRUCTURAL ENGINEER: WHL Consulting Engineers
LIGHTING DESIGN: Lighting Design Alliance (LDA)
CONSTRUCTION SUPERVISION: Lukshon

2. Pitfire Pizza | Culver City, CA
ARCHITECTURE: Bestor Architecture
LANDSCAPE DESIGN: Urban Organics Landscape Design
CONSTRUCTION MANAGER: Colin Thompson
STRUCTURAL ENGINEER: Gordon L. Polon
ELECTRICAL ENGINEER: Kipust Engineering
MECHANICAL AND PLUMBING ENGINEER: Hyle Engineering Co. Inc.

3. The Wright | New York, NY
ARCHITECTURE: Andre Kikoski Architect PLLC
LIGHTING DESIGN: Tillotson Design Associates
ENGINEER: HHF Design Consulting, Ltd.
MILLWORK MANUFACTURER: Petersen Geller Spurge
METALWORK MANUFACTURER: Amuneal Manufacturing Corp.
CEILING CANOPY MANUFACTURER: Newmat USA Ltd.

PEOPLE'S CHOICE:

4. Grace Restaurant | Portland, ME
INTERIOR DESIGN, BRANDING, FIXTURE FABRICATION AND GRAPHIC DESIGN: Tivi Design
ARCHITECT OF RECORD: R. Dean Bingham Architects
GENERAL CONTRACTOR: EW Littlefield Inc.

HONORABLE MENTION:

5. Edamame Sushi + Grill | Columbus, OH
ARCHITECTURE: Bass Studio Architects
STRUCTURAL ENGINEER: Jezerinac Geers
MECHANICAL ENGINEER: Point One Design, Ltd.
GENERAL CONTRACTOR: HK Construction

LOUNGE/NIGHTCLUB CATEGORY

JURY AWARD:

6. Icenhauer's | Austin, TX
ARCHITECTURE AND INTERIOR DESIGN: Michael Hsu Office of Architecture
OWNER: Nueces Street Capital, LLC
MEP ENGINEER: AYS Engineering, LLC
STRUCTURAL ENGINEER: MJ Structures
GENERAL CONTRACTOR: Franklin-Alan, LLC
LANDSCAPE DESIGN: Jackie Nadler Design

PEOPLE'S CHOICE:

7. The Spare Room | Hollywood, CA
INTERIOR DESIGN: Studio Collective
OWNERS: Med Abrous and Marc Rose
ARCHITECT OF RECORD: (fer) Studio
GENERAL CONTRACTOR: City Constructors, Inc.
CUSTOM MILLWORK: EB Designs
CUSTOM LIGHTING FABRICATOR: Orion Chandelier, Inc.

CAFÉ/BAR CATEGORY

JURY AWARDS:

8. City Center's Aria Pool Deck | Las Vegas, NV
ARCHITECTURE AND INTERIOR DESIGN: Graft

9. Earl's Gourmet Grub | Mar Vista, CA
INTERIOR ARCHITECTURE: FreelandBuck
GENERAL CONTRACTOR: Vandermeer General Contractors
CNC MILLWORK: Joseph Cooper Milling & Woodwork

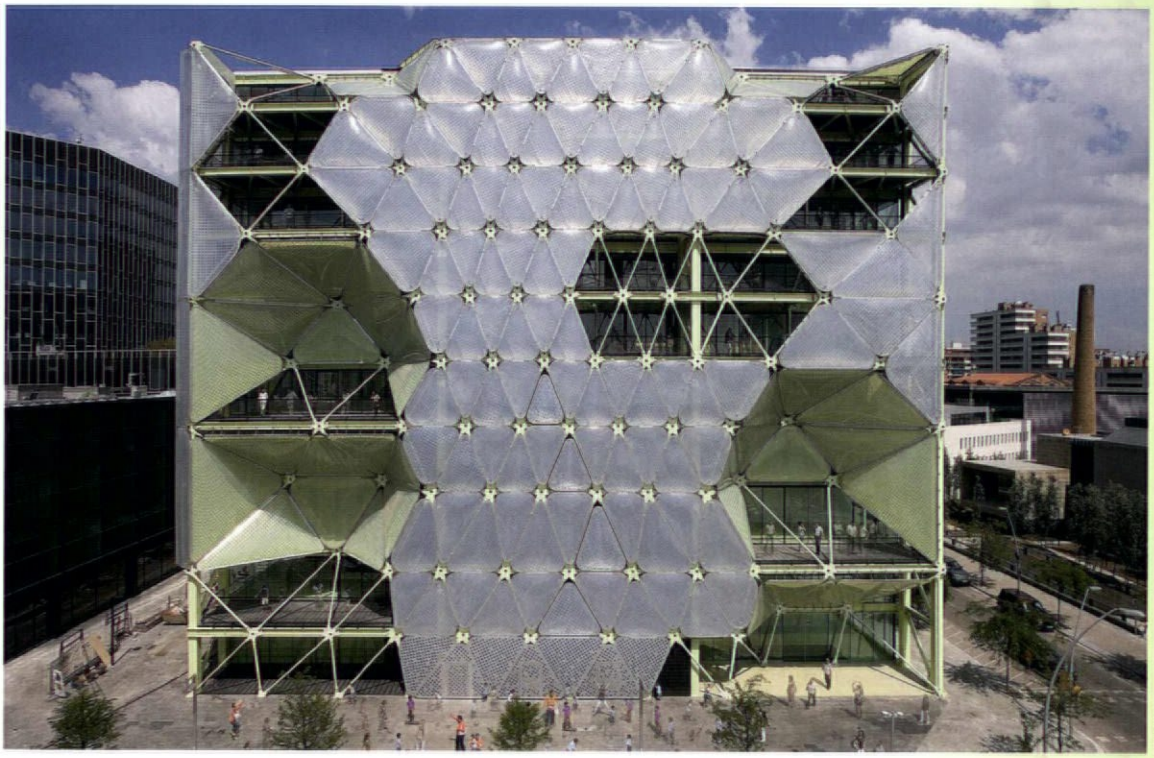
PEOPLE'S CHOICE:

