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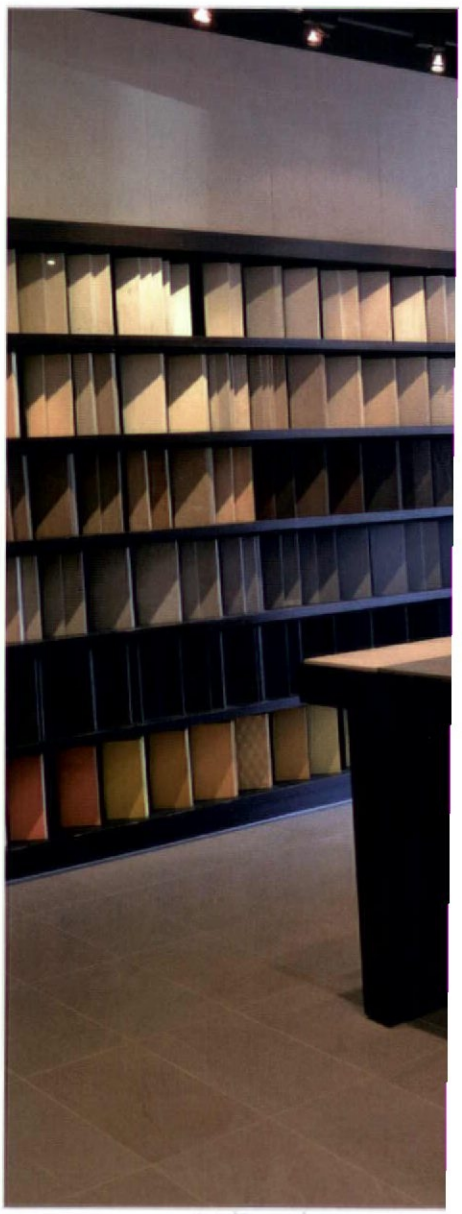

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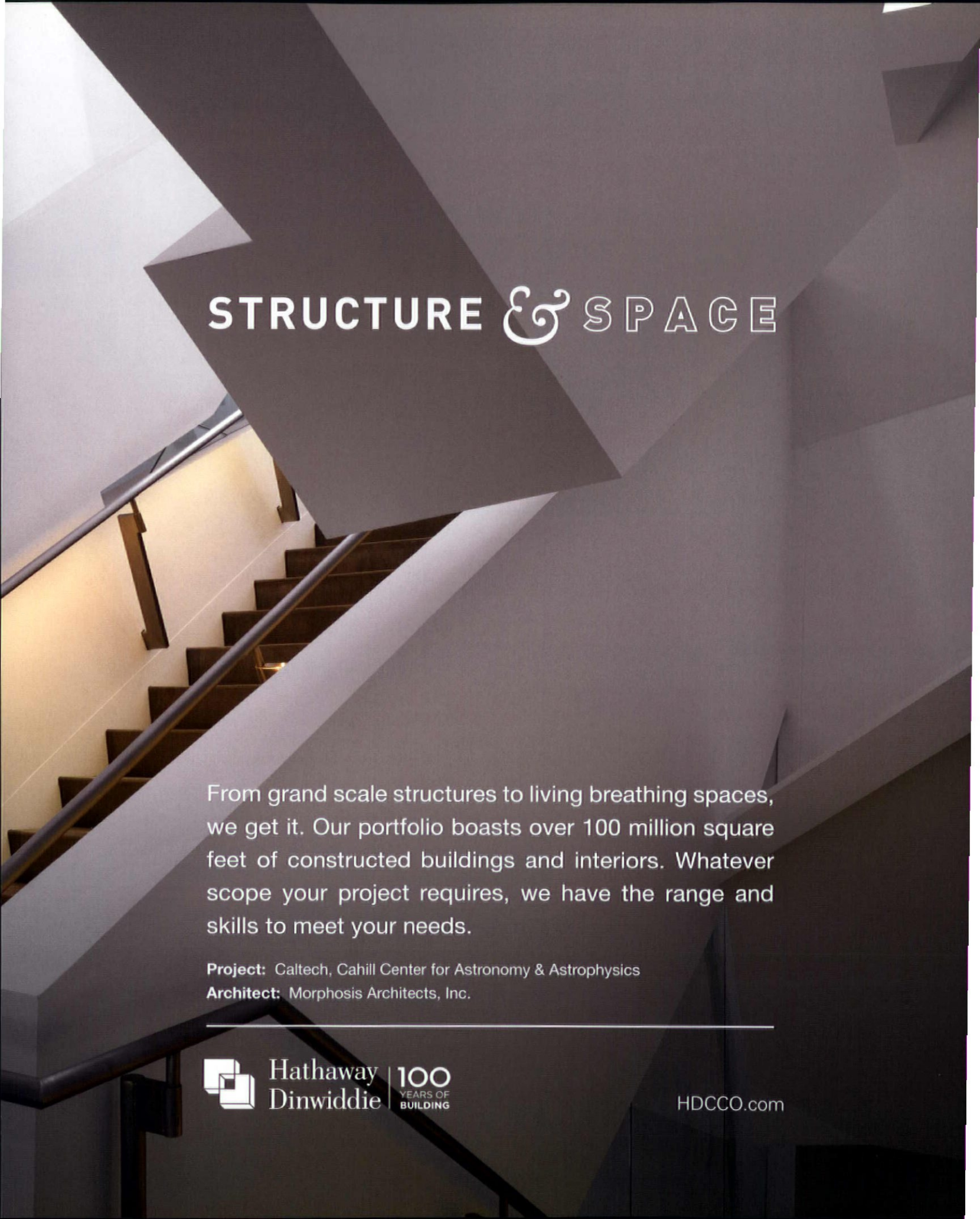
COMING SOON

Deliciously Entertaining

FORM's April event treats the eyes and stomach

FORM MAGAZINE KICKED OFF THE SPRING SEASON WITH ITS Vertically Inclined event at Bulthaup Santa Monica. James Brasuell, FORM's online content manager, presented a talented panel—including event host and Bulthaup showroom owner Chris Tosdevin; Scott Johnson, design partner of Johnson Fain; and audio/visual expert Bradford Wells—who treated guests to an informative and entertaining presentation on designing and building for the high-end client. Celebrity chef and food stylist, Jack White wowed partygoers with decadent appetizers and desserts, which he prepared with the showroom's appliances from Gaggenau USA. Wine and other refreshments were contributed by Morley Builders and Bulthaup Santa Monica.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EDITOR'S NOTE

When it comes to technology, people have strong opinions. Is it helping us or hurting us? Is it saving us time or giving us new ways to waste it? When it comes to the world of architecture and design, I'm sure the same discussions apply. But in putting together this issue, we found that designers are implementing technology in inspiring and surprising ways. Technology is changing how firms design projects, build practices, interact with clients and each other.

Carly Hebert

In our feature Wired for Work (page 28), Yuki Bowman talks to four different firms to see how they've harnessed the power of technology to enhance and build their businesses. The responses—from holding virtual meetings to designing custom software—suggest the simple to complex ways designers are engaging with its potential. Michael Webb reports on how after ten years, Gehry Technologies is still taking the lead with its newest platform, GTeam (page 34). The system will offer a new way of working on multilayered projects that will keep all of the key players connected. Our Workbook section (page 16) demonstrates how technology is influencing the built environment, with innovative construction techniques to schools wired like production studios. Susan Macdonald, head of field projects for the Getty Conservation Institute, explains in our P.O.V. column (page 10) how the Getty is turning its vast resources towards conserving modern architecture. The new initiative proves that while technology is moving us steadily towards the future, it's also helping to protect our past.

Caren Kurlander
Editor in Chief

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FORM FOLLOWS LIFE

Conserving Modern Architecture, 2012. Photo by Gail Ostergren.

Minding the Moderns

Susan Macdonald, head of field projects at the Getty Conservation Institute, discusses the new Conserving Modern Architecture Initiative and its first project, the Eames House

What is the Getty Conservation Institute (GCI)?
We are one of four programs at the J. Paul Getty Trust, and our mission is to advance conservation practices in the visual arts with a specific focus on cultural heritage sites. We try and make sure that conservation practice is continually improving and taking advantage of new technologies and techniques.

Why did the GCI decide to launch the Conserving Modern Architecture Initiative (CMAI)?
The Conservation Institute has been working for a number of years on the conservation of contemporary and modern art, and it seemed to be a nice progression for us to look at conserving modern architecture. As time goes on, more and more buildings from the 20th century become eligible for conservation, and there are some unanswered questions, both philosophical and technical. We felt that jumping into this area was a good fit for us.

What are those unanswered questions?
I think there's an underlying philosophical question about how you approach the conservation of these buildings, and then I think there are some unanswered technical problems. One of the things that's characteristic of the modern era is this massive expansion of the type of materials that were used and an abandonment of traditional materials and construction techniques. They all haven't stood the test of time that well, and we don't yet know how to conserve some of these materials.

Can you give an example?
Concrete has been around for about 100 years and is very prevalent in the postwar era. To repair concrete on a building that hasn't been painted, you cut out the concrete, fix the reinforcement bars underneath, and then you patch it. The patches look pretty horrible so you put a coating over the top so the whole building becomes painted. If you think of Le Corbusier's Unite d'Habitation, the use of concrete was meant to be a very honest expression of material. We really want to maintain that aesthetic and that kind of key architectural driver that related to the choice of materials. So we need to solve some of those problems in a way that meets the normal approach to conservation, which is careful retention of fabric, minimum intervention and trying to retain the original aesthetic.

What are some of the other challenges?
Another problem, particularly in the postwar era, is the use of prefabricated materials. When they reach the end of their lifespan and they're no longer being fabricated, what do you do? Do you try to craft one to match the original? If we have to handcraft something, it becomes really expensive. So do we go back to the spirit of the

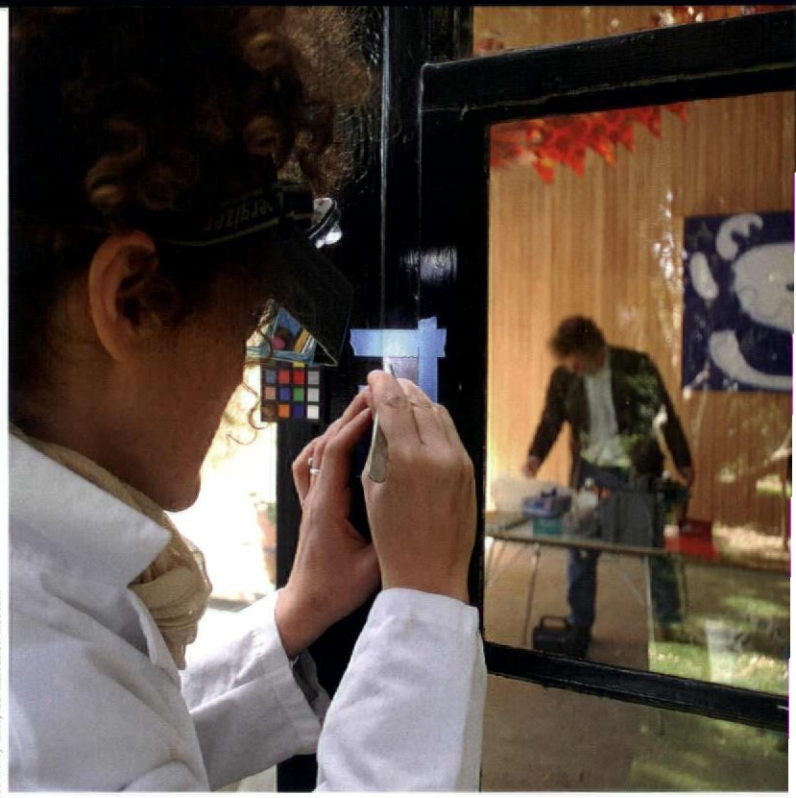
intention, which was using something that's easily available and reasonably cheap to manufacture? Or do we take a more crafted approach? There are some interesting philosophical problems, as well as physical problems, that you have to consider when making those decisions.

