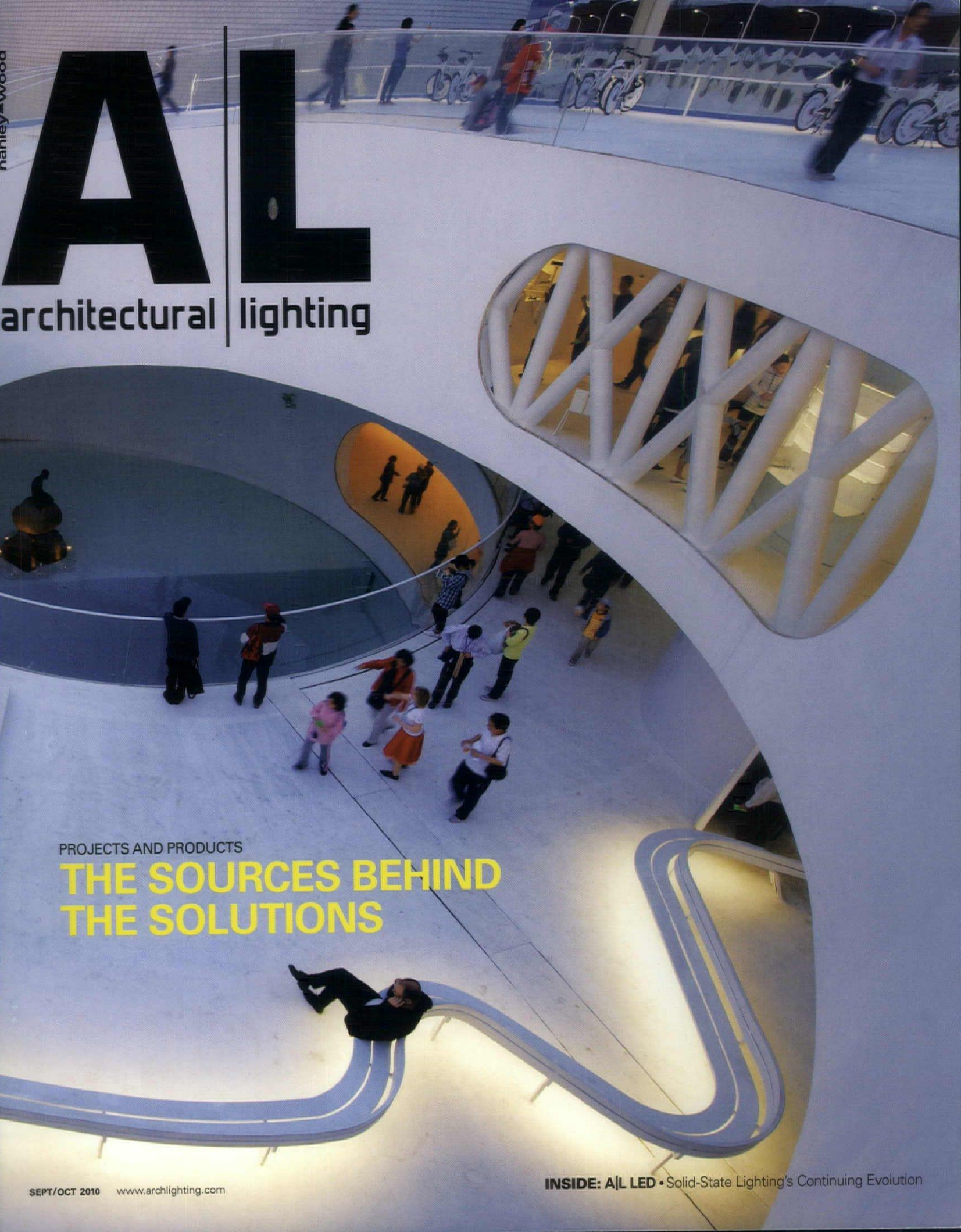


A|L architectural | lighting

PROJECTS AND PRODUCTS

THE SOURCES BEHIND THE SOLUTIONS

SEPT/OCT 2010 www.archlighting.com

INSIDE: A|L LED • Solid-State Lighting's Continuing Evolution

Cananda Line, Vancouver BC | Lighting Design: Galina Zbrizher, IALD, LC Total Lighting Solutions