10. Mendocino Farms | Marina del Rey, CA
ARCHITECTURE AND INTERIOR DESIGN: Poon Design Inc.
CLIENT: Mendocino Farms, LLC
PROPERTY OWNER: Caruso Affiliated
GENERAL CONTRACTOR: Dorado Enterprises
GRAPHIC DESIGNER: Yee Design

MEDIA MARVEL

Cloud 9's Media TIC building in Barcelona offers a model of sustainability with its innovative and interactive facades

BY MICHAEL WEBB



Luis Ros

Barcelona is setting the pace in Spain for innovation, and the city planning office is maintaining that lead by collaborating with private developers and institutions to transform a decrepit industrial zone into a showcase of sustainable building. Located to the south of the Diagonal, a broad axis that links the center to the redeveloped waterfront, the 22@ district will accommodate a dense mix of housing and corporate headquarters, along with a new university, a hospital and a film studio. The knowledge industry is fostering a smarter, less monumental architecture. City authorities have provided a new infrastructure to reduce energy consumption, piping in cold water from the sea and warm from a power station, and the latest European construction code mandates a 15 percent reduction in CO2 emissions. The 22@ project is an urban proving ground, and its star achievement is Media TIC, a ten-story, steel-framed office block designed by Cloud 9.

Enric Ruiz-Geli established his studio in 1997 as a laboratory to explore fresh ideas, including new ways of using materials and shaping cities. From the start it was research-driven, collaborating with outside specialists, and the city administration is now one of its clients. Though many of its designs have yet to be realized, it should soon complete a pavilion across from the Cartier Foundation in Paris and, to the north of Barcelona, a complex for the El Bulli Foundation, where avant-garde chef Ferran Adria can continue his experiments. Media TIC, which is energy self-sufficient and reduces carbon emissions by 95 percent, demonstrates the practical utility of Cloud 9's thinking. "Buckminster Fuller inspired me to think out of the box," says Ruiz-Geli. "I wanted to build a model structure on the same budget as a conventional office building."

ABOVE: Cloud 9's Media TIC building in Barcelona uses a combination of innovative façade systems to realize architect Enric Ruiz-Geli's ultra-efficient vision.
OPPOSITE: Vertical ETFE cushions wrap the southwest side of the structure.

Gunnar Knechtel

THIS PAGE AND OPPOSITE TOP AND BOTTOM: The southeast façade is covered with triangular silk-screened ETFE cushions, which inflate in response to built-in heat sensors.

Fuller was fond of asking how much a building weighed: Media TIC is a third the weight of a typical concrete-frame structure. Ultra-thin, column-free concrete floors are suspended from steel trusses that span the peripheral steel frame. That saved 1.5 million euros on the foundation, and an innovative system of cross bracing—using bars of different thickness to distribute the loads—reduced the amount of steel by 25 percent. These economies paid for the interactive, climate-responsive facades. The block occupies a corner site, and a neighboring building partially shades the northwest side. There and to the northeast the skin is clear glass. The southeast façade is protected by a hundred gray silk-screened ETFE cushions, each equipped with a heat sensor that prompts a computer-controlled air pump to inflate or deflate the three dotted layers. The dynamic character of this breathing skin is enhanced by the green-toned recesses of terraces serving public programs within the building. The base is protected by digitally fabricated "flowers" of perforated metal.