How was the Eames house selected as the first project?
We met with the foundation and the foundation's architects, a local firm Escher GuneWardena. We found that their approach to this building really resonated with some of the things that we feel are important when you're trying to prolong the life of some of these materials, and that is a very careful long-term approach, where the maintenance of the building is considered very much a conservation action. So now we're working with the Eames Foundation to look at the short, medium and long-term care of the house.

What are the goals for the house?
Because the collection has gone to LACMA, they wanted to make sure that when it came back, they'd created an optimum environment for it. And one of the things that the Getty has been involved with in the past was finding ways to manage the internal environment of house museums. So it was a great case study for us to show how you could apply that approach to a modern building with a really important collection in it.

How did you start?
We started by looking at the internal environment for the collection, and then it expanded from there. We've been doing paint analysis of the external frame of the building, we've been giving advice on the timber—what type of treatment the wood inside the house has had on it and what type they should have in the future—and now we have decided with the Eames Foundation that we'd work together to create a conservation management plan. It's a framework for understanding the place, the history, its physical fabric, where it's vulnerable, and then developing policies for managing the vulnerabilities. From that you develop a long-term maintenance plan. If you do regular and ongoing maintenance it keeps you from having to do large-scale, project-based rescue work.

Tell me about the process of assessing the house.
We set up a weather station on the site, which records the climate of the house, the temperature, the humidity and the wind-speed. And then inside we're using environmental monitoring techniques to record the temperature and humidity so we can understand what the existing climate is and how it may need to be modified for the collection. We've also used things like endoscopes to look down inside the heating ducts and behind the timber walls. We've got soil sensors sitting behind the concrete retaining wall that forms one whole side of the house to see what sort of moisture ingress we might be getting. We've used a scientific approach for taking very small samples of different paints and then looking at them through high-level microscopes. Then we've used different techniques to tell us about the components of the paint. It also helps us to understand the history and the chronology of the painted finishes.



Courtesy Getty Conservation Institute

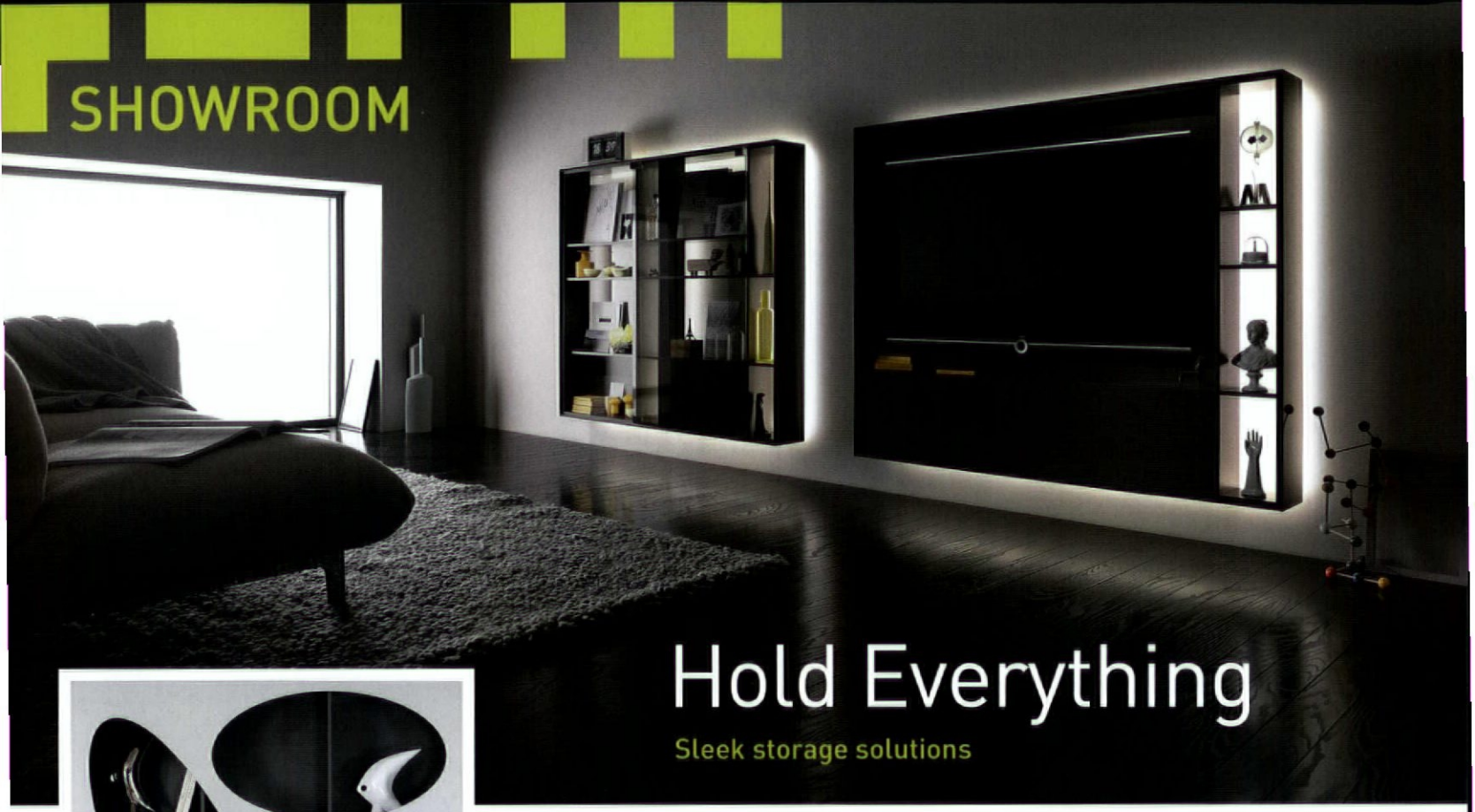
OPPOSITE: The Eames House will be the first project studied by the Getty Conservation Institute's new Conserving Modern Architecture Initiative. ABOVE: Paint is one aspect being studied.

How do thorough restorations of private modern houses differ from conservation?
This house is not operating as a dwelling, so it offers an opportunity to give it another level of care. I think when you're dealing with an individual house that's owned by an owner, their primary motivation is that they want to continue to live in it. So they might have to make some compromises that we don't have to. There are some things that we're going into detail about because we're learning things that could be more widely applicable, and then maybe the next person doesn't need to go to that same level of research.

How will the knowledge you obtain be disseminated?
Dissemination, education and training are at the core of everything we do. In terms of how we're going to do it for CMAI, first, we want to hold a series of public lectures, panel discussions and seminars here in Los Angeles. There are a lot of professionals here who have been looking at these issues and struggling with them. So we're really interested in hearing what they're struggling with, so we can begin to address some of those needs.

What's next for the CMAI?
We're going to spend the next six months to a year talking to the profession and hearing what they have to say to help us target where we want to go. We want to delve into some serious research on the material and technological issues. We want to spend time working out which ones the professionals are finding most difficult, most urgent and which will have the most widespread impact. We want to continue to find where the knowledge gaps are and then do research and work to help fill those gaps.

—Interview by Caren Kurlander



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Created by engineer Paul Schärer and architect Fritz Haller more than 40 years ago, the USM Modular Furniture Haller collection remains a timeless storage option today. The **Haller Credenza**, sold through Jules Seltzer Associates for $2,234, is made with a framework of chromed steel tubes connected with chrome-plated, brass ball joints. Powder-coated metal panels are offered in a variety of colors. **julesseltzer.com**

INTERLÜBKE

German furniture manufacturer Interlübke is introducing its Bookless line of wall-mounted media cabinets, room dividers and floor-to-ceiling shelving. The sleek pieces, made with thin MDF, glass and LED lighting, come in a high-gloss or matte finish and are meant to showcase belongings in a gallery-like way. Prices start at $2,917. **interluebke.de**

ROCHE-BOBOIS

The **Denia** bookcase by Roche-Bobois offers form and function. Front panels, available in thirteen shades of matte lacquer, are marked with oval apertures, which can be arranged in various patterns to reveal a grid of shelves inside. The interior panels of the bookcase are made from durable anthracite melamine, and the piece sells for $4,476. **roche-bobois.com**

BLU DOT

The $99 **Juice Box** charging system is the perfect accessory for the information age. Designed by Blu Dot and made of sturdy mitered walnut, the Juice Box features a removal wool-felted top and space to plug in four devices—from a smart phone to an iPod—in one place, without the mess of tangled cords and cables. **bludot.com**

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Power Play

BWP morphs its industrial site into a visionary—and verdant—EcoCampus

Courtesy of Heliphoto/AHBE Landscape Architects

When Burbank Water and Power (BWP) set out to redesign its campus, the goal was very specific: demonstrate that an industrial site can incorporate sustainable elements, blend into its urban setting and contribute to the economic vitality of the community. The resultant EcoCampus meets all of those criteria, while showing how technology and nature can work together to sustainable, profitable and beautiful results.

"For many, the idea of sustainability and conservation means sacrificing or doing without," says Joe Flores, conservation manager for BWP. To the contrary, BWP was looking for ways to "get more and have something better, but with less resources."

BWP reached award-winning status in 2005, when upgrades to the campus included three LEED Platinum structures and a power plant operating on 100-percent recycled water, one million gallons of it per day. At the time, BWP also replaced several existing substations and realized an opportunity to achieve something even greater: the transformation of an aging industrial site into a regenerative green space.

The plant commissioned AHBE Landscape Architects to devise a landscaping program for the property that would complement and enhance technological advances, like the solar carport that powers nearly 100-percent of the energy needed for the LEED Platinum Service Center and Warehouse building, while capturing and channeling storm water into underground storage and percolation tanks.

Calvin Abe, president of AHBE, said his firm's aim was twofold: "To focus on the idea of water as a critical resource from the perspective of conservation, filtration and infiltration," he says, "and to re-contextualize a salvaged substation into a garden space usable for events and functions."

Those goals have been realized in myriad ways, including establishing one of Southern California's longest "green streets," where the landscape running across three contiguous city streets acts as a filter before runoff enters the storm water system. Abe also implemented the use of California native and drought tolerant plants and installed three rooftop gardens, which work to insulate the historic BWP Administration building and reduce the "heat island effect."

The EcoCampus also serves as a reminder that repurposing what exists is a major factor of sustainability. This is evidenced in BWP's Centennial Courtyard, now a gathering place for employees. Here, a substation that, according to Abe, "was only serving as a historic reminder of past technologies" has been repurposed as part of a living trellis that will grow over time. Artifacts like concrete footings and slabs that were left in place for historic significance are now married with elements like a phytoextraction channel, which collects and filters storm water from the courtyard and adjacent roof, solar-powered fountains and a drought tolerant garden with seating.