An AcuityBrands Company

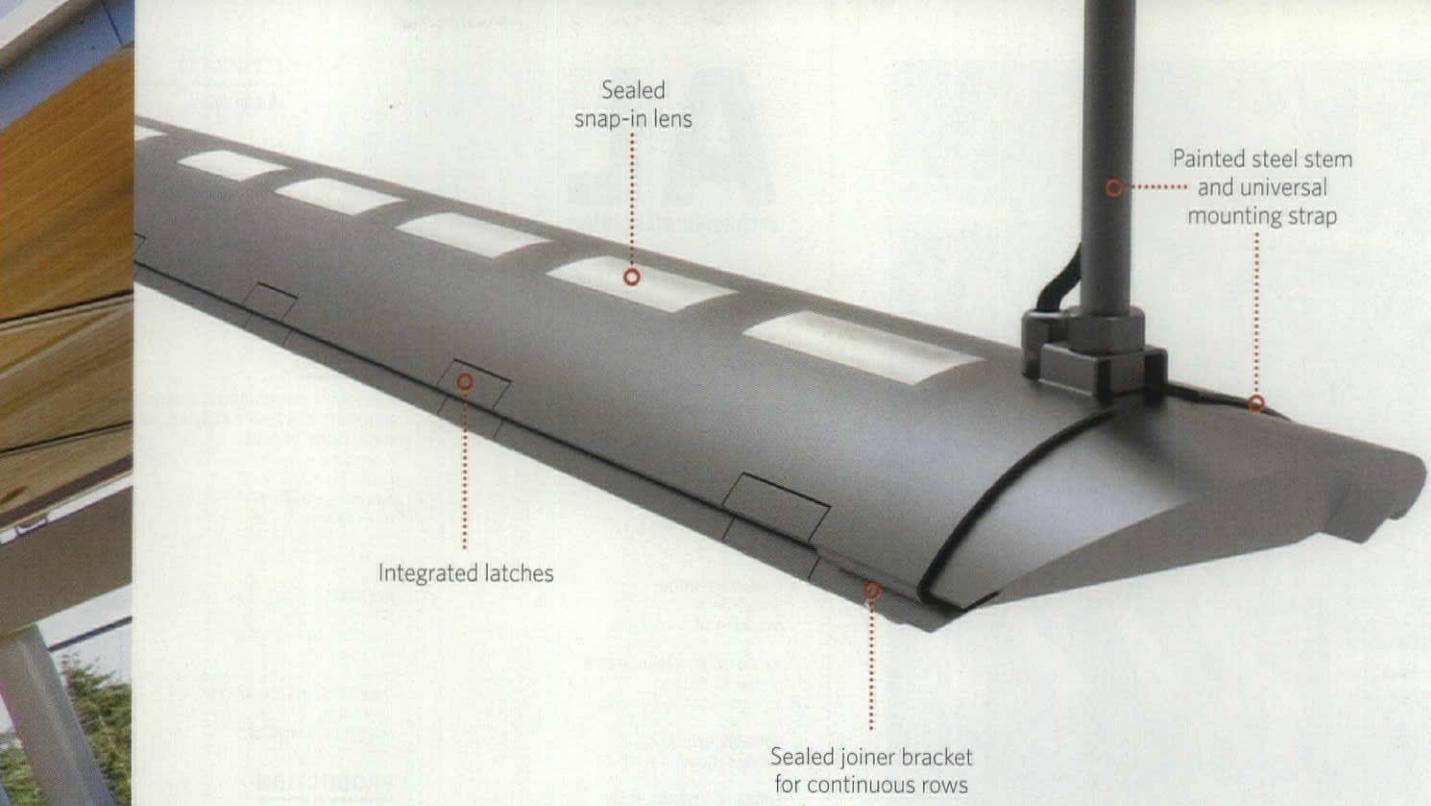
AL architectural lighting

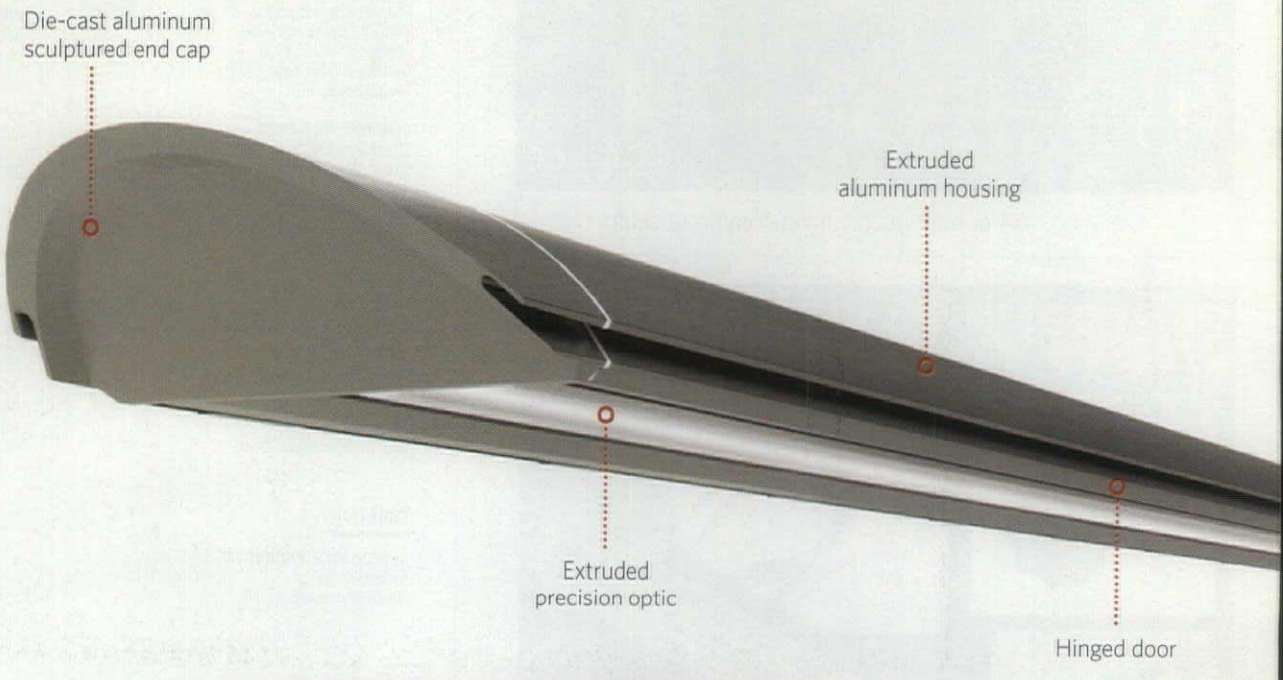
SEPT/OCT 10
VOL 24, NO 6

AJL ARCHITECTURAL LIGHTING (Vol. 24, No. 6 USPS 000-846, ISSN 0894-0436) is published seven times per year (bimonthly, except monthly in March and June) by Hanley Wood, LLC, One Thomas Circle, N.W., Suite 600, Washington, DC 20005. Periodicals postage paid at Washington, DC, and additional mailing offices. Printed in the USA. POSTMASTER: Send changes of address to ARCHITECTURAL LIGHTING, P.O. Box 3494, Northbrook, IL 60065-9831.

Canada Post Registration #40612608/G.S.T. number: R-120931738. Canadian return address: Pitney Bowes Inc., P.O. Box 25542, London, ON N6C 6B2.

Distributed free of charge to individuals or firms engaged in the specification of lighting products in the U.S. Publisher reserves the right to determine recipient qualification. Per year, all other U.S. subscriptions $48; Canada, $60; foreign, $96. Payable in U.S. dollars. For subscription inquiries, address changes, and single copy sales ($10 in the U.S., $15 in Canada, $20 for other countries, payable in advance) write to ARCHITECTURAL LIGHTING, P.O. Box 3494, Northbrook, IL 60065-9831 or call 847.291.5221 or toll-free 888.269.8410.





station

PEERLESS®

It's extraordinarily durable and proudly wears the IP65 rating, withstanding the grueling rigors of dust and water. Best of all, it comes with the kind of quality and performance that's made Peerless the indirect lighting standard.