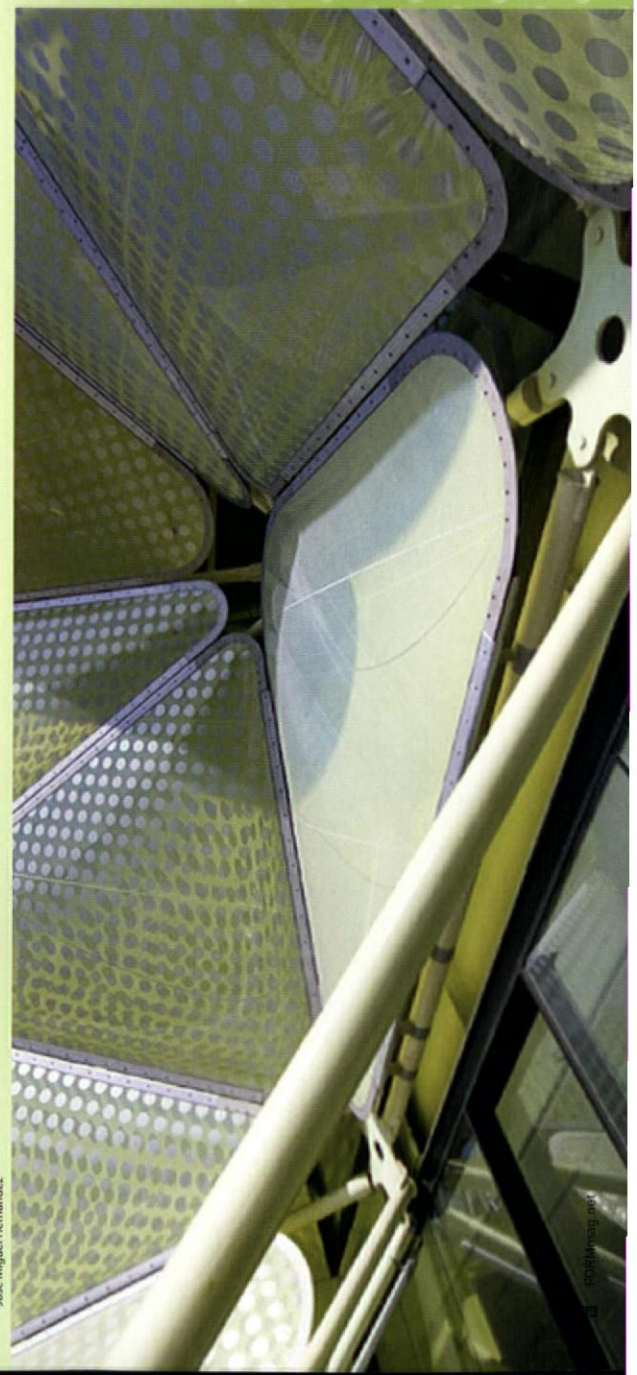
The southwest façade is screened by vertical ETFE cushions that can be inflated with nitrogen fog—vaporized with oil to ensure even distribution—which filters the glare and heat of the sun. The roof is covered with photovoltaic panels, and the exposed structural frame is coated with lime-green bioluminescent paint, which glows for six hours on the energy it absorbs from the sun. "We were inspired by jellyfish, and we are sending a message, 'Shut down the lights!'" says Ruiz-Geli. Motion sensors perform that task within the building, and the abundant natural lighting further limits the need for artificial illumination.

The mix of sensuality and wizardry would also have delighted Fuller. As an inventor, he is best known for the climatically inefficient geodesic dome, but he produced a stream of sophisticated devices in his earlier years—notably the idea-crammed Dymaxion House, which has been reconstructed by the Henry Ford Museum in Dearborn, Michigan. Years of research precede all of Cloud 9's projects. When I first called on Ruiz-Geli, two of his assistants were playing with soap bubbles, testing the tensile strength of a liquid membrane in preparation for the ETFE roof canopy of El Bulli. For Media TIC, every surface and device was mocked-up in the studio and rigorously tested on different scales. Recycled linoleum and perforated, sound absorbent ceilings represent the low-tech end of the spectrum; the other is revealed in the interplay of computers, sensors, pumps and valves that animate the cushioned facades. Three floors are occupied by university researchers; the penthouse is leased to private firms at the highest commercial rent in the city.

In keeping with the mission of Media TIC to educate the public as well as to serve its occupants, the expansive lobby is a welcoming forum for exhibits and events that's named "Pensat in Barcelona." The Catalan translates to "thought up in Barcelona," and it demonstrates the varied strategies of local manufacturers and research institutes. Cloud 9 is moving its offices from a historic courtyard in the Eixample to an open floor of this building, to demonstrate its commitment to the principles the structure enshrines and to be closer to individuals and firms that are also pushing the envelope. ■