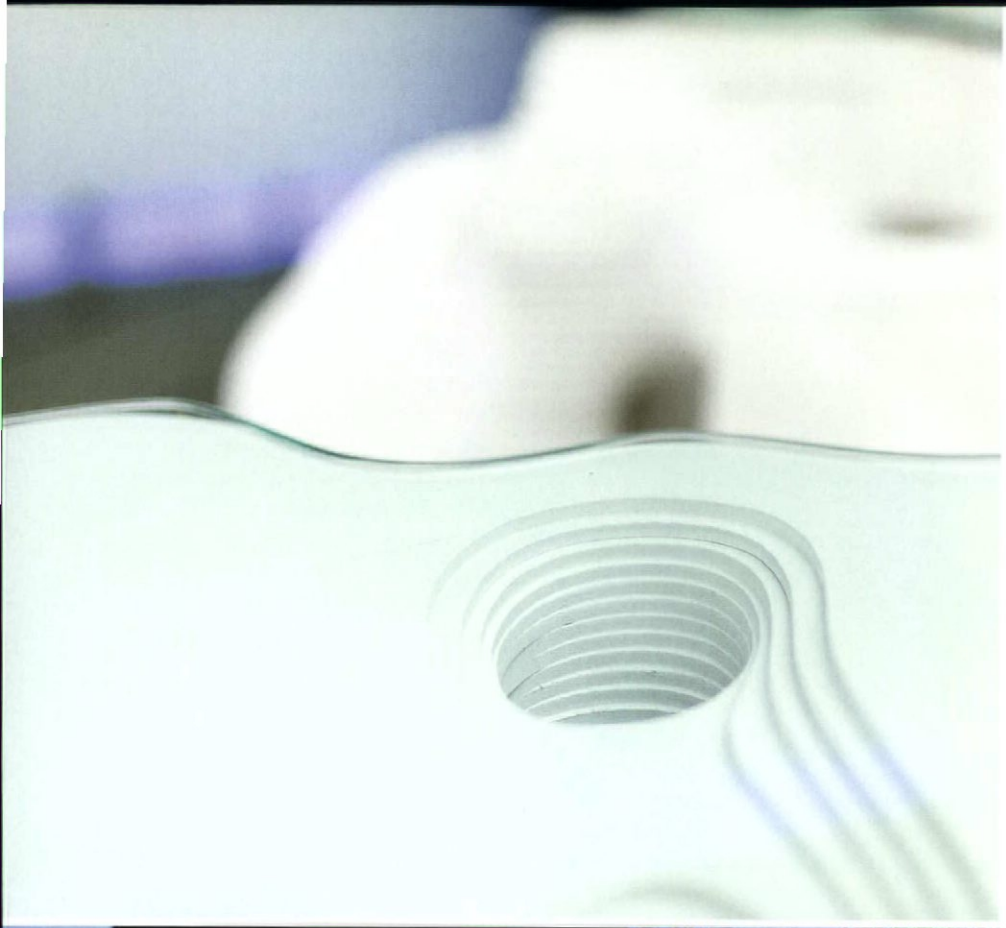
BWP has signed on as the only industrial project to be included in the pilot program for the Sustainable Sites Initiative (SITES). Much like LEED's rating system for buildings, SITES is a first step toward a rating system that will evaluate the landscaping that ties urban environments together. With its participation, BWP hopes it will inspire other facilities to undergo similar sustainable transformations.

—Jennifer Quail

Building Currents

Structures that encourage and reflect technology

For Workbook credits, please see page 39.



Silknet Sales Office

Location: Tbilisi, Georgia
Designer: Architects of Invention
Website: architectsofinvention.com

Architects of Invention approached the design of the Silknet sales office in Tbilisi, Georgia, with the same forward-looking approach as the high-tech company it would symbolize. "Silknet launched IPTV and optical Internet services," says Niko Japaridze, principal architect with the London and Tbilisi-based firm. "That's why we thought of something futuristic."

The sci-fi looking space revolves around a sculptural desk designed to represent an information transmitter. Seventy layers of plywood sheets were cut on a CNC router, assembled on-site and held in place with vertical poles instead of glue. The architects were inspired by "Death Valley canyons that transmit wind and water freely through the openings," in crafting the curves and voids of the sinuous piece.

Above the desk a light source made with Barrisol, a translucent film, illuminates the space while establishing a circular motif picked up again in a perforated wall and the facade. Large and small round windows are lined with reflective stainless steel to "draw attention in and out from both the public and private environments," says Japaridze.

Photography courtesy of Architects of Invention

Fox Technology Center, West Valley College

Location: Saratoga, CA
Designer: Steinberg Architects
Website: steinberg.us.com

"For this project, the vision was to bring the very best faculty from around the campus in all different disciplines—art, science, humanities—into this one facility," says David Hart, design principal with Steinberg Architects, of the new Fox Technology Center at West Valley College. In addition to the multidisciplinary approach, Hart also wanted to engage the picturesque Saratoga, California, campus itself. "We wanted to bring these high-tech spaces into contact with nature."

Keeping this in mind, the structure was designed with curved modules that branch off a long, central core. "It's a very robust core," says Hart. "It has the power and the fiber optics; it's like the spinal cord running through the building." The core spills out into courtyards created by the modules, and ample glazing allows natural light to fill the structure. "As you're walking along a hall or coming out of a classroom, you're engaged with one of the courtyards," says Hart, "which have heavy bandwidth, high-speed wireless Internet." The standing-seam metal modules are sheathed in stripes that reference early punch-card ribbons. "We pulled imagery for all kinds of ways of communicating with technology."

Inside, technology becomes a tool not just for communicating, but also for teaching more effectively. "We're moving towards spaces being more technology rich, " explains Hart. "And we're also moving towards them being more flexible. Wireless is allowing us to do this." The building holds everything from computer-equipped classrooms to wood-paneled auditoriums to high-bay experimental spaces wired like mini TV studios. "They wanted to have a great-looking building with high-tech elements and total flexibility for the future," says Hart.

Photography by Tim Griffith

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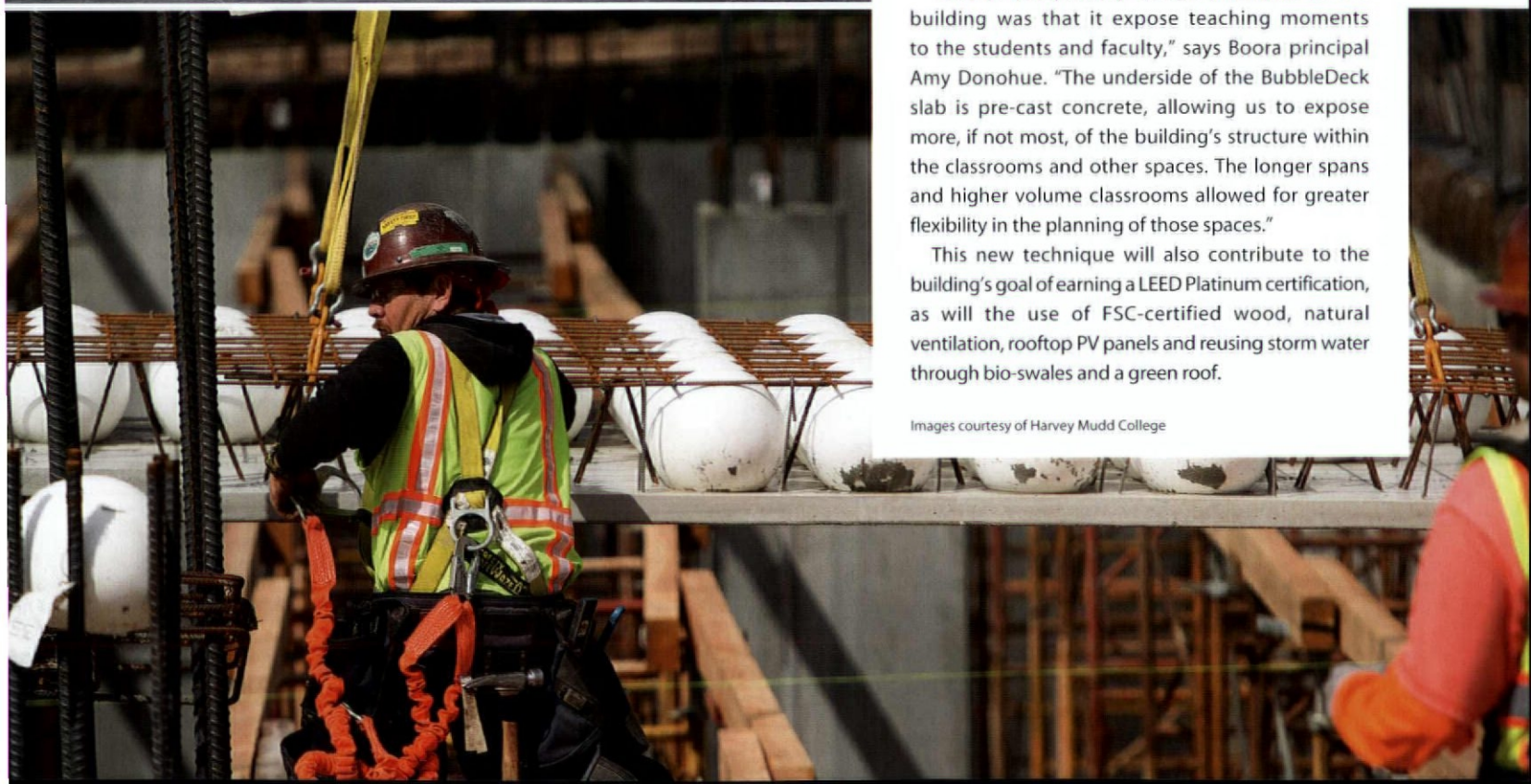

Teaching and Learning Building, Harvey Mudd College

Location: Claremont, CA
Designer: Boora Architects
Website: boora.com

Harvey Mudd College is known for its innovative and rigorous undergraduate program in engineering, science and math, and it's now putting those values into practice with the new Teaching and Learning Building. Designed by Portland, Oregon, firm Boora Architects, the structure will reflect the modern vernacular of the campus with a new vocabulary. Square metal shingles, painted in hues matched to the surrounding buildings, and extensive glazing will enhance the streamlined horizontal lines of the building. The glazing is meant to showcase the work being done inside the building, but the inner workings of the structure also deserve attention.

Boora turned to structural engineer KPFF and general contractor MATT Construction to implement, for the first time in an above-ground building in the U.S., a new voided concrete slab system called BubbleDeck. The biaxial technology retains the performance of reinforced concrete slabs while increasing span lengths and making floors thinner. This is achieved by replacing the area between columns with a grid of recycled plastic spheres sandwiched between layers of reinforced welded wire steel. Concrete is poured over the spheres and the resulting system distributes force uniformly and continuously, while weighing 33% lighter than a solid reinforced concrete slab.

"One of the primary design principles of the building was that it expose teaching moments to the students and faculty," says Boora principal Amy Donohue. "The underside of the BubbleDeck slab is pre-cast concrete, allowing us to expose more, if not most, of the building's structure within the classrooms and other spaces. The longer spans and higher volume classrooms allowed for greater flexibility in the planning of those spaces."

This new technique will also contribute to the building's goal of earning a LEED Platinum certification, as will the use of FSC-certified wood, natural ventilation, rooftop PV panels and reusing storm water through bio-swales and a green roof.

Images courtesy of Harvey Mudd College

HOK PRODUCT DESIGN
SPONSORS INTERNAL COMPETITION

In its first 3 years in existence, HOK Product Design and its Advisory Board had already reviewed 400 idea submissions and had 35 ideas launched or in development. The best of the best ideas were selected twice a year to fund and move forward into development. But the company felt that many people at HOK hadn't yet taken the plunge to submit their idea and that many stones had been left unturned.

In February of this year, HOK Product Design decided to sponsor an internal design competition with Gold, Silver and Bronze Awards for the best ideas. The winning individuals or teams would receive prize money as well as internal recognition on HOK's intranet. The competition rules were sent out firmwide on March 1st, responses were due back on April 1st (April Fool's Day) and the jury would make their selections and award by May 1st. Twenty-Six fantastic ideas were submitted for review ranging from furniture to lighting, sustainable to humanitarian, and everything in between.