While transit platforms, stadium concourses and airport canopies are the most likely applications for Station's suspended linear configuration, novel locations abound for its state-of-the-aesthetic design in large-scale retail, convention and even manufacturing environments. Station travels well. www.peerless-lighting.com

Circle no. 34 or http://archlighting.com/productinfo

AL architectural lighting

SEPT/OCT 10

VOL 24, NO 6

WWW.ARCHLIGHTING.COM

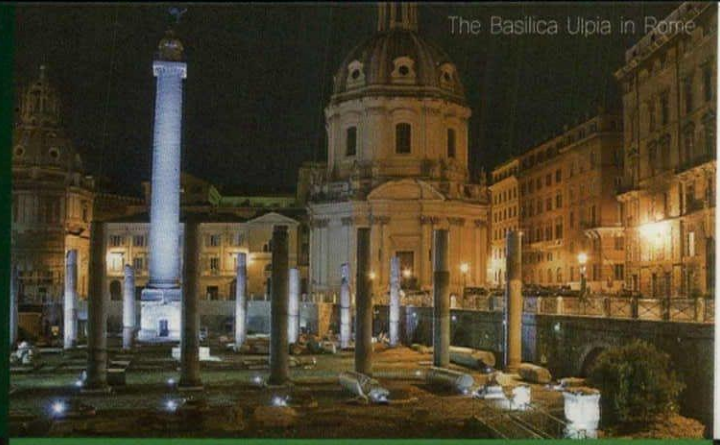
hanley▲wood

One Thomas Circle, N.W. Suite 600 Washington, DC 20005

FROM HANLEY WOOD, LLC, PUBLISHER OF ARCHITECT, AQUATICS INTERNATIONAL, BIG BUILDER, BUILDER, BUILDING PRODUCTS, CONCRETE & MASONRY CONSTRUCTION PRODUCTS, CONCRETE CONSTRUCTION, THE CONCRETE PRODUCER, CUSTOM HOME, ECO-STRUCTURE, THE JOURNAL OF LIGHT CONSTRUCTION, MASONRY CONSTRUCTION, METALMAG, MULTIFAMILY EXECUTIVE, POOL & SPA NEWS, PRO AV, PROSALES, PUBLIC WORKS, REMODELING, REPLACEMENT CONTRACTOR, RESIDENTIAL ARCHITECT, AND TOOLS OF THE TRADE MAGAZINES.

DISCLOSURE ARCHITECTURAL LIGHTING WILL OCCASIONALLY WRITE ABOUT COMPANIES IN WHICH ITS PARENT ORGANIZATION, HANLEY WOOD, LLC, HAS AN INVESTMENT INTEREST. WHEN IT DOES, THE MAGAZINE WILL FULLY DISCLOSE THAT RELATIONSHIP.

PRIVACY OF MAILING LIST SOMETIMES WE SHARE OUR SUBSCRIBER MAILING WITH REPUTABLE COMPANIES WE THINK YOU'LL FIND INTERESTING. HOWEVER, IF YOU DO NOT WISH TO BE INCLUDED, PLEASE CALL US AT 888.269.8410.



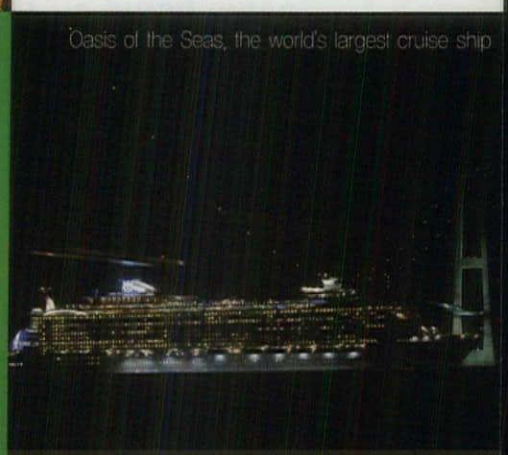
electronica 2010
09-12 November 2010
Neue Messe Munchen
Booth No. A3, 433

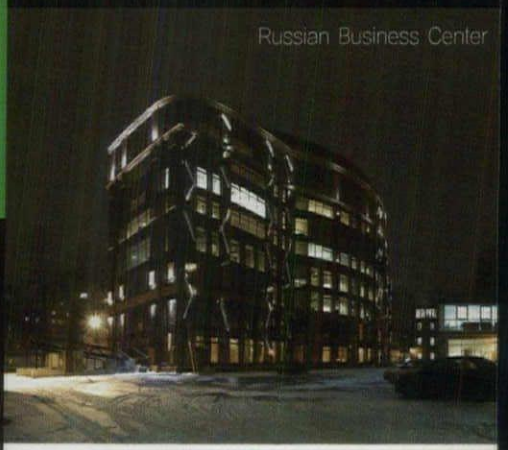
HKTDC Hong Kong International Lighting Fair
27-30 October 2010
Hong Kong Convention and Exhibition Centre
Booth No.1B-C16

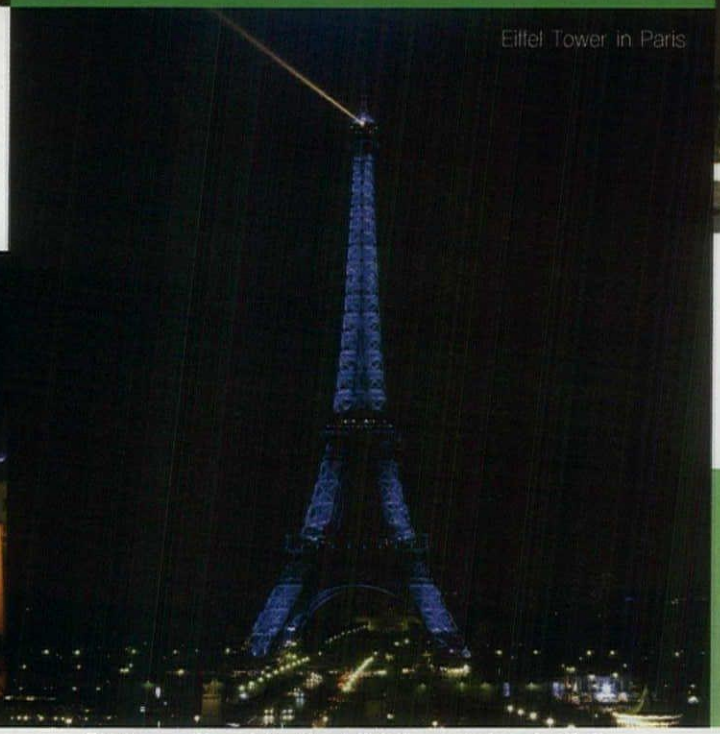
Seoul Semiconductor changing the world!