Luis Ros

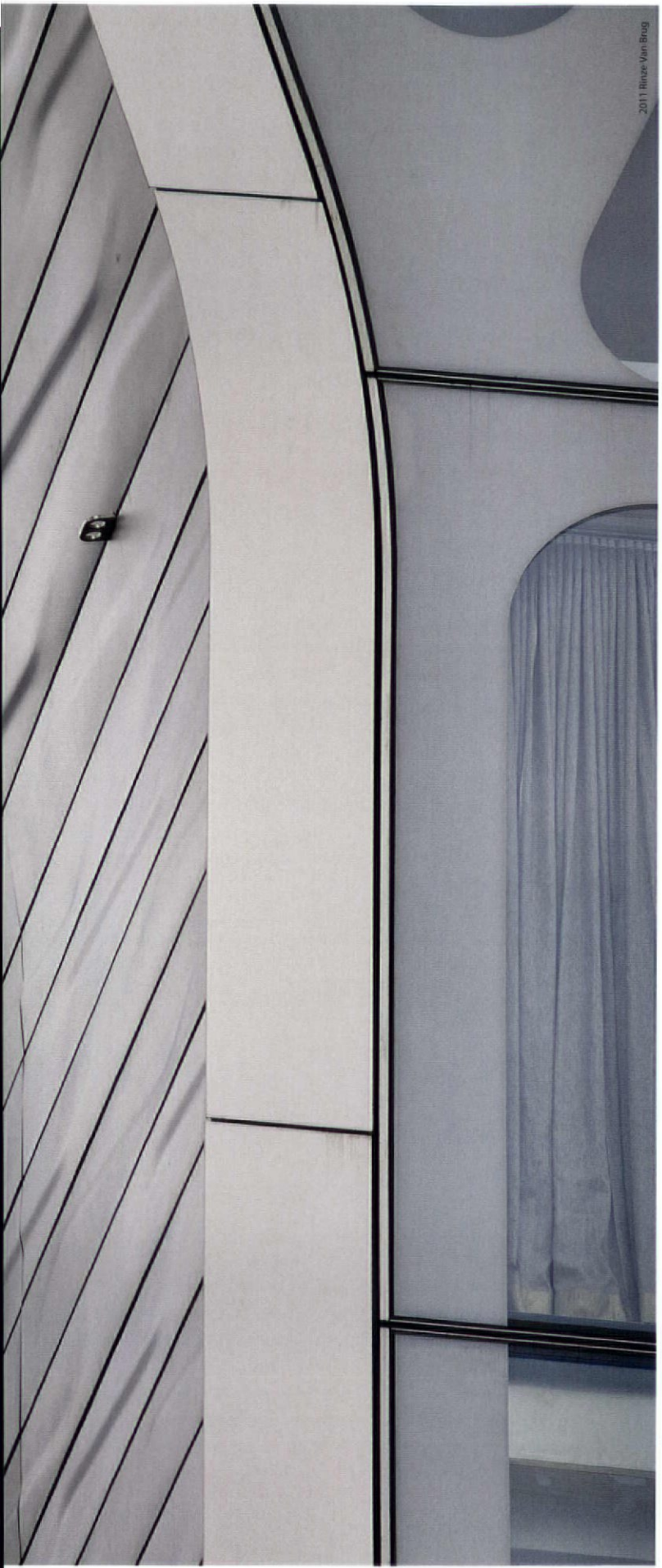
Enric Ruiz-Geli



José Miguel Hernández

PUSHING THE ENVELOPE

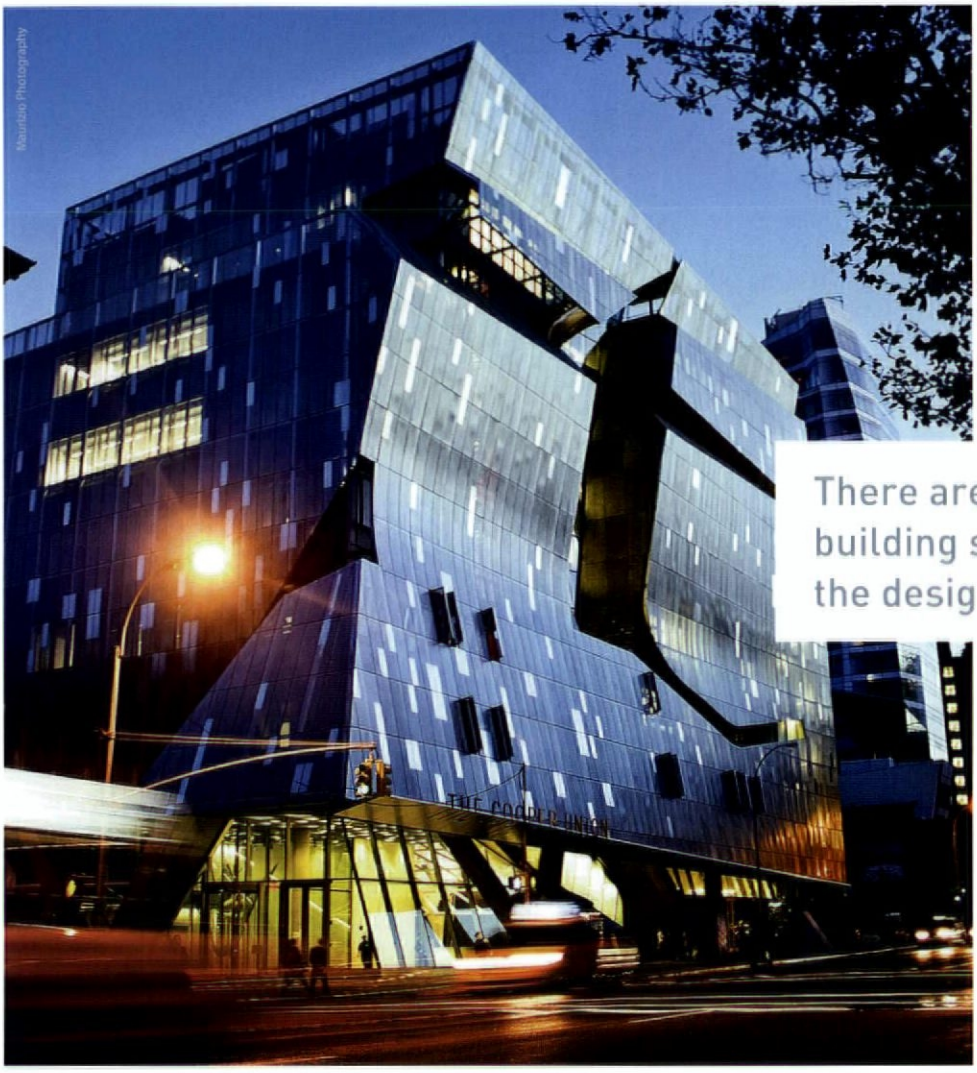
In response to growing performance demands, building facades evolve to balance form with function. BY JOHN GENDALL



THE CONTEMPORARY BUILDING IS SHAPING UP TO BE DEFINED NOT JUST BY THE largely aesthetic categories that have dominated architectural history, but also by an emphasis on performance. Throughout the twentieth century, building envelopes became thinner and thinner, moving from the initial emergence of curtain walls to the more recent development of entire buildings clad in nothing but glass and spider clamps. Though this allowed buildings to become increasingly transparent and more legibly modern, these methods carried major environmental inefficiencies because of the easy heat gain/loss allowed by thin surfaces. So, facing an urgent climate crisis, architects are racing to mitigate the environmental costs of their work. As a principle culprit, building skins have been placed squarely in the crosshairs by a growing industry of façade designers now taking on this new challenge.