The Gold Award went to a team with members from three offices and three disciplines. Paul Woolford, Director of Design, HOK San Francisco, Rick Irving, Director of Interior Design, HOK San Francisco, Blake Gallagher, Senior Designer at HOK Seattle and Tom Kaczkowski, Director of HOK's Lighting Group in St. Louis submitted their idea called Ventus Lux. The idea artfully combines air, water and light utilizing an integrated air cooling and distribution system.

The Silver Award went to Hiroyuki Kawakami, Senior Project Designer at HOK Hong Kong for his Mobi-Rak idea. It is a smart, simple device which allows users to store and transport their desktop items and can be used at home or in the office. And who better than IT Managers to realize the need for a cable tray management system designed to keep cables tidy and out of site under desks. Nick Hicks and Adam Cottle, both in HOK London, won the Bronze Award for Cable Cosi, another smart idea.

The jury felt the ideas were fresh and interesting. Several ideas that were not selected for awards will still be moved through the development process. "There is an amazing brain trust at HOK and untapped talent and creativity which our Product Design company allows us to access in a different way than through traditional architectural and interior design projects. Our Product Development teams are a joy to work with and we all celebrate each new launch with our manufacturer partners", said Susan Grossinger, Senior Vice President and Director of Product Design. "We plan to make the Product Design Competition an annual event and look forward to seeing more great ideas next year."

PAUL WOOLFORD
Director of Design
San Francisco

RICK IRVING
Director of Interior Design
San Francisco

BLAKE GALLAGHER
Senior Designer
Seattle

TOM KACZKOWSKI
Director of HOK's Lighting Group
St. Louis

HIROYUKI KAWAKAMI
Senior Project Designer
Hong Kong

NICK HICKS & ADAM COTTLE
Sr. IT Support Specialist / IT Manager
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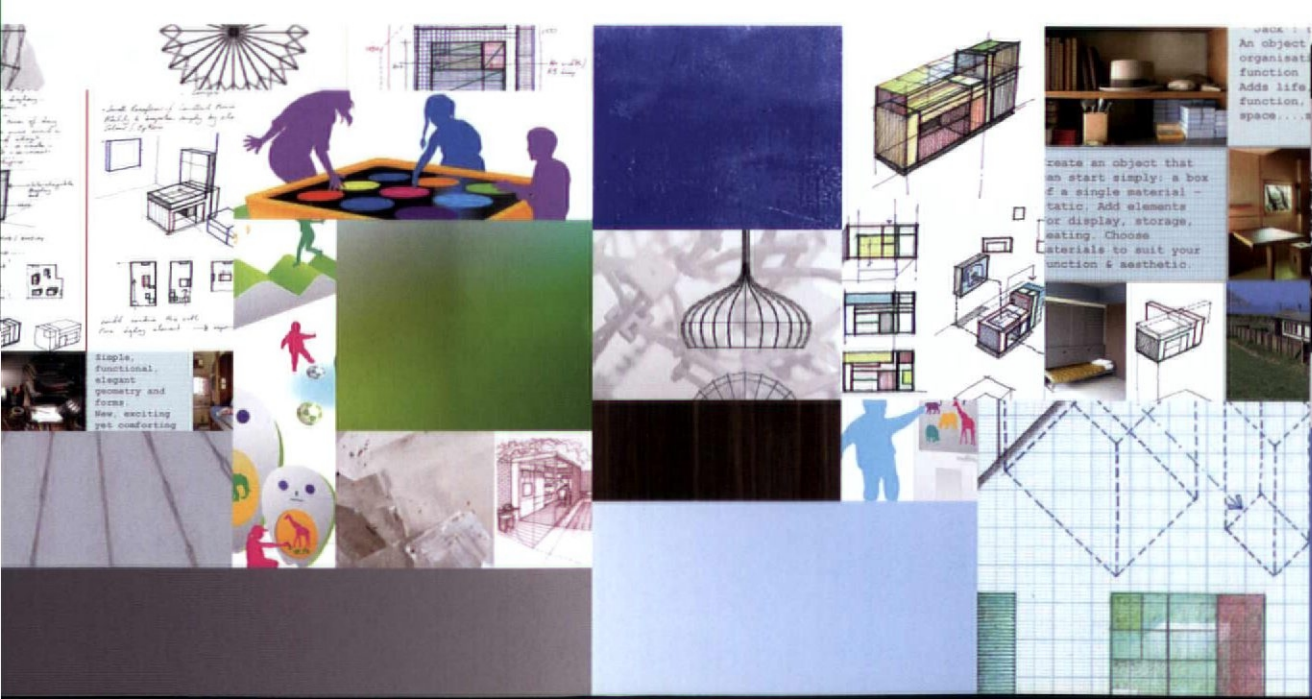
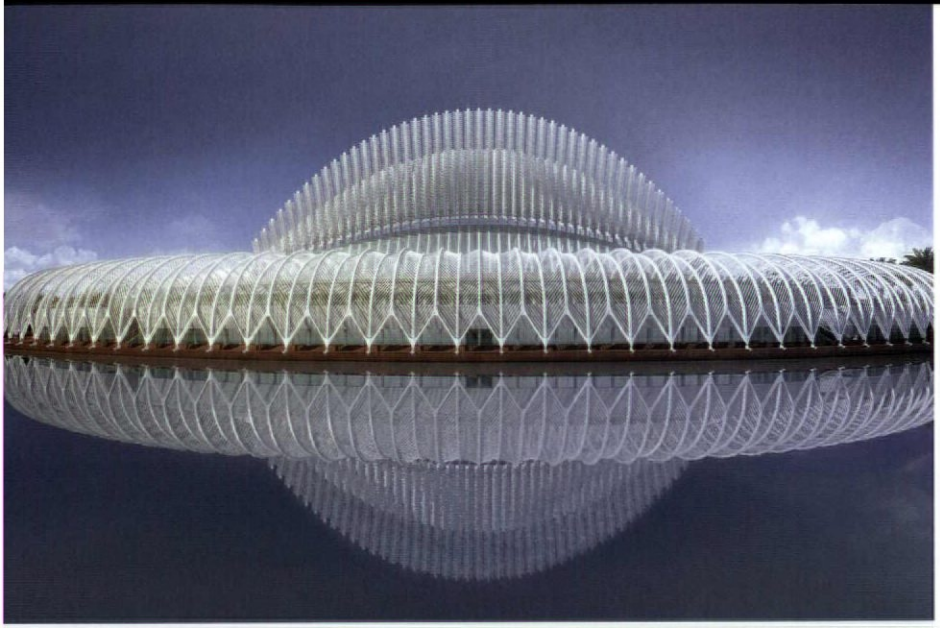
Hong Kong



HOK **PRODUCT** DESIGN



Science, Innovation and Technology Building, Florida Polytechnic University

Location: Lakeland, FL
Designer: Santiago Calatrava
Website: calatrava.com

"I was drawn to this project for several reasons," architect Santiago Calatrava says of his design for the new Florida Polytechnic University, "first among them the opportunity to help build an institution dedicated to advancing 21st-century technology and grounded in principals of interdisciplinary study and collaboration." Calatrava is creating the master plan for the new Lakeland, Florida, campus, and its first structure, the Science, Innovation and Technology Building.

The site in central Florida, where "the climate was so similar to that of my native region in Spain that I instinctively felt at home," notes Calatrava, played a big part in the design. The architect wanted the campus to reflect the native landscape, vegetation and water features found in the region. As such, a large lake forms a central anchor and will be crowned on the north end by the Science, Innovation and Technology Building.

The 120,000-square-foot structure will be organized around a central commons, which will open to a skylight above. Envisioned as a multi-functional hall, the commons will accommodate a range of events from lectures to performances to fundraisers, and it will provide a central gathering point for students and faculty. Administration and faculty offices surround the commons, while the science and research labs will be located within the building's core, where the mechanical systems' requirements can be met. An outdoor garden terrace will offer additional meeting places.

A light steel trellis will surround the entire building, reducing solar load by over 30% and giving the structure a defining aesthetic. Calatrava also created an operable roof to provide shade for the commons' skylight. The hydraulically activated brise-soleils can be programmed to follow the sun throughout the day and will eventually be outfitted with 20,000-square-feet of solar panels.

Images Courtesy of Santiago Calatrava, LLC.

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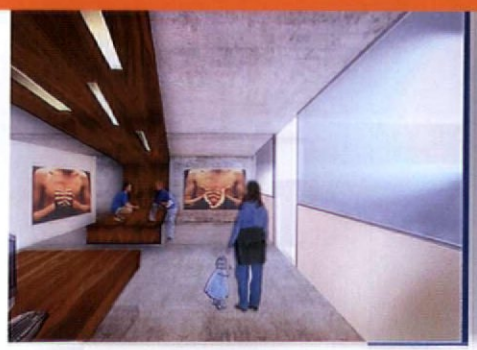

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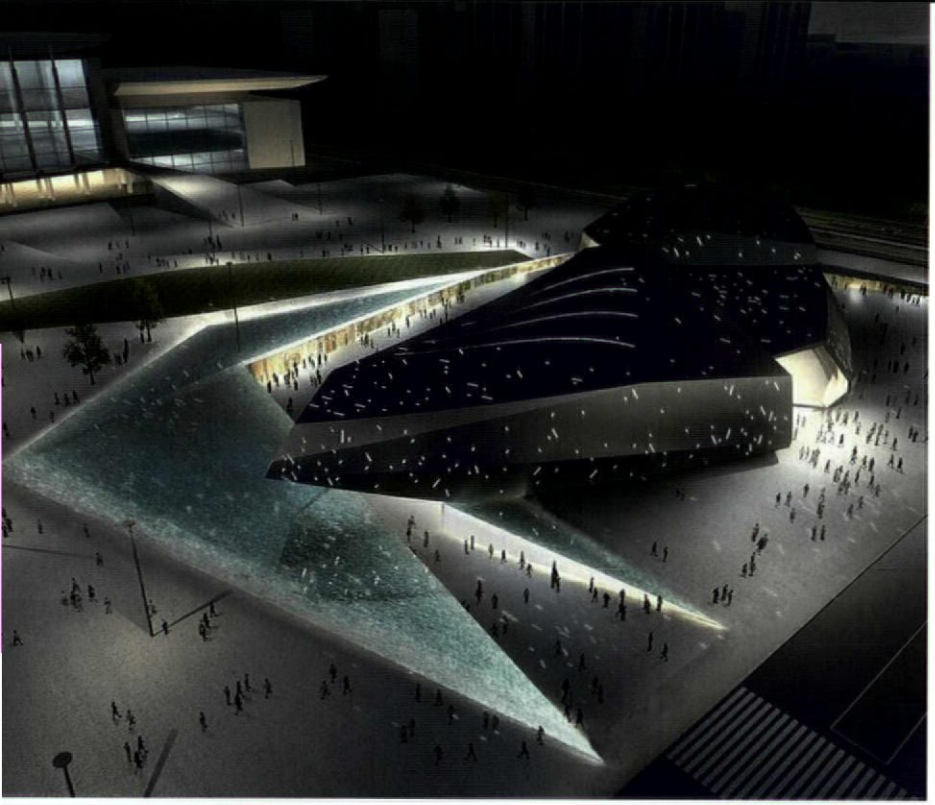

Jinan Science and Technology Culture Center

Location: Jinan, Shandong province, China
Designer: RTA-Office
Website: rta-office.com

"This building needs to speak the language of Jinan East," says architect Santiago Parramón, founder and director of RTA-Office, "which is modern, technology and software." The building in question is designed to act as the Science and Technology Culture Center within the city's tech corridor. Aside from its high-tech presence, the city of Jinan plays an important role as a transportation hub—with an international airport, high-speed train and several highways—and has strong historical ties as well. "Jinan is one of the most important birthplaces of Chinese civilization," says Parramón. "It has deep roots in culture and art and is the capital state of Qilu. Its rich cultural resources provide Jinan with a solid industry base and a huge development potential."