The most famous places and monuments are already being illuminated by Seoul Semiconductors LED' s

Tell us about your next bright idea







Acriche

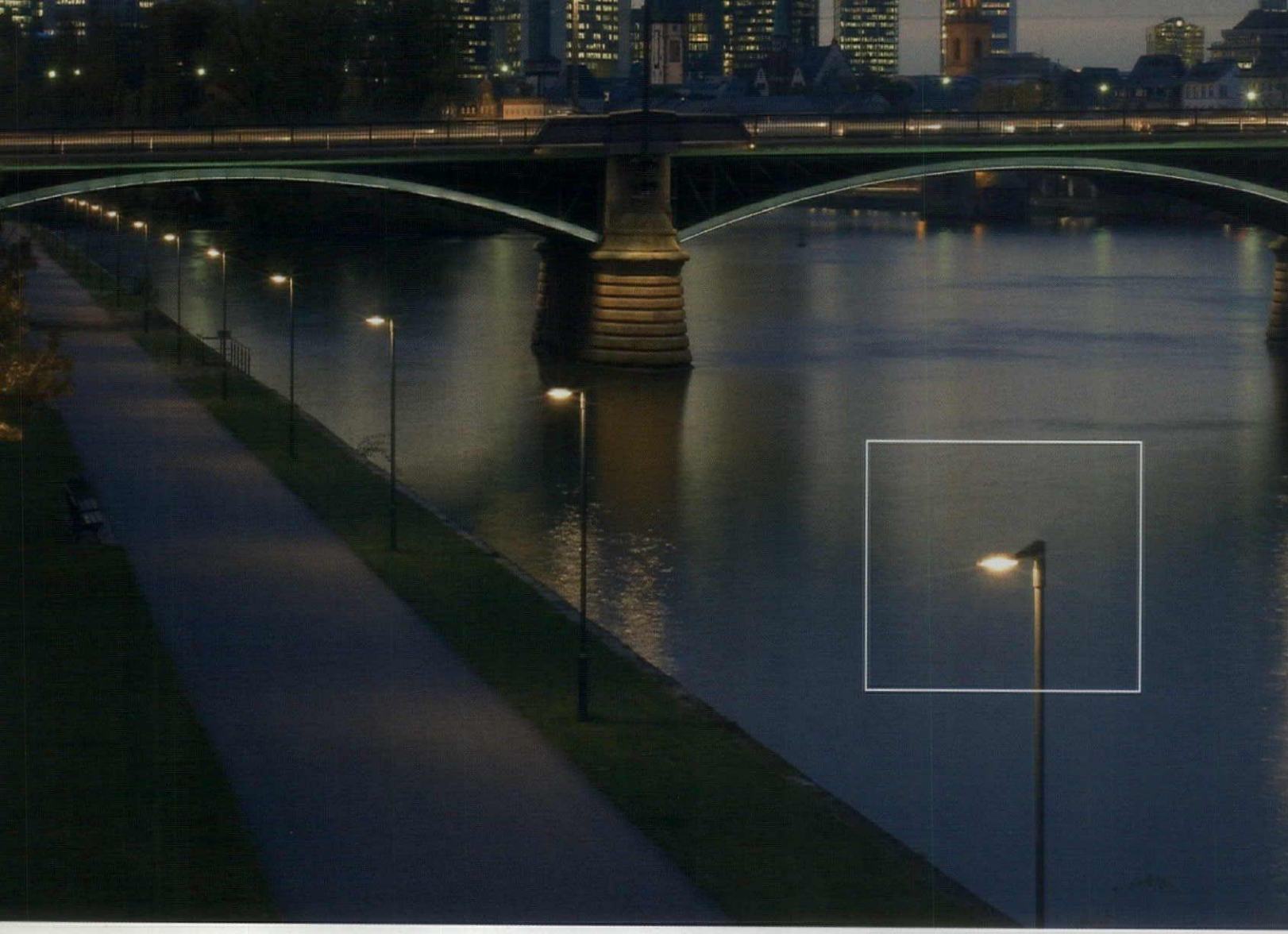
Acriche from Seoul Semiconductor, illumination driven directly from AC [100/110/220/230V]
Eco friendly, energy saving light source

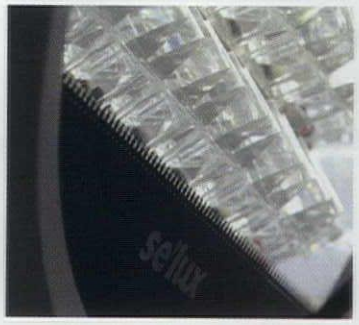
Circle no. 30 or http://archlighting.com/productinfo

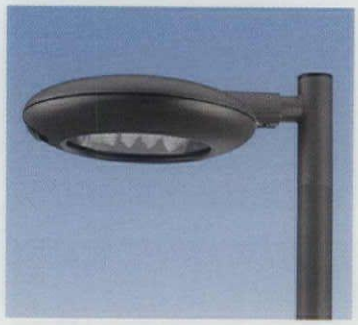
Seoul Semiconductor, HQ in Korea
• s1u0n0@acriche.com • Tel + 82-2-6913-7515

Official Distributors
• USA Los Angeles • Tel +1-714-995-7151
• USA Detroit • Tel +1-248-649-5381