Energy demands, though, are just the beginning. Cities are becoming more populated and tightly configured than ever before, and residents often come with a certain set of sometimes-conflicting expectations: daylight, privacy, security, quietness and clean air. As Mic Patterson, director of strategic development for the Advanced Technology Studio of custom façade specialists Enclos puts it, "the bottom line is this: there are a lot more demands on building skins than ever before, and the designs are more complex."

LEFT AND ABOVE: Front, a design and façade consultancy firm, recently consulted on Neil M. Denari Architect's HL23 building along the High Line in New York. The structure's eye-catching surfaces combine opaque and transparent materials.



Mauricio Photography

One of the visible markers of this shift is that architects are revising the goal of an ultra-thin, entirely transparent building skin. "What we're seeing now is that facades are getting deeper," says Patterson, citing elements like double-skins and sun shades. "If you consider the recent projects designed by Morphosis, for example, they have surfaces that are up to six feet deep. Somewhere in there is a weather skin."

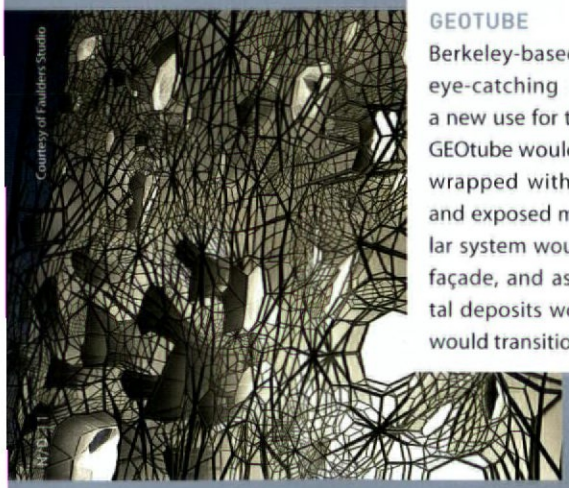
> There are a lot more demands on building skins than ever before, and the designs are more complex.

Indeed there is. IBE Consulting Engineers worked with Morphosis on the Cooper Union academic building in New York. Peter Simmonds, senior associate and head of IBE's Advanced Technology Group, explains, "we normally want to get daylight in, but we need to avoid solar radiation. It's always a delicate balance."

With Cooper Union, Morphosis and IBE designed an outer mesh to envelop an interior skin as a way to stop solar radiation from

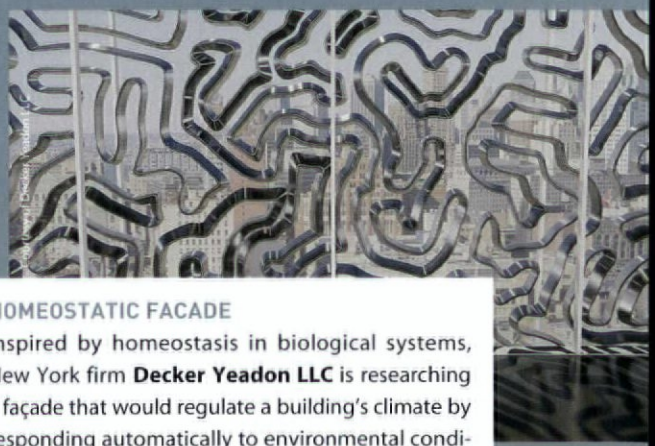
THE FUTURE OF FACADES

Innovative concepts in building skins


Courtesy of Faulders Studio

GEOTUBE

Berkeley-based **Faulders Studio** envisions an eye-catching addition to Dubai's skyline and a new use for the Persian Gulf's salty waters. The GEOtube would feature a structural steel lattice wrapped with fiber reinforced polymer (FRP) and exposed membrane skin. An external vascular system would spray local salt water over the façade, and as the water evaporates, salt crystal deposits would aggregate, and the building would transition from transparent to opaque.


Courtesy Decker Yeadon LLC

HOMEOSTATIC FACADE

Inspired by homeostasis in biological systems, New York firm **Decker Yeadon LLC** is researching a façade that would regulate a building's climate by responding automatically to environmental conditions. The ribbon-like design—housed between a building's curtain wall and interior surface glass—works with a dielectric elastomer wrapped over a flexible polymer core. The ribbon would open and close to control solar heat gain locally along any segment of the façade.

hitting the glass in the summer. But, during the cold New York winters when solar radiation is coveted, they allowed the facades to open up.

IBE was also part of the competition-winning team—which included Heerim Architects & Partners, Mooyoung Architects and Engineers and Gensler—for South Korea's Incheon International Airport design, which featured a breathing roof consisting of double-skin air pillows.They will allow for ample daylight, and, to prevent heat gain/loss, the client can manipulate the temperature within the pillow. "In this scenario," says Simmonds, "the heat loss comes from the cushion rather than from the main space."

With these complex sets of issues, and with a growing list of available materials—"the National Fenestration Rating Council lists over 4,000 types of glass now," notes Simmonds—façade consultants are integral design partners.