The firm, which has offices in Shanghai and Barcelona, tapped into both bases with the structure's form. "We tried to balance the high-tech design through the study of the ancient culture of the area," says Parramón. Positioned on a central square, two independent buildings—referencing the East and West sides of the city as well as the intersection of Qi and Lu cultures—will be linked by a series of ramps, which will rise among a large water feature. "The buildings will project an image of the future," says Parramón, who wanted the low-slung, faceted structures to "soften the hardness of the surrounding buildings." To meet the city's demanding weather conditions, the organic shapes will be constructed with reinforced concrete and sheathed with black ceramic. The structures, measuring 269,000-square-feet combined, will hold a 1,000-seat theater, a conference hall and a space underground for commercial activities and parking.

Renderings courtesy of RTA-Office

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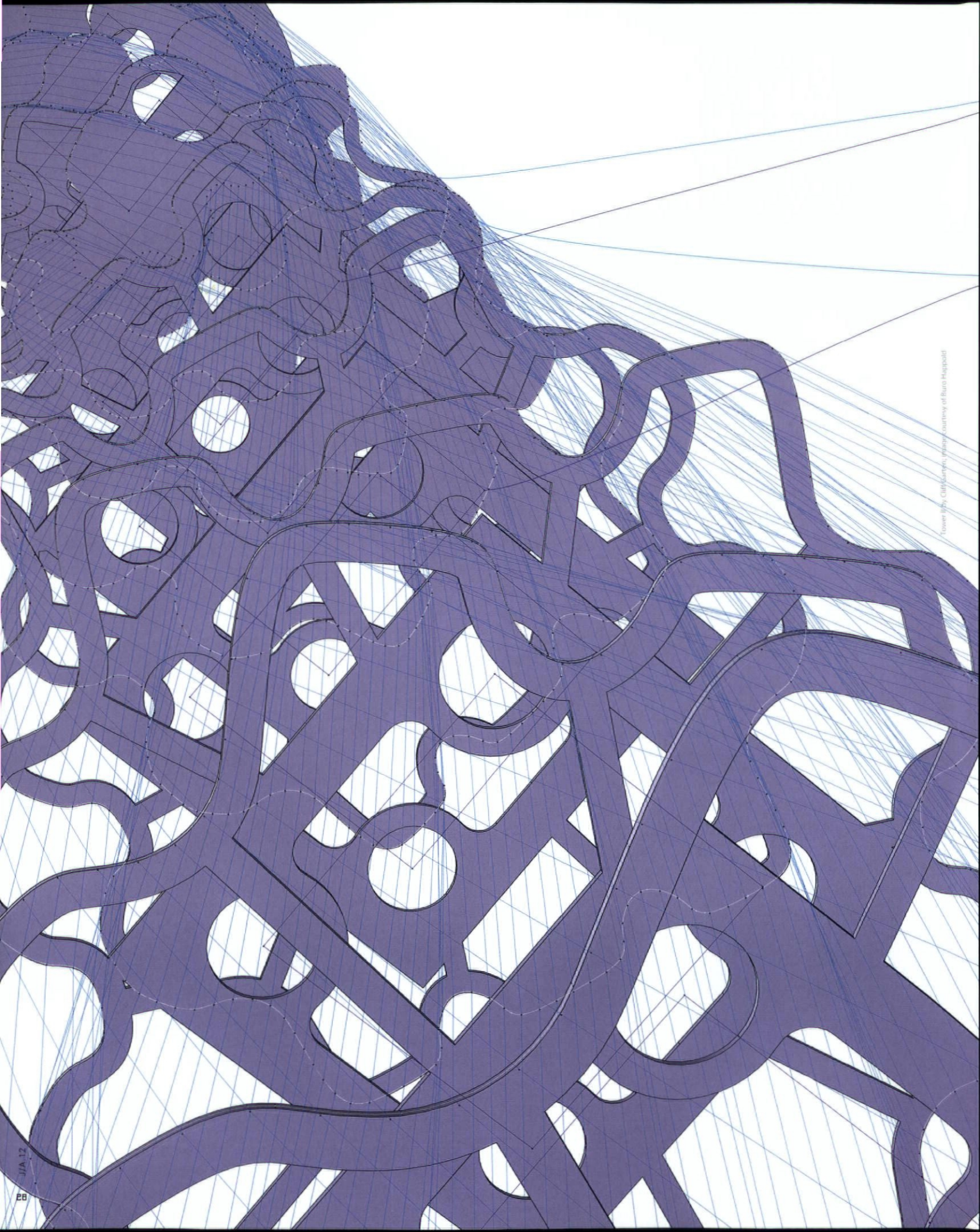


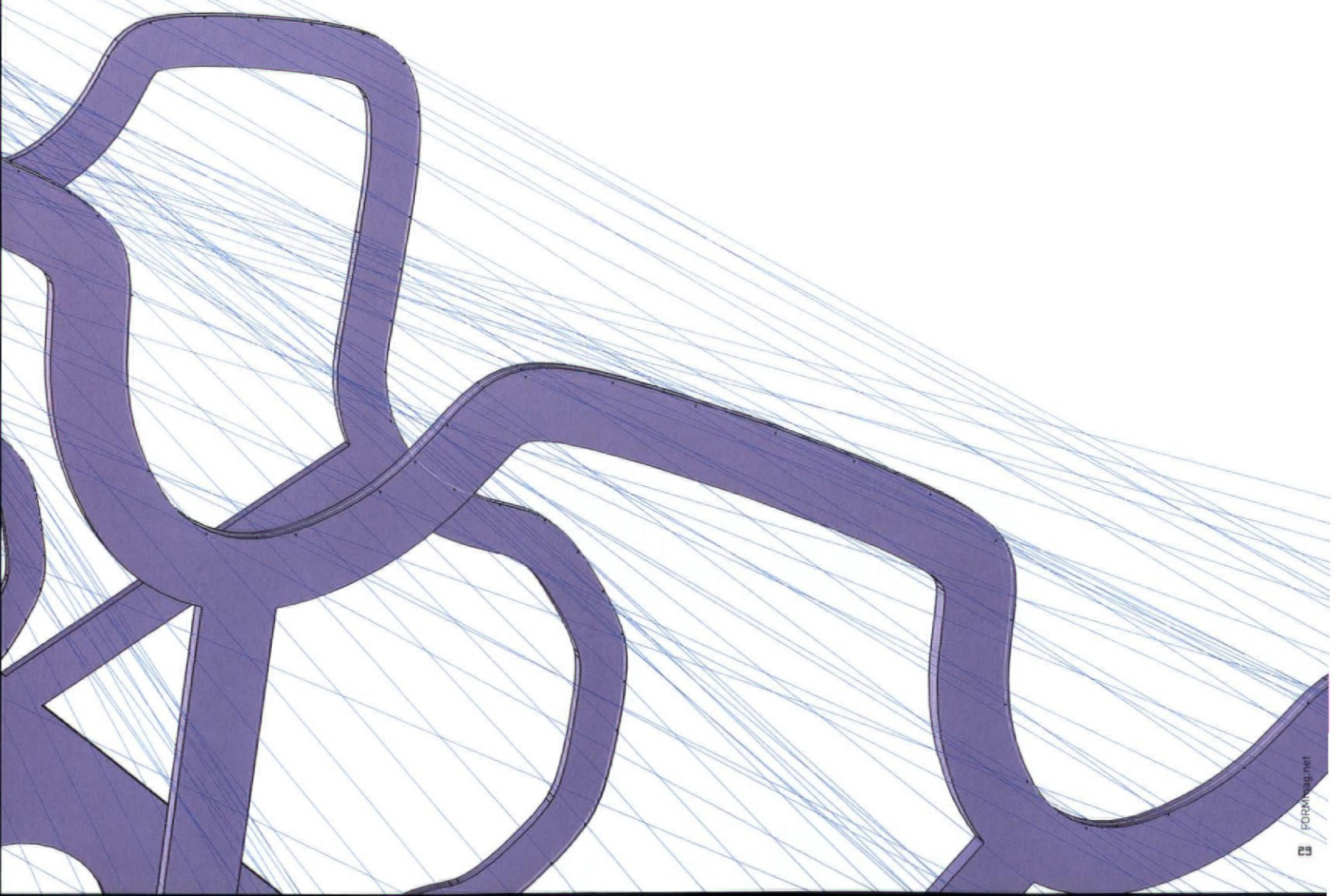
Tower III by Cliff Garten, model courtesy of Buro Happold

WIRED FOR WORK

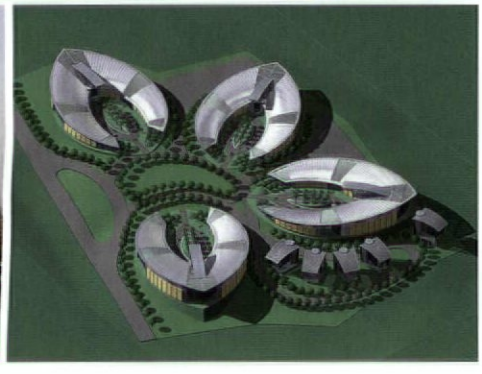
How four firms embrace technology to shape their practice

BY YUKI BOWMAN

From design development to firm management, professionals today are using technology to redefine how they work and interact with clients. Although vastly different in their tools and techniques, these four case studies explore the different ways in which the AEC industry is using, exploiting and experimenting with digital technologies. Whether to coordinate meetings with participants around the globe or to create customized software to reverse engineer an artist's sculpture, it's clear that the expanding capabilities of the digital world continue to transform our physical one.



THE PIONEER



EON Software Park: top: photography by Navdeep Soni; bottom left and rendering: courtesy of Form4 Architecture

Design software has evolved considerably since 1991, when pioneer digital designer John Marx first started using the newly released Form Z. Educated during an era of watercolors and hand lettering, Marx's foray into 3-D design was spellbinding and sometimes frustrating. "We were working on Mac IIci's with 80MB hard drives and 8MB of RAM—fast at the time—but we were always trying to get the computer to do what we wanted." Captivated by the formal explorations that Form Z allowed, Marx set out to master it and in 1999 co-founded Form4 Architecture, where he continues to use the program.

"We design and model everything in FormZ," he explains, "which allows a 20-person firm like us to be competitive in the international market, accomplishing in weeks what would have taken months." An in-house production team creates drawing sets from Marx's detailed models, a step that is occasionally by-passed. This was the case with the EON Software Park in India, an iconic, 4-million-square-foot building constructed from a highly detailed digital model, which Form4 built in two weeks.

Having witnessed a lot of change during his career, Marx believes the golden era of digital design is yet to come, since younger professionals have the skills, but not the seniority, to call the shots. "As computer-savvy designers move up, we're going to see expressive architecture that has the power to captivate the public again—something that waned with Modernism's austerity," he notes.