SEOUL SEMICONDUCTOR
www.seoulsemicon.com







Discera 4 LED

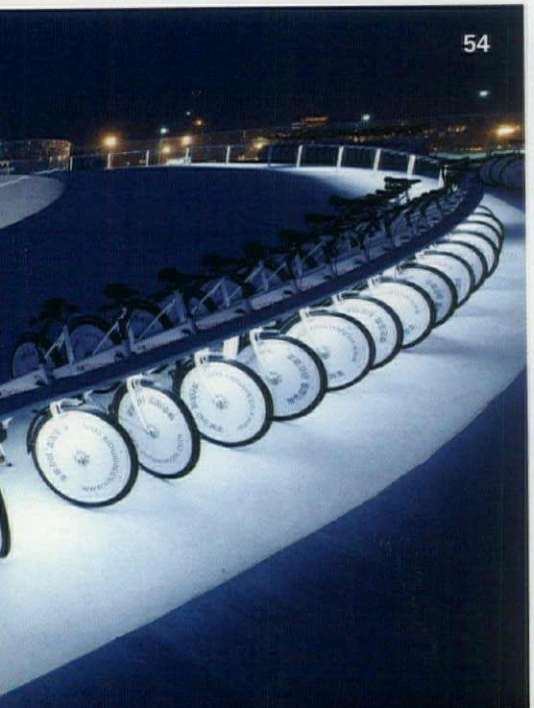
Pedestrian scaled street and area lighting solutions. The new Discera 4 LED balances efficacy with visual comfort! Using high-flux LEDs with precision lens optics, Discera 4 LED delivers exceptional uniformity and low glare ideal for street lighting, parking area, pedestrian walkway and egress applications.

Visit us at Greenbuild- booth #2436!

Circle no. 53 or http://archlighting.com/productinfo

selux.com/usa
(800) 735-8927

se'lux®
Light. Ideas. Systems.



SEPT/OCT 2010

CONTENTS

FRONT

08 **comment** / Lights Out

11 **briefs** / Richard Kelly at Yale; Lutron Smithsonian Donation; and more

DEPARTMENTS

19 **report** / Rubik Code, Part Two

25 **technology** / The Task at Hand

35 **products** / Hello. May I Help You?

39 **in focus** / Bethesda Garden

FEATURES

42 A View on Wright

48 Northern Lights

54 Light Assimilation

60 Specs

BACK

63 **ad index**

64 **one-on-one** / Francesca Bettridge

Cover: Danish Pavilion at the Expo 2010 in Shanghai.

PHOTOGRAPHER: LEIF ORKELBOG-ANDRESEN

THIS PAGE (TOP TO BOTTOM): PAUL WARCHOL PHOTOGRAPHY; BENJAMIN BENSCHNEIDER PHOTOGRAPHY; LEIF ORKELBOG-ANDRESEN

www.sylvania.com/LED

We bring architectural lighting to new heights.

Inside and out, LED lighting systems deliver sustainable energy-efficient lighting consistent with the principles of modern architecture. With more than a century's worth of experience in delivering high-quality light, SYLVANIA LED lighting solutions precisely deliver light to where it is intended, creating the desired interplay of light and shadow. Together with our partner Traxon Technologies, we can specify and install the right LED system for your building, including programming software and commissioning services. As a leader in LED system technology, and with the industry's best warranty, SYLVANIA is your trusted source to meet all of your lighting challenges. To talk to us about your architectural lighting needs, call 1-800-LIGHTBULB or go to www.sylvania.com/LED.

SEE THE WORLD IN A NEW LIGHT **SYLVANIA**

Circle no. 237 or http://archlighting.com/productinfo

Lights Out

The recession is taking its toll on an unassuming bystander: street lighting. Across the U.S., cities and towns, from Dennis, Mass., to Santa Rosa, Calif., are having to make difficult choices in the face of drastically reduced or even nonexistent operating budgets: namely, light or no light.

What's so disturbing about reading these reports, particularly the case of Colorado Springs, Colo., profiled as part of an Aug. 6 *New York Times* article, "Governments Go To Extremes as the Downturn Wears On," is the simplification of the issue into a single option—to save money in electricity costs by turning off the lights—without discussing other options. (In the case of Colorado Springs, Colo., the city turned off a third of its 24,512 streetlights to save $1.2 million in electricity costs and simultaneously cut the size of its police force; neither move has gone over well with residents.)

The fact that we live in a time where municipalities can't afford to run their infrastructure is an issue that directly impacts everyone. And yet, it might be just the wake-up call we need to re-evaluate our approach to our nation's infrastructure issues and the fact that we live in an over-lit world. I'm not suggesting that we risk public safety, but no one can argue that our consumption and demand for electricity has grown profoundly since World War II, to the point where, when there is an electricity loss, we forget how to operate our lives sans connectivity. The current situation begs several questions: How much light do we really need? Are current models for spacing of streetlights overkill or would our street-lighting efforts be better served with less light and/or a different configuration of equipment?

One also wonders, in reading the accounts of municipalities choosing to turn off their streetlights, if the officials making these decisions are aware of the upgrades that can be made to sources and equipment as well as the control and operating systems that allow, through the use of sensors, individual streetlights to be monitored and controlled, and to turn on when a car or person approaches. Smart use of light and energy means that you don't have to turn the switch off completely.

A review of the agenda for the Illuminating Engineering Society's upcoming Annual Street and Area Lighting Conference (Sept. 26–29 in Huntington Beach, Calif.) reveals a rich offering of case study presentations and discussions of energy-efficient technologies and legislative issues, given by architects and lighting designers, lighting manufacturers, city officials, and utility representatives. Once again, here is an opportunity for the lighting community to step forward and inform the larger public about the value of lighting and its skilled professionals, available lighting technologies, and the benefits of quality lighting.