"The challenges are almost never about design or engineering," explains Michael Ra, a partner in the San Francisco office of Front, a design and façade consultancy firm. "The challenge is to find a way to get it built. Over the years, one of the things we've done is to become more detailed and specific, so that when documents are in front of contractors, they're able to translate them readily."

At Enclos, Patterson positions the practice in a "design-assist" relationship, where the firm partners with architects in the very initial stages of projects and works through many of the details in 3D software.

Though contemporary facades can offer a litany of features to enhance performance, and though many of these features are highly technological, they should not be regarded as a futuristic cure-all to cover up an otherwise poorly designed building. "Shading is the best way to introduce performance into a façade," says Patterson.

"In terms of energy goals, we're on the passive end," echoes Ra. "Instead of looking for new gimmicks, we're looking for ways to deploy what is already available. You have to straddle the issue a bit. Passive means you have sound fundamentals—orientation, mass, site—and everything else gets added."

Front recently consulted on HL23, a 14-story residential building along the High Line in New York designed by Neil M. Denari Architects. For the Eastern elevation, the designers called for an opaque wall because of daylight and privacy concerns. They rendered this into an ornamental surface made with panels constructed in Argentina by underwater explosion forming. For the other surfaces, Front was able to use glass. "It's a high-performance building in terms of its energy expenditures," explains Ra, "but it still utilizes the same basic elements that most buildings are made from."

HL23 highlights the delicate balance embodied in today's facades—complex shapes, ornamental surfaces, and performance-driven designs. Even though performance issues have been moved to the foreground, surfaces will remain eminently aesthetic. "One of the interesting things about facades," Patterson says, "is that they uniquely combine performance considerations with aesthetic considerations." This, one hopes, is how the history books will frame the beginning of the 21st century. ■

OPPOSITE: IBE Consulting Engineers worked with Morphosis to help develop an innovative façade for the award-winning Cooper Union building. The resulting outer layer of mesh keeps solar radiation from hitting the interior glass.

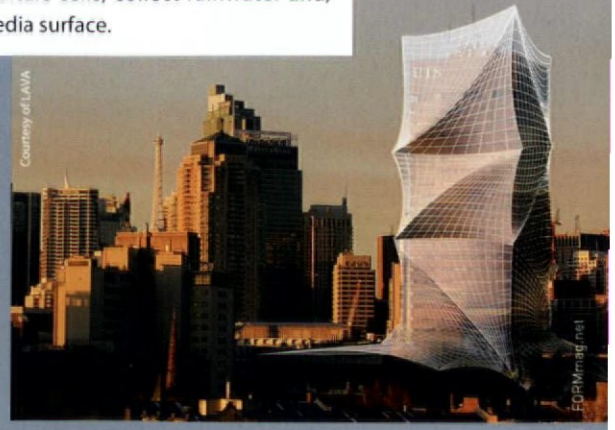
Ben Hosking

PIXEL BUILDING

Designed by **Studio 505**, the Pixel building was awarded the highest score possible by Australia's Greenstar V3 rating system. The architects achieved this level of sustainability in part by finding intelligent uses for every surface. The roof is covered with native grasses, which collect and filter water, and photovoltaic panels. Reed beds grow on ledges along the windows to filter grey water, and colorful geometric panels cut from sheets of recycled aluminum shade the windows.

TOWER SKIN

Although conceived for the UTS Tower in Sydney, the Tower Skin proposal has much broader implications. Developed by **LAVA**, the project involves a translucent cocoon-like skin—made from lightweight, high-performance composite mesh—which would encapsulate an existing structure and effectively change its identity and sustainability. The new skin would create its own microclimate, generate energy with photovoltaic cells, collect rainwater and, at night, act as an intelligent media surface.



Courtesy of LAVA

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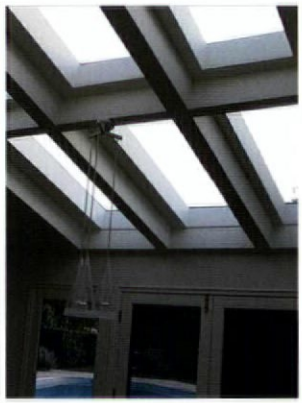

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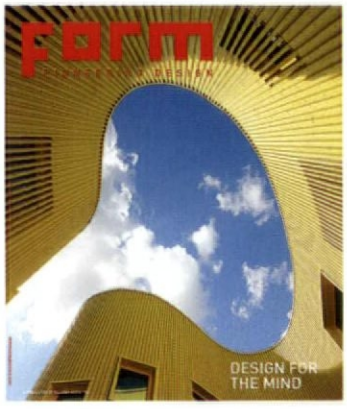

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Nebuta House

AOMORI, JAPAN
CLIENT: City of Aomori, Japan
DESIGN + SITE SUPERVISION:
ARCHITECTURE: molo
d&dt Architects
Frank la Rivière Architects Inc.
STRUCTURE: Kanebako Structural Engineers
MEP: PT Morimura & Associates, Ltd.
Masanori Sodekawa, Takashi Yoshida (mechanical), Akira Katayanagi (electrical)
ACOUSTICS: Nittobo Acoustic Engineering Co. Ltd
GRAPHICS: Studio Fukude
CLIENT REPRESENTATIVE: Tomoichi Urushidate

EXECUTION:
ARCHITECTURE: Kajima – Fujimoto – Kurahashi Construction JV
ELECTRICAL: Yoden – Utou Construction JV
Kouji Kawayama, Akikazu Okuzaki
(Stage Lighting: Yutaka Oda,
Stage Audio: Akihiro Kimura)
MECHANICAL: Shikanai – Daiki Construction JV