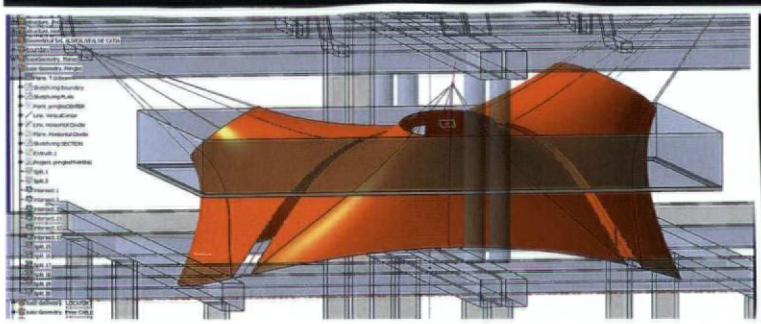
Gensler's Los Angeles office; photography courtesy of Gensler

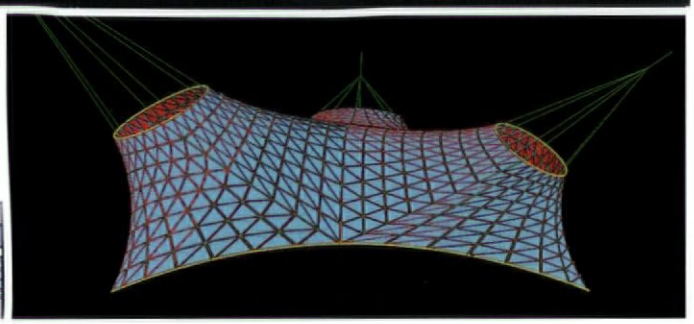
Gensler manages projects in 86 countries and employs some 3,000 professionals in 41 offices around the world. For this industry giant, running a smooth practice means empowering employees to collaborate with their team and clients at anytime, from anywhere. Laptops, tablets and smartphones provide instant documentation and communication during travel and site visits, while cloud-based Citrix products, for web-conferencing and remote desktop access, support "location-free" meetings and uninterrupted workflow.

Digital integration allows Gensler to deliver unique solutions for every client, regardless of location. One client with an advanced sustainability imperative eschewed air travel, even though the firm's sustainability specialists were based elsewhere. Gensler used virtual communication to import firm-wide expertise to its local office and conduct daily client meetings, ultimately transforming the design process. "Compared to formal weekly meetings, these shorter, frequent communications kept us all in sync, mitigating lag-time and guesswork," recalls Gensler principal Michael White.

This flexibility creates an environment that attracts talent. A paperless office has more physical space for teamwork and diverse modes of productivity—a trend exemplified in Gensler's new Los Angeles office, where more than forty different collaborative spaces and impromptu meeting areas redefine how people interact. Ubiquitous connectivity also supports a more personalized workweek, of particular appeal in Los Angeles, with its long commutes and heavy traffic. "We recognize that talent, client and design quality are interrelated, so as long as you get the work done and are available to your team, we don't care where or when you work," claims White, estimating that roughly 15% of the firm's work is done remotely, excluding travel time. A case in point: one long-time professional moved to a city without a Gensler office, but remains a full-time employee. New leads from that area have been an unanticipated benefit.

THE ENGINEER



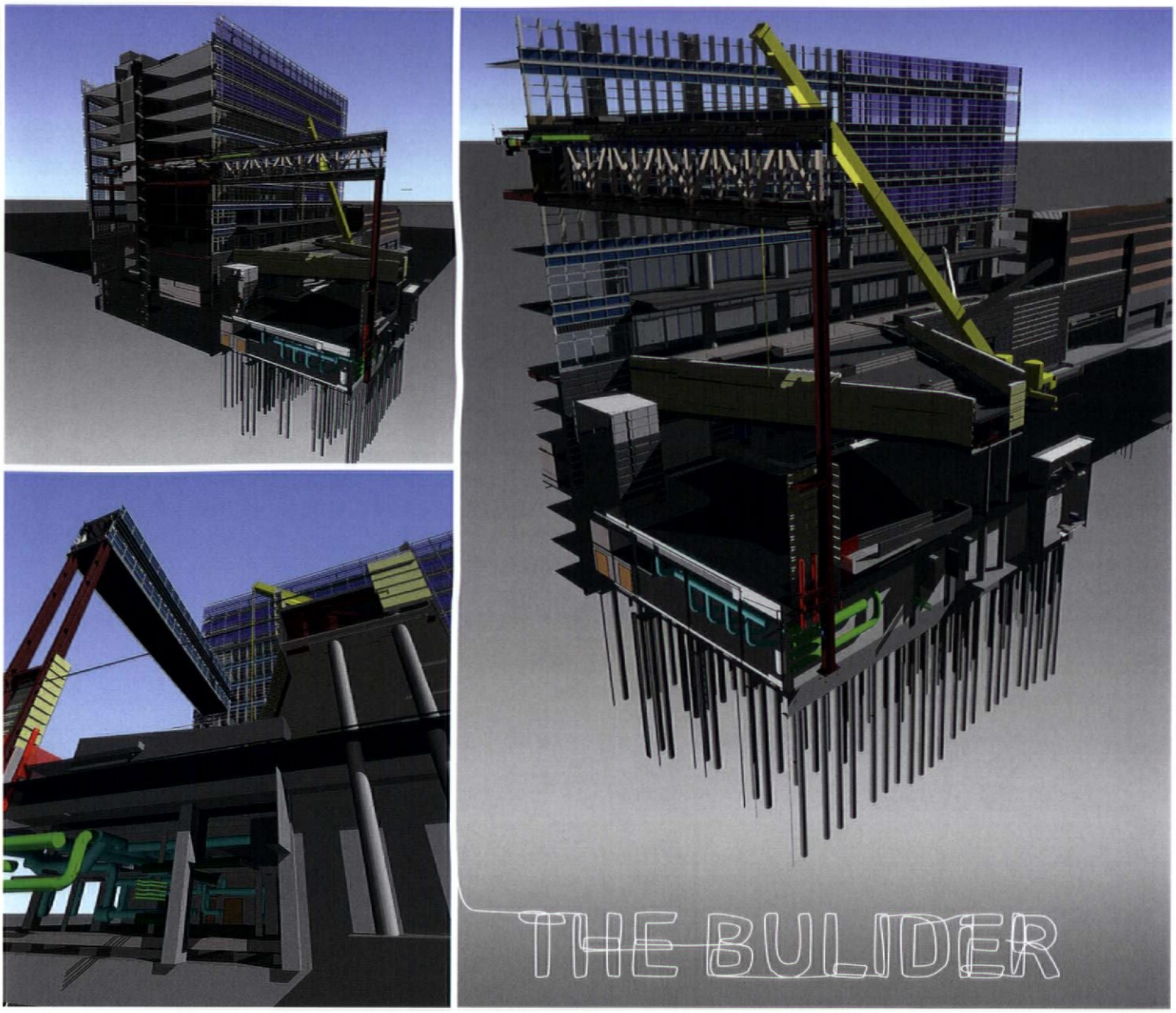


Aortic Arc by Visible Research Office; images courtesy of Buro Happold

Buro Happold translates imagination into fabrication, and is distinguished by the customized processes it develops for its clients. As part of this capacity, the firm dedicates much of its R&D to developing SMART Solutions, specialized software that integrates design and engineering. Programs such as Tensyl, a non-linear form-finder, and SMART Form, for complex surface optimization, embed structural performance within geometric exploration, facilitating buildability.

In addition to SMART, Buro Happold works in Ansys, Revit, CATIA, Rhino and Maya, among others, looking for the best tool for any problem. This "software agnosticism," says Greg Otto, principal and founder of the firm's Los Angeles office, means that data translation is a core concern. "As we move between programs, we try to maximize the amount of refinement," he explains. Agnosticism demands high expenditures on software development and training, but results in close working relationships with companies such as Autodesk and Ansys, who are striving to push the avant-garde and improve inter-operability.

Many of Buro Happold's clients are artists who imagine their creations "post gravity," so structures must be reverse engineered and manufactured in their pre-relaxed states. For Janet Echelman's netted sculpture *Her Secret is Patience*, Buro Happold imported Rhino geometry into Revit, where a custom-coded "Echelman tool" performed reverse engineering and laid out the netting on its surface. Each knot's location was sent to an Excel spreadsheet, which fed into a computerized loom that fabricated the piece. Another form-found structure, *Aortic Arc* by Visible Research Office, was developed using an entirely different process and tool set comprising Rhino and CATIA for modeling, Tensyl for reverse engineering and Autodesk Robot for deflection and material analysis. "Whatever the starting point, we're constantly evolving a process that caters specifically to each client," says Otto. "They're the creative genius; we just enable that genius to happen."



Cedars Sinai bridge study: images courtesy of Hathaway Dinwiddie

Since 2004, when Hathaway Dinwiddie first adopted Building Information Modeling (BIM) for estimating, the construction firm has fully integrated BIM into every phase of project delivery—from modeling in Revit, clash-detection and multi-format file coordination in Navisworks, and estimating in Vico Office, a model-based program that provides real-time feedback between design and cost. The precision attained in the digital model during preconstruction and planning removes unanticipated construction conflicts and opens the door to prefabrication—the real benefit of BIM, argues John Cowles, vice president of preconstruction and estimating. "Four or five years ago, everything was cut to length and fabricated on-site," says Cowles. "Now, BIM is unleashing the potential of 'plug and play' construction, where a building can be delivered as a kit of parts, plans and diagrams included." On site, Hathaway Dinwiddie employs Trimble, a Robotic Total Station that transfers measured coordinates from the 3-D model into real space, acting as a full-scale, digital layout tool that's accurate to 1/16th inch. The use of BIM and Trimble decreases change orders, increases job-site safety, and improves quality and efficiency, helping firms remain competitive during a slow market.

Cowles believes that BIM and other technologies are game-changers for the AEC industry, not only in terms of deliverables but also in terms of how people relate. "It's catalyzing greater collaboration between stakeholders—contractors, architects, sub-contractors, even the end-user—like never before." Embracing it requires total commitment, admits Cowles, "but once you take the leap, you have to fully immerse yourself and push the technology to its fullest potential. We're still doing that, and we haven't looked back." ■

HIGH-TECH SUPPORT

Channeling the skills of Gehry Technologies BY MICHAEL WEBB

Gehry Technologies is celebrating its tenth anniversary with the launch of GTeam, a platform that allows project teams in different time zones to analyze 3-D models on their web browsers. Everyone can interact on design documents in real time without recourse to CAD and BIM tools or expertise. Andrew Witt, director of research for Gehry Technologies (GT), calls it "a new paradigm that allows you to upload, share and view 3-D files from a multitude of technologies, reviewing the entire history of each document." The system is based on cloud technology, which has nearly infinite capacity, and firms can lease GTeam on a monthly or annual basis and use it on all their projects.