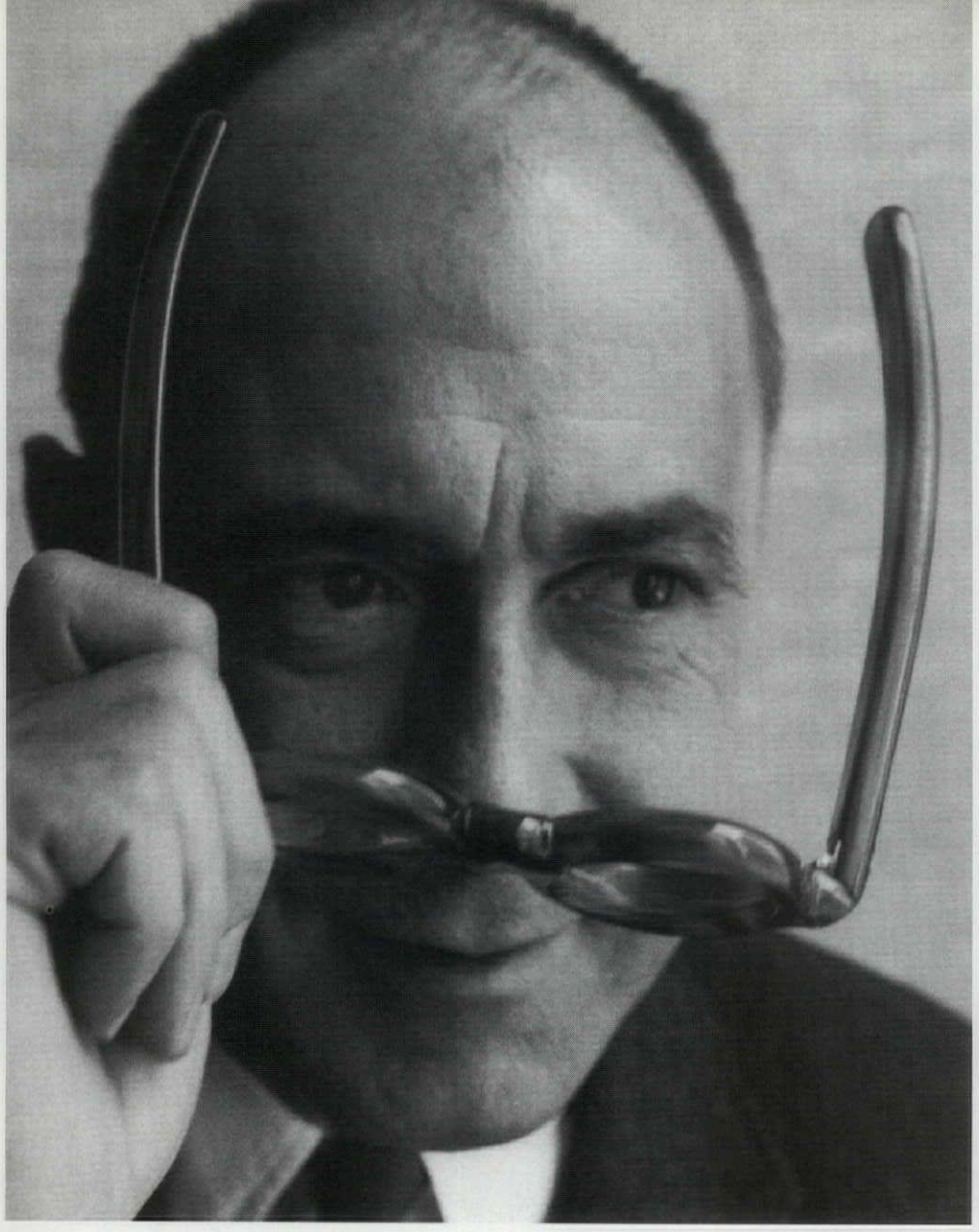
Several cities and towns have already made the investment in switching their infrastructure (many have opted for LED-type streetlights) and several other major metropolitan areas, such as New York, Boston, and Washington, D.C., have pilot programs under way to assess LED technology to address long-term cost, energy, and maintenance issues. But what to do now, when cities and towns have literally run out of money?

Some municipalities, such as Santa Rosa, Calif., have turned to their citizens and implemented an "Adopt-A-Light" program where individual residents pay $150 a year (the cost of operating a single streetlight in 2008) to turn a streetlight on and assure its continued function. But should individuals have to step in and make up the shortfall for municipal services that are supposed to benefit the greater public? Isn't that in part why we pay taxes? There must be stimulus money to help cities and towns purchase, install, and implement some of these newer technologies. These upgrades don't seem any different than the regular maintenance needed to repave roads, so why shouldn't there be some allotment of stimulus funds directed to the maintenance and upkeep of streetlights?

Lighting has fallen victim to economic circumstances; it's treated as low-hanging fruit in many municipalities' budgets. If cities and towns opt to turn streetlights off, they risk letting equipment fall into disrepair and this will only further contribute to accelerating the nation's aging infrastructure of roadways and bridges. Attempting to address one issue in the short-term will create more problems in the long run. But we can (and should) more effectively manage our cities' and towns' light, and there are affordable options for all municipalities so that they needn't be forced to choose between expenditure and public safety. Otherwise, when it comes to the basic public services we are accustomed to, it will really be lights-out for all of us.

ELIZABETH DONOFF
EDITOR

SPENCER LUM



COURTESY ADDISON KELLY

Yale Exhibit Celebrates Richard Kelly

To mark the centennial year of lighting designer Richard Kelly's birth, an exhibit and symposium have been organized at the Yale School of Architecture in New Haven, Conn. Titled, "The Structure of Light: Richard Kelly and the Illumination of Modern Architecture," the exhibition runs from Aug. 23 to Oct. 2.

Curated by Dietrich Neumann, Brown University Professor of History of Modern Architecture, the exhibit draws from photographs and drawings in Kelly's papers, which are housed in Yale's Manuscripts & Archives collection. (Kelly attended the Department of Architecture of Yale's School of Fine Arts and graduated in 1944.) There are additional items from the Kelly family archive and a series of luminous models of several of the projects Kelly worked on during his career.

Recognized as one of the foundational figures in architectural lighting design, Kelly was instrumental in developing a vocabulary of light centered around three principles: focal glow (highlight), ambient luminescence (graded washes), and play of brilliants (sharp detail). It was a language largely influenced by modern architecture and Kelly worked with many of the greats including Mies van der Rohe, Louis Kahn, and Philip Johnson. Many of architecture's 20th century iconic buildings have Kelly's imprint, such as the Seagram Building in New York and the Kimbell Art Museum in Fort Worth, Texas.