Dynabyte

STOCKHOLM, SWEDEN
ARCHITECTURE AND INTERIOR DESIGN:
PS Arkitektur, Peter Sahlin, CEO,
and Erika Janunger, Project Architect
GENERAL CONTRACTOR: Bonnier Fastigheter
CLIENT: Dynabyte / Anders Lentell CEO
PROJECT MANAGEMENT: Nomad Projekt / Sven Gustafsson
PHOTOGRAPHER: Erika Janunger

Armstrong Senior Housing

SAN FRANCISCO, CA
CLIENT: BRIDGE Housing
AFFILIATED GOVERNMENT AGENCY:
San Francisco Redevelopment Agency
AFFILIATED GOVERNMENT AGENCY: HUD
ARCHITECT: David Baker + Partners
ASSOCIATE ARCHITECT: Full-Circle Design Group
STRUCTURAL ENGINEER: Structural Design Engineers
ELECTRICAL ENGINEER: Bhatia Associates
LIGHTING DESIGNER: Horton Lees Brogden
GEOTECH ENGINEER: Treadwell + Rollo
MECHANICAL/PLUMBING ENGINEER: Tommy Siu + Associates
ACOUSTICAL ENGINEER: Wilson Ihrig + Associates
SOLAR CONTRACTOR: Sun Light & Power
CONTRACTOR: Nibbi Brothers General Contractors
CIVIL ENGINEER: Luk + Associates

Mocha Mojo

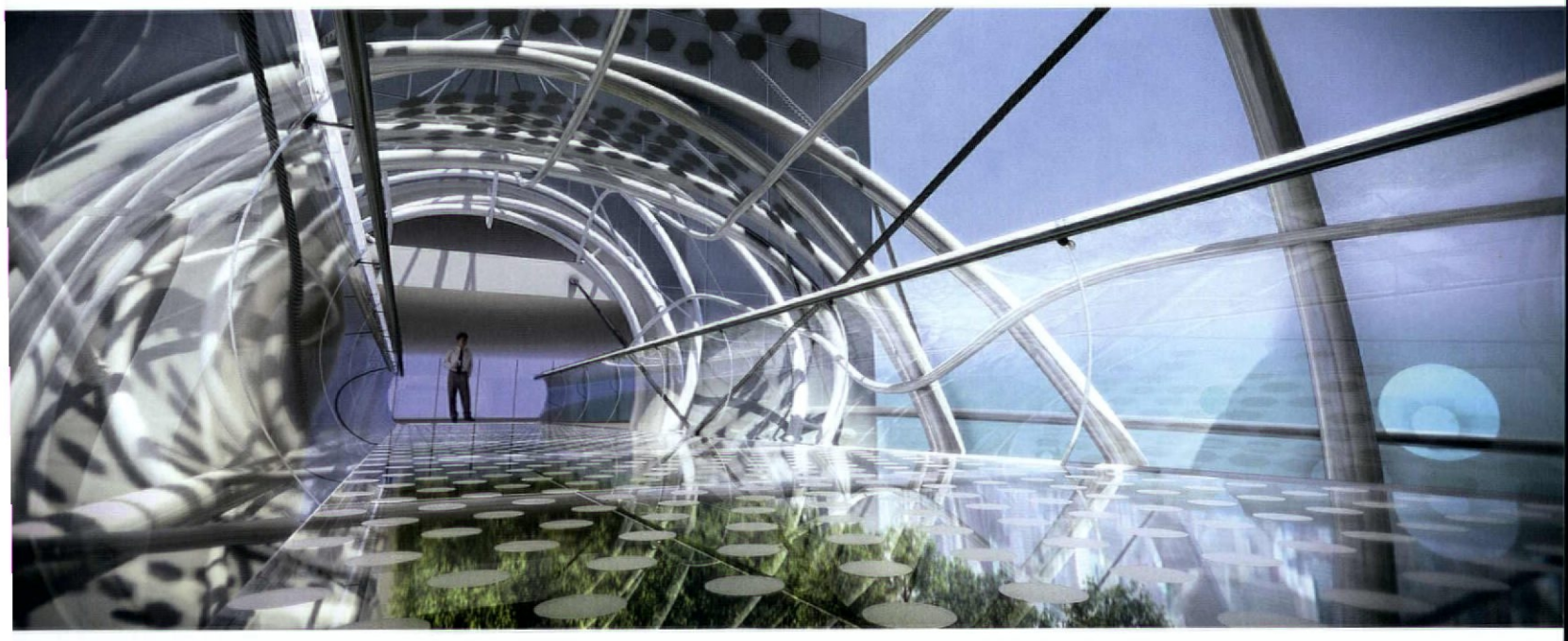
CHENNAI, INDIA
INTERIOR DESIGN: Mancini Enterprises Pvt. Ltd.
ENGINEER/LIGHTING: Mancini Enterprises Pvt. Ltd.
GENERAL CONTRACTOR: Mancini Enterprises Pvt. Ltd.
CLIENT: Oneworld impex Pvt. Ltd. as franchisee of Mocha Mojo by Impresario Entertainment & Hospitality Pvt. Ltd.
PROJECT TEAM: Niels Schoenfelder, Bharath Ram, V.S. Aneesh, Velu R.,
Sangeetha Patrick, Natasha Jeyasingh