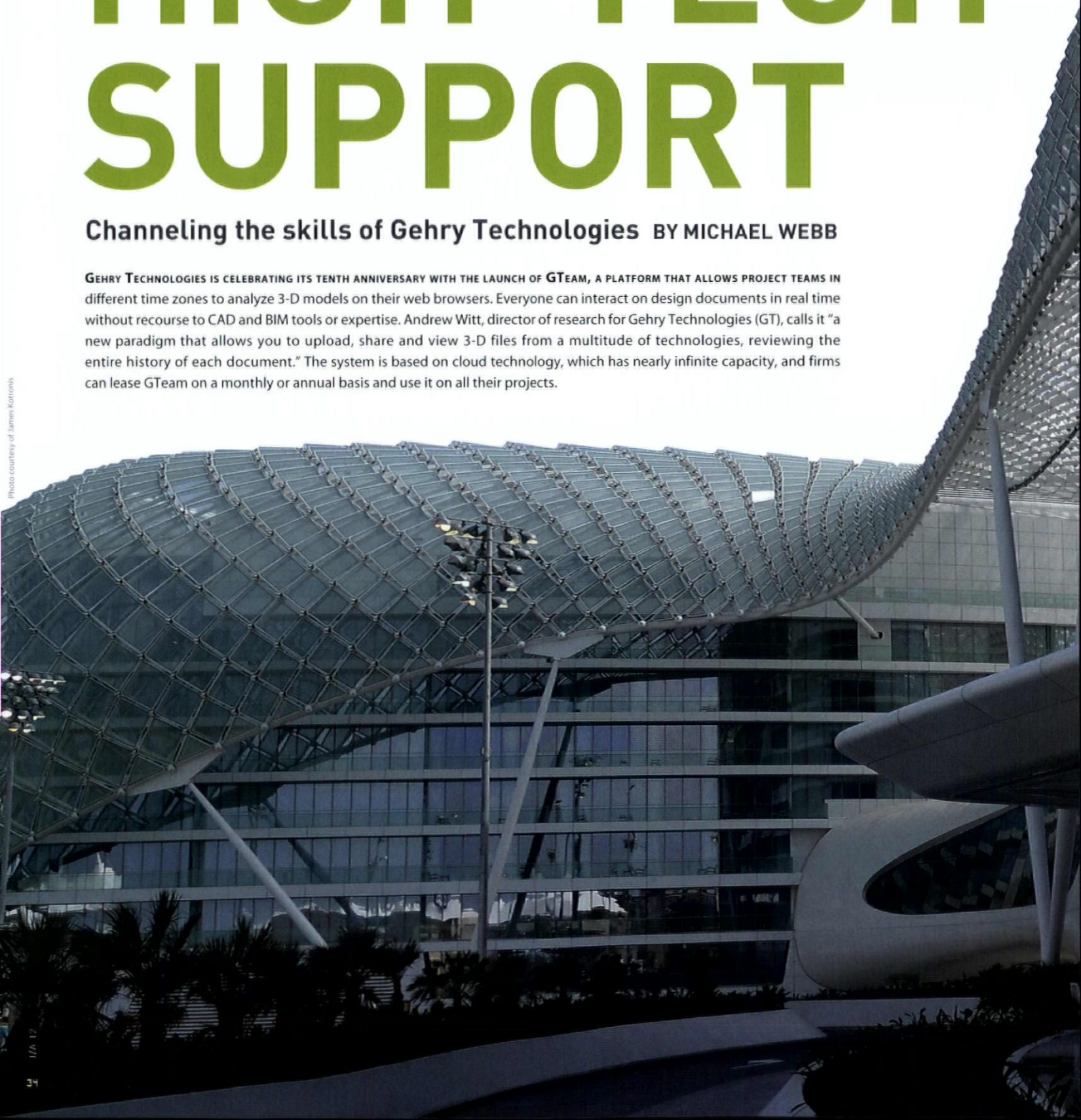
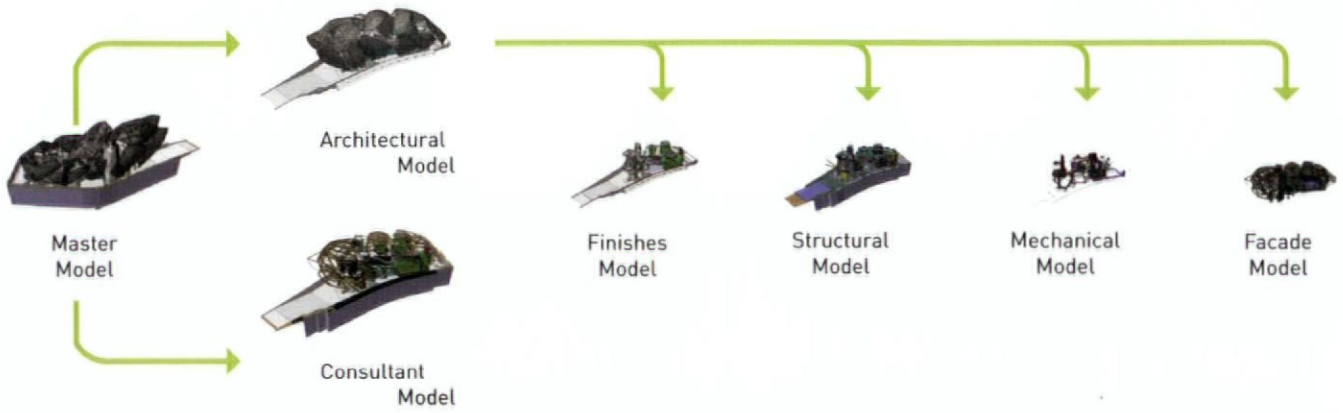
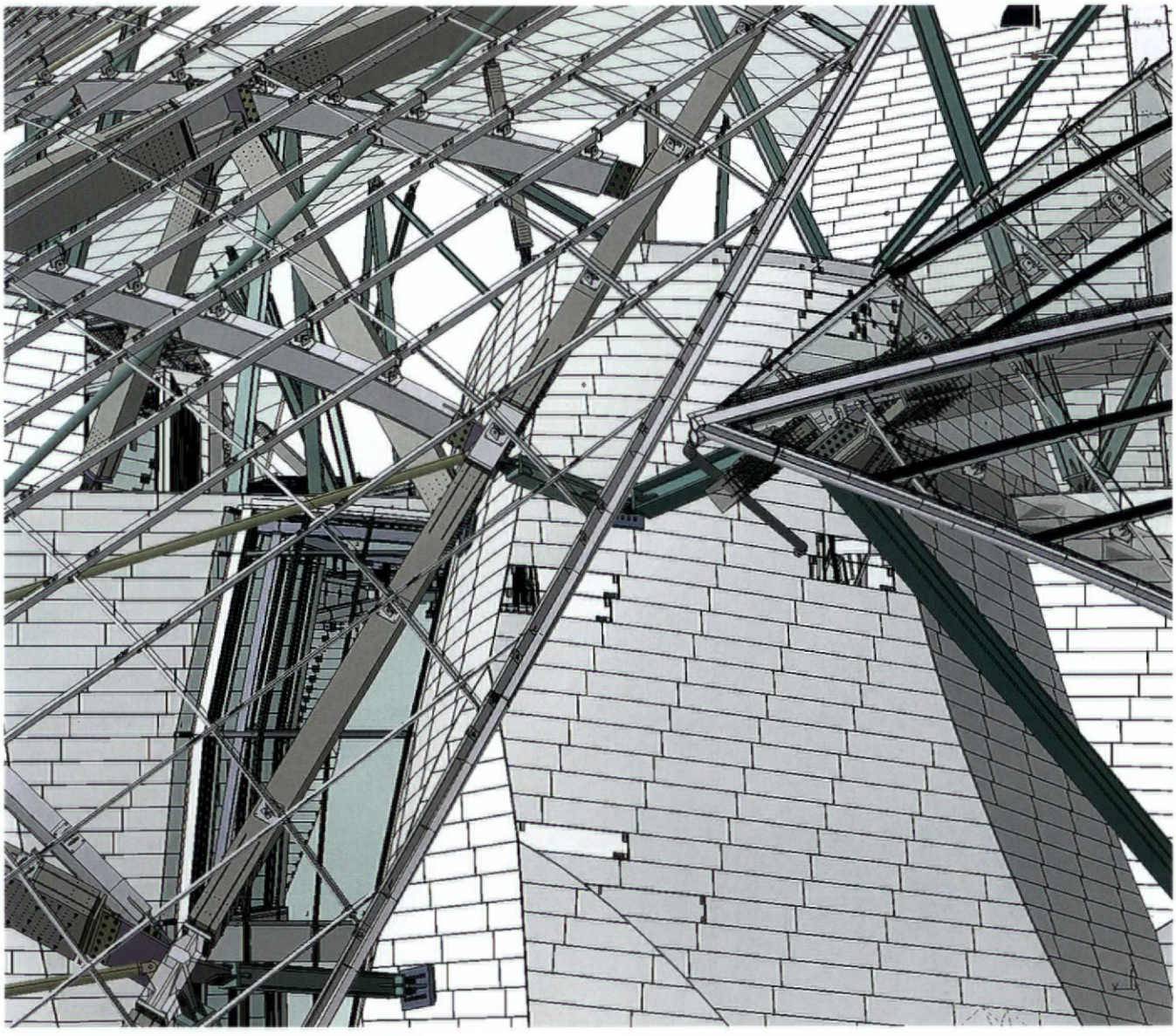


Photo courtesy of James Kotronis





Renderings courtesy of Gehry Technologies

PREVIOUS PAGES: Asymptote Architecture sought out the expertise of Gehry Technologies for the design of the Yas Island Marina Hotel. TOP: GTeam, a new cloud-based system developed while working on the Louis Vuitton Foundation (ABOVE AND OPPOSITE), allowed fifteen project teams from around the world to contribute 3-D information to the building's design.

This is the latest offering from an independent company that grew out of Frank Gehry's struggle to realize the spontaneity of his sketches in an era when contractors had to interpret sheaves of paper. That compromised the entire process of design and construction, pitting adventurous architects against a skeptical and uncomprehending establishment. Walt Disney Concert Hall might easily have been shelved as unbuildable or unaffordable had Gehry Partners not made use of advanced software tools meant for the design of supersonic aircraft. GT developed Digital Project as a software to bring these advanced techniques to the building industry. Their hard-won expertise launched a company that has helped more than 150 clients realize increasingly sophisticated buildings in an efficient way.

As GT grew out of the need for Digital Project, so did GTeam emerge from prototypes developed for the Louis Vuitton Foundation, now under construction in Paris. This building, which Gehry describes as a shimmering cloud hovering over the Bois de Boulogne, won an AIA 2012 Technology in Architectural Practice Award. Fifteen project teams around the world contributed 3-D information on engineering, fabricating and constructing a carapace of glass loosely wrapped around a cluster of orthogonal galleries. Each team added its own rules on how different systems had to work and interact, and thousands of files were combined seamlessly in one master model that could be accessed on-line. The shared platform allowed Gehry and his design team to refine their scheme with a full understanding of the implications, and log 100,000 modifications. It also speeded construction and held costs down by rationalizing custom fabrication of the glass and other key elements.

For Gehry, GT is part of a larger agenda. He is determined to harness technology as a means of restoring the architect to his pre-eminence as a master builder, and avoid being marginalized by contractors and construction managers. GT offices around the world are channeling the best ideas and practices in an effort to achieve that inspiring goal. Dennis Shelden, the firm's chief technology officer, draws on his experience in teaching computation and cognitive theory at MIT. "There are younger designers for whom computational tools are like a violin; you learn to play it so well it becomes an extension of yourself," he observes. "The language has achieved a new subtlety and richness. You don't have to boil down new inventions in old forms."

> **"We need to exploit the opportunities that are available to us now. It's a new world—a revolution in possibilities."** – ANDREW WITT

Ironically, Frank Gehry creates new forms out of his head and explores them in a succession of tabletop models, using paper, aluminum foil and whatever other materials are at hand, just as he used wood shavings as a child. Some things never change, but his younger associates now analyze and develop those conceptual designs with the latest tools of technology. As Witt remarks, "we need to exploit the opportunities that are available to us now. It's a new world—a revolution in possibilities."

Over the past decade, GT has taken a broad approach, offering the most advanced tools and strategic advice. They've collaborated on major buildings by Jean Nouvel, UNStudio, Asymptote Architecture, Coop Himmelblau and other cutting edge firms. Clients include small offices that could never afford to develop their own technological capacity to such giants as SOM, who benefits from their special skills. "We offer consulting services to project team members, facilitating the use of information, and providing training to accelerate their adoption of BIM," says Witt. "We collaborate with contractors to help them understand the 3-D design information, even working with them on-site. Often we are one of the few players that's involved in a project from beginning to end."

A mastery of the latest advances has contributed to GT's success, but people are its most important asset. By locating its offices across the globe from L.A. to London to Hong Kong, GT staff can work face to face with a fabricator in China, an engineer in Europe and an architect in the U.S., helping them to overcome challenges and work productively together. "That's something tools alone could never do," says Witt. "Many of the challenges are organizational and there's a need for focused people to shepherd each project." It's a two-way process, for the global network of GT learns as it teaches, and its skills and experience benefit from exposure to the best talents on every continent. ■

Photo courtesy of Gehry Partners

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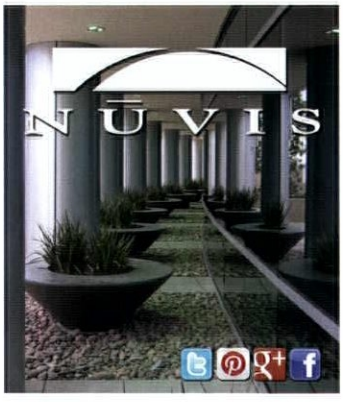

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Teaching and Learning Building

CLAREMONT, CA

ARCHITECTURE: Boora Architects

INTERIOR DESIGN: Boora Architects

LANDSCAPE: 2.INK Studio

MEP ENGINEERS: Glumac

STRUCTURAL ENGINEER: Kpff

ARBORIST: Cy Carlberg

ACOUSTICAL CONSULTANT: Jaffe Holden Acoustic

AUDIO VISUAL CONSULTANT: Shalleck Collaborative, Inc.

GENERAL CONTRACTOR: MATT Construction

CLIENT: Harvey Mudd College

Science, Innovation and Technology Building

LAKELAND, FL

ARCHITECTURE: Santiago Calatrava

STRUCTURAL ENGINEER: Thornton Tomasetti

MEP ENGINEER: TLC

CIVIL ENGINEER: Anderson Lane, Inc.

ARCHITECT OF RECORD: Alfonso Architects

GENERAL CONTRACTOR: Skanska

LANDSCAPE ARCHITECT OF RECORD: Studio Jefre

Fox Technology Center

SARATOGA, CA

ARCHITECTURE: Steinberg Architects

LANDSCAPE ARCHITECTURE: Conger Moss Guillard

COST CONSULTANT: Cumming LLC

LIGHTING DESIGNER: Lighting Design Alliance, Inc.

TITLE 24/ENERGY: Builders Energy Service

SECURITY: Catalyst Consulting Group Inc.

CODE CONSULTANT: Aon Fire Protection

CONSTRUCTION MANAGER:
Swinerton Management & Consulting

MEP, FIRE ALARM, & TELECOMMUNICATIONS:
Alfa Tech Consulting Engineers, Inc.

STRUCTURAL ENGINEER: Thorton Tomasetti

CIVIL ENGINEER: Nolte Associates, Inc

GENERAL CONTRACTOR: Zovich Construction Company

CLIENT: West Valley-Mission
Community College District

Silknet Sales Office

TBILISI, GEORGIA

ARCHITECTURE: Niko Japaridze, Gogiko Sakvarelidze, Eka Kankava, Kakha Maisuradze

GENERAL CONTRACTOR: Archtrade

ENGINEERING SYSTEMS: Gesko

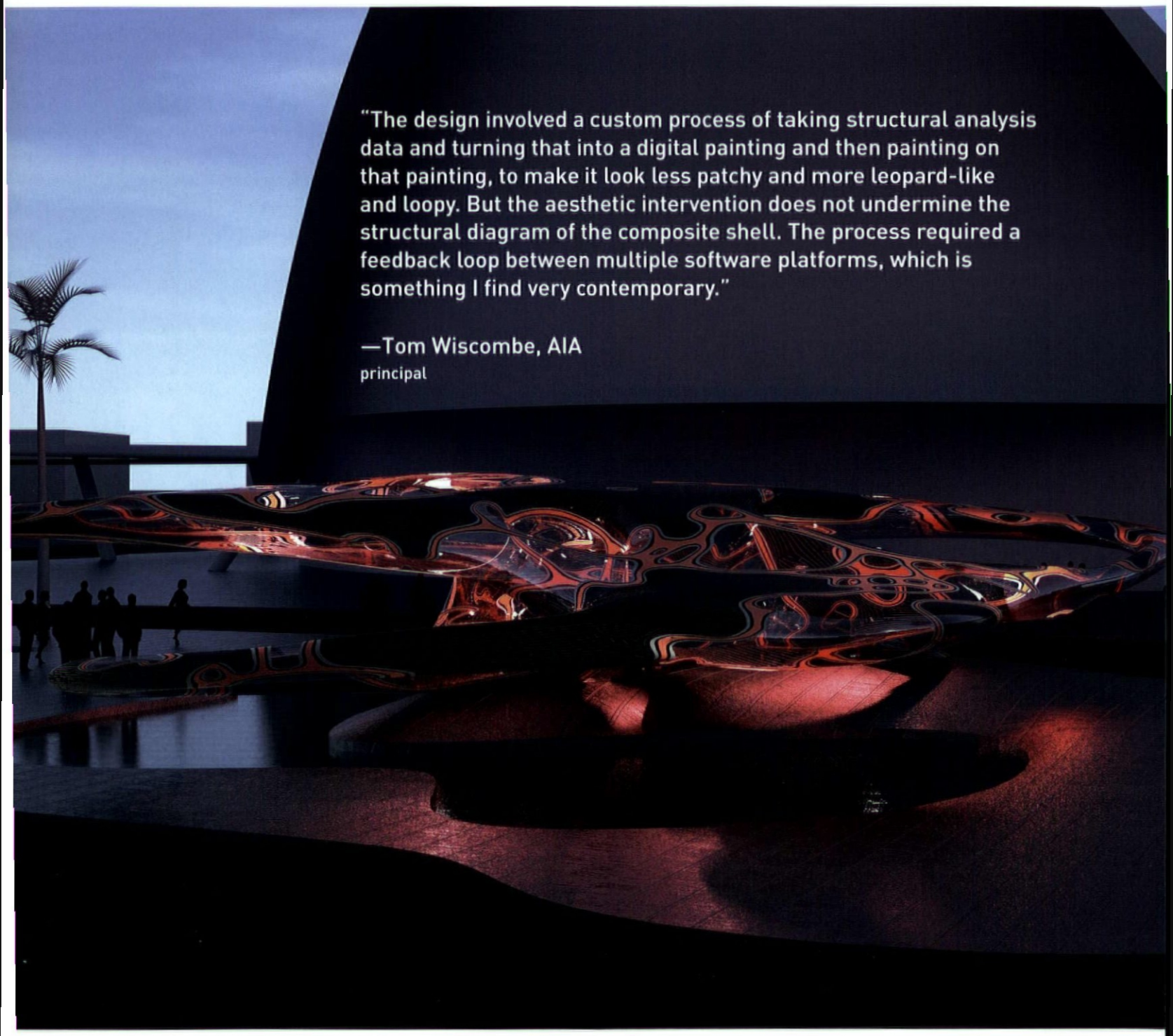
RECEPTION DESK: Switch Ltd.

LIGTHING: Modular Lighting Instruments

Jinan Science and Technology Culture Center

JINAN, SHANDONG PROVINCE, CHINA

ARCHITECTURE: RTA-Office



"The design involved a custom process of taking structural analysis data and turning that into a digital painting and then painting on that painting, to make it look less patchy and more leopard-like and loopy. But the aesthetic intervention does not undermine the structural diagram of the composite shell. The process required a feedback loop between multiple software platforms, which is something I find very contemporary."

—Tom Wiscombe, AIA
principal

FIRM: Tom Wiscombe Design | PROJECT: Artic Mass-Painting was an entry for the Anaheim Regional Transportation Intermodal Center public art competition | LOCATION: Anaheim, CA | DESIGN TOOLS: ZBrush and Maya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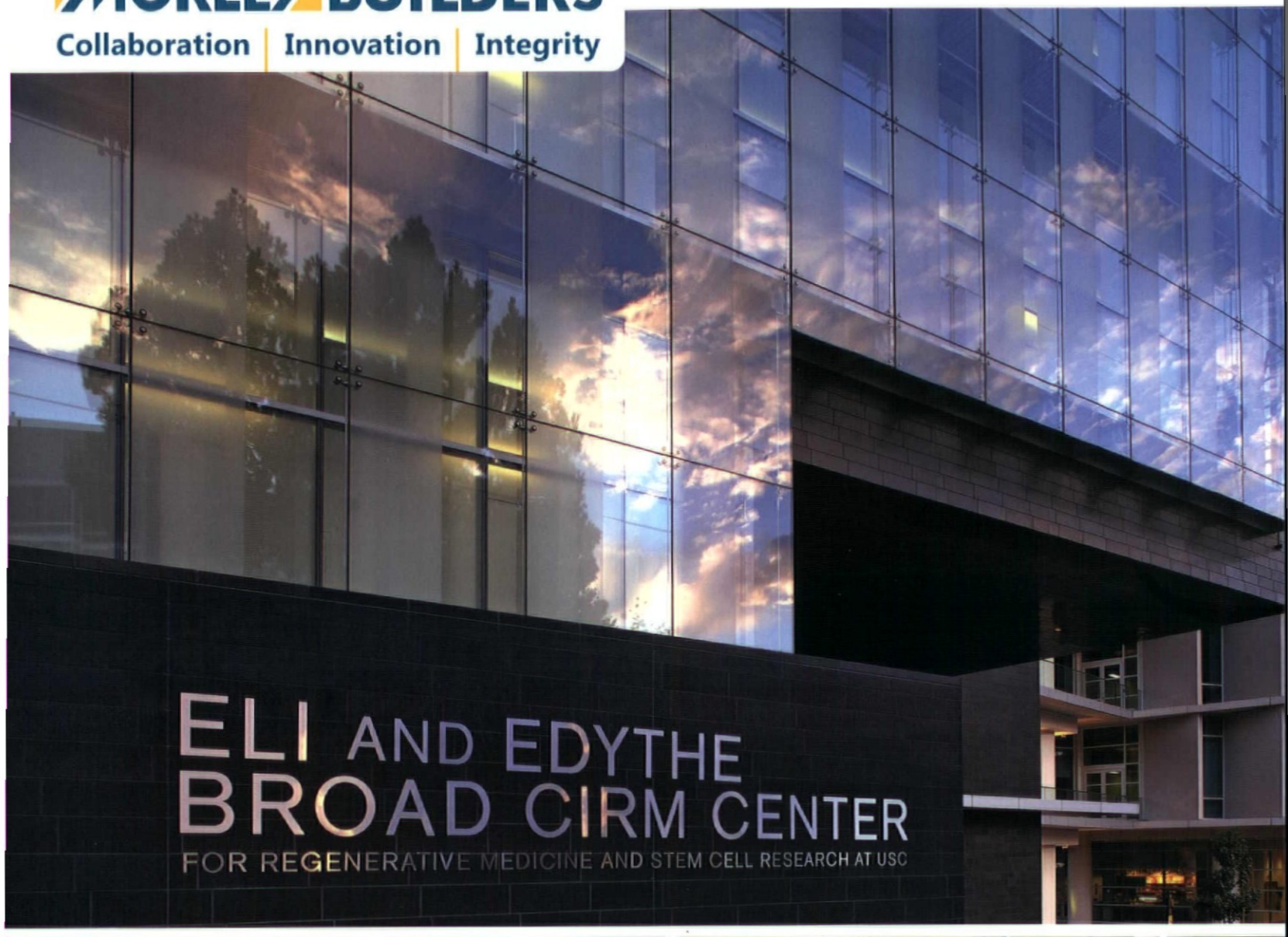

Eli and Edythe Broad CIRM Center for Regenerative Medicine and Stem Cell Research at USC

Architect: ZGF Architects LLP
LEED® Gold Rating
2012 Los Angeles Business Council Sustainability Award

Morley Builders Santa Monica · Irvine · San Diego
Please note our new address:
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