The exhibition is organized into five sections as it traces Kelly's career. "I wanted to contextualize Kelly," Neumann explains. The first section examines Kelly's European influences. The second section looks at Kelly's time at Yale, his exposure to stage lighting courses, and the influence of theater designer Stanley McCandless. Kelly's influence on contemporary lighting designers is the subject of the third section, followed by the fourth section which looks at materials and reflective surfaces. Neumann has assembled some of the materials used in the projects Kelly worked on, such as travertine and metal chain curtain, and has created installations that illustrate how light interacts with these materials. Finally, a series of panoramic photographic images recreates the seminal projects Kelly worked on.

A two-day symposium on Oct. 1–2 will close the exhibition. Kelly's language of light continues to influence the work of today's architects and lighting designers, as evidenced by the symposium's line-up of speakers, which includes Rogier van der Heide, Mark Major, and Yann Kersalé. An accompanying book of the same title as the exhibit is to be released this fall. There will also be an IES New York City Section-sponsored lecture related to the centennial year celebrations on Oct. 6 in New York. For more information on the Yale exhibit and symposium, go to bit.ly/a2Ujr0, and for the IES New York City event, go to iesnyc.org. **ELIZABETH DONOFF**

Lutron chairman and founder Joel Spira has donated several materials from the company's artifacts to the Smithsonian's National Museum of American History. His inventor notebook (above) holds more than 100 pages of handwritten notes that shed light on his invention of the solid-state electronic dimmer.

Lutron Donates Company Artifacts to Smithsonian

Lutron chairman and founder Joel Spira, the inventor of the solid-state electronic dimmer, has donated several artifacts from the company's 50-year history to the Smithsonian's National Museum of American History in Washington, D.C. It is a testament to Lutron's contribution to American business, the lighting industry, and lighting history to have its offerings accepted into the museum's Electricity Collection, which includes such notable items as early experimental light bulbs from Thomas Edison.

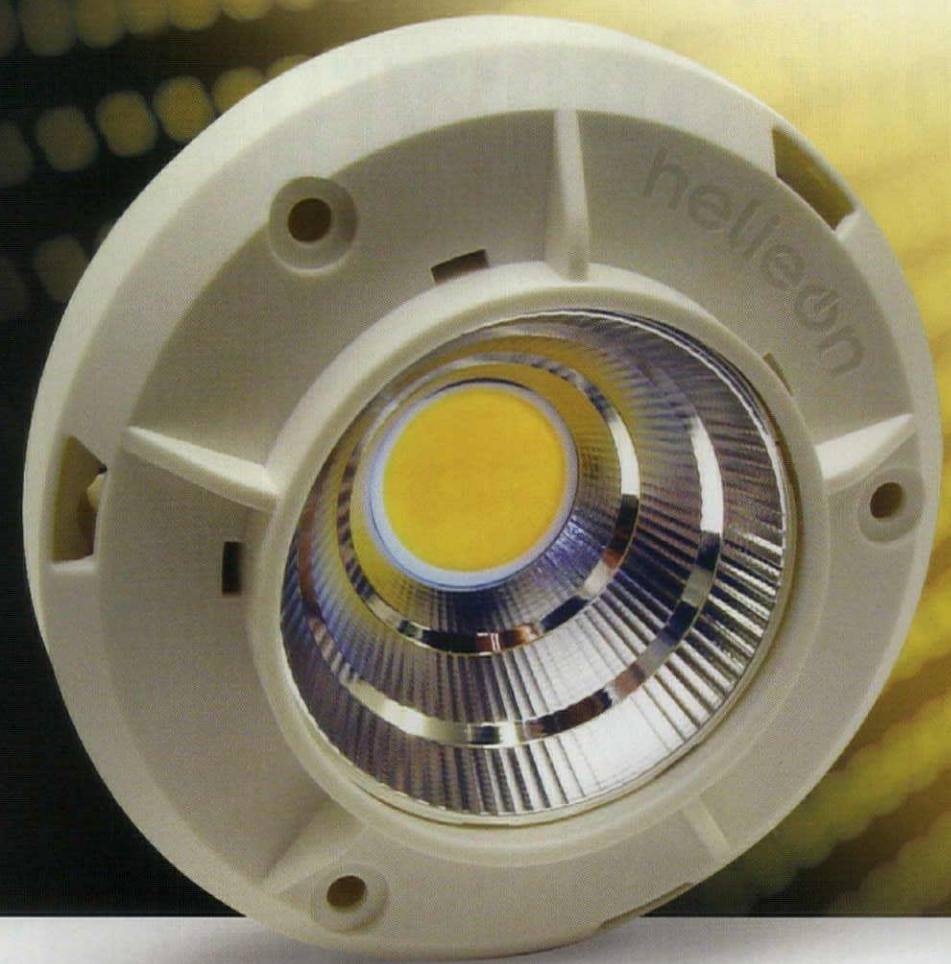
In an April 2010 ceremony at the National Museum of American History, to recognize and celebrate the contribution, museum director Brent D. Glass remarked, "The collections are the heart of what makes this museum unique." Spira himself humbly noted during the presentation, "I never imagined I'd be donating something to the Smithsonian Institute." Hal Wallace, associate curator of the Electricity Collection is excited about the new materials. "Studying the tools of everyday life, such as light switches, helps us to understand our ever-changing technological society," he notes.

The donation items include Spira's inventor notebooks, an early version of the Capri dimmer manufactured by the company in 1964, and the associated advertising materials, as well as other Lutron dimming products. The museum will begin its recording process and hopes to have some of the objects on display within the next two years. **ED**

COURTESY LUTRON

EXPERIENCE BRILLIANCE

The Helieon™ Sustainable Light Module — the future of solid-state lighting



LIGHTFAIR® International 2010
MOST INNOVATIVE PRODUCT OF THE YEAR

Developed by Molex and Bridgelux, the Helieon system is the world's first remarkably simple, easily replaceable, solid-state lighting solution. This breakthrough module delivers energy efficiency, long-lasting performance and sustainability — all with the ease of using a light bulb.

The Helieon system provides you with:

- 500 to 1500 lumens
- High-quality light, color controlled to 3 SDCM
- Separable source and socket design
- Familiar turn and lock installation
- Interchangeable color temperature, light output and beam pattern
- Easy replacement and upgrade path

Plus, Helieon modules can be used in a wide array of interior and exterior applications, including retail, hospitality, commercial and architectural lighting.

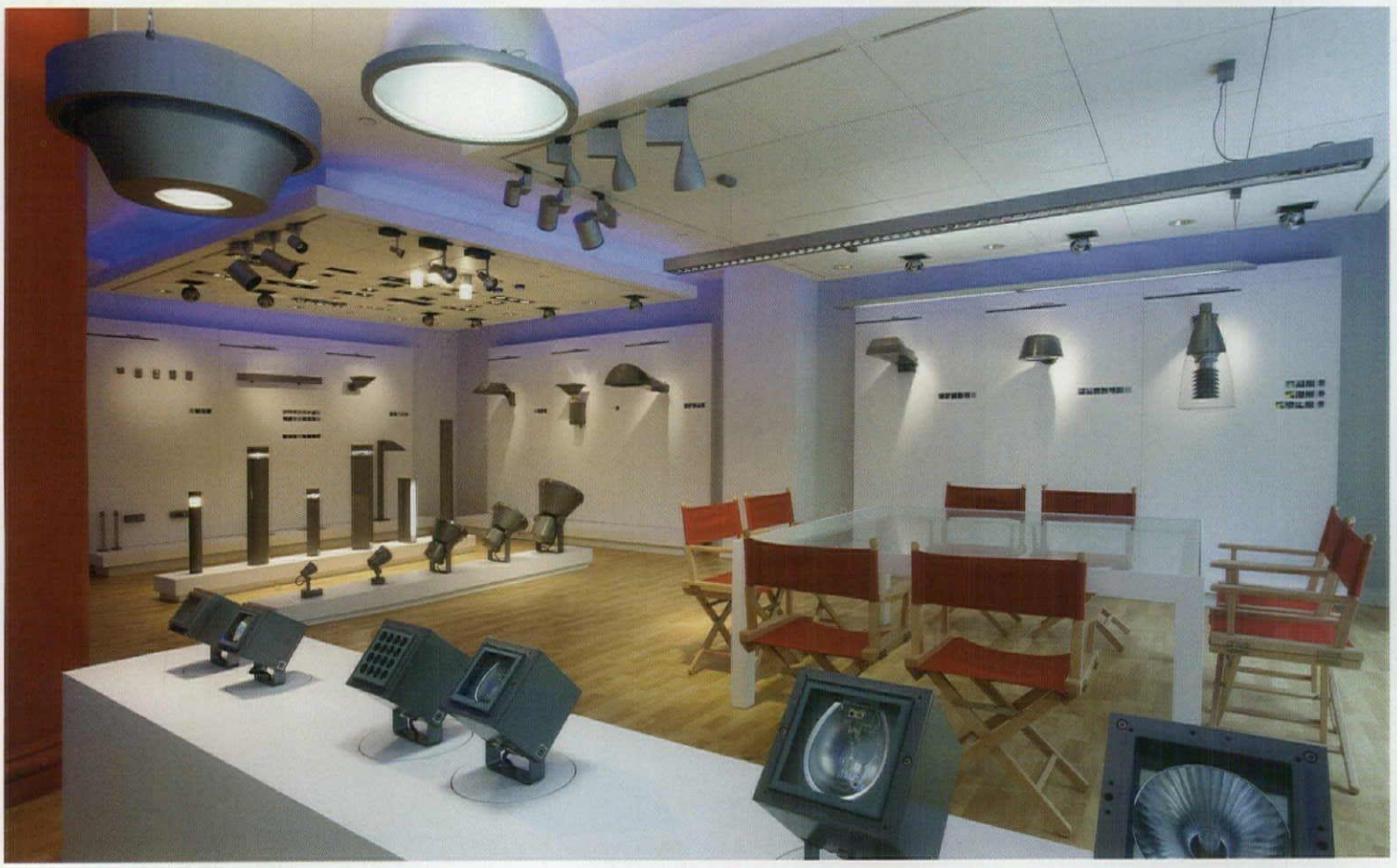
helieon™

Lighting Innovation by Molex & Bridgelux

Circle no. 203 or http://archlighting.com/productinfo

VISIT WWW.MOLEX.COM/LINK/HELIEON_SLM.HTML FOR SPECS, VIDEOS AND MORE.

iGuzzini Opens New York Showroom



Italian lighting manufacturer iGuzzini, known for its technically sophisticated architectural luminaires, has opened its first office-and-presentation space in the United States at 60 Madison Avenue in New York City. The second-floor 4,700-square-foot corner space overlooks Madison Square Park and provides an outlet for the company as it seeks to establish and grow its presence in the U.S. and the North American commercial lighting sectors.

The showroom's location was selected for its proximity to the large number of architecture and lighting design offices in the area. The company, which was founded in 1958 in Recanti, Italy, envisions the New York space as a meeting place to celebrate what it refers to as "the culture of light." One of the purposes of the facility is to introduce architects, lighting designers, and members of the greater New York design community to iGuzzini's vast array of luminaire offerings, many of which are on display, but the showroom is also meant to serve as an outlet for the company's solutions-based technical and design services, and it welcomes designers to call on iGuzzini's New York-based staff for this purpose. This focus on service is integral to the company's business philosophy, which intertwines design, research, sustainability, and attention to human factors. "We sell service, we don't sell products," notes company president Adolfo Guzzini.

It is also anticipated that the showroom will host lectures and events. Showroom manager Giorgio Pierini hopes to develop programs with affiliate design organizations such as the New York chapter of the American Institute of Architects, the Designers Lighting Forum of New York, and the International Association of Lighting Designers. "We want all design professionals to know that the space is here and available to them as a resource," Pierini says. **ED**

COURTESY IGUZZINI

tune the light

Cantax LED

The premiere launch of the latest generation of Cantax LED spotlights