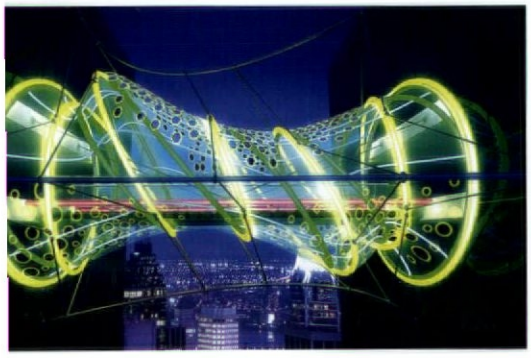
Wahroonga Preparatory School

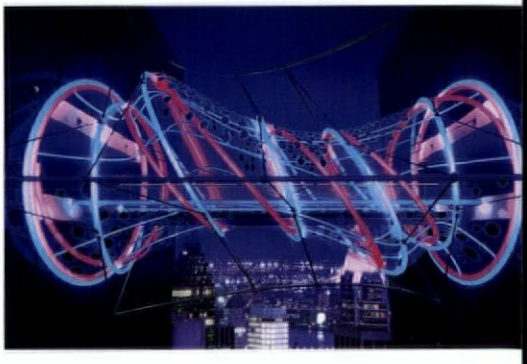
WAHROONGA, AUSTRALIA
CLIENT: Wahroonga Preparatory School
PROJECT ARCHITECT: GGF Architects, Derek Raithby
INTERIOR DESIGN: GGF Architects, Fiona Swan
CONTRACTOR: Admire Build Pty Ltd.
PLANNER: Glendinning Minto & Associates
HERITAGE ADVISOR: NBRS+Partners
STRUCTURAL & CIVIL: Eclipse Consulting Engineers
HYDRAULIC & TRAFFIC: Martens & Associates Pty Ltd
ELECTRICAL ENGINEER: Crowley Consulting Pty Ltd
FIRE: Paramount Fire Consultants
ENERGY: Partners Energy
ACCESS: Gordon Fuller
BCA: BCA Insight
CLADDING SYSTEM: Fairview Architectural Pty Ltd
PHOTOGRAPHER (1): Tanja Milbourne Photography
PHOTOGRAPHER (2): ArchiShot

"The double-helix structure is designed with carbon-fiber, semi-flexible tubes and the cylindrical skin with a transparent tensile membrane. A connection between two independent structures cannot be rigid, so this bridge is based structurally on a tensile body. It allows, and does not interfere with, movements between the buildings."

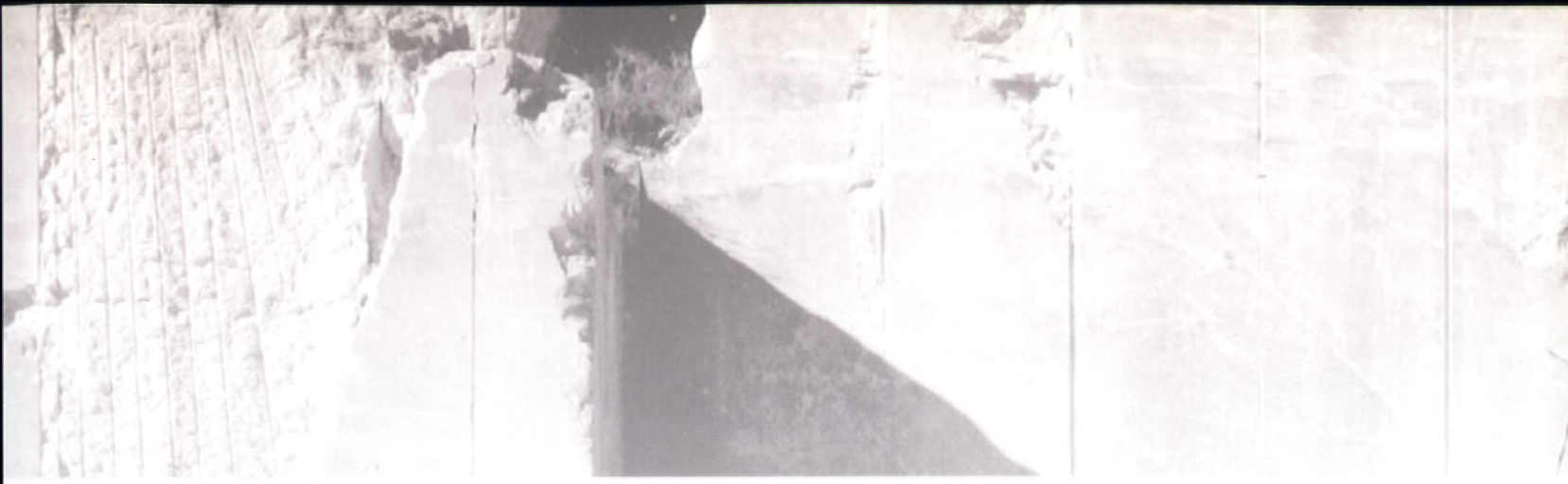
-Sergio Sanz Pont
cofounder and principal







FIRM: sanzpont [arquitectura] | PROJECT: The Dynamic Shape-Shifting Helix Bridge (DSSH) was a competition entry for the Building to Building Pedestrian Bridge Challenge | LOCATION: Montreal, Canada | DESIGN TOOLS: Blender on Mac OS X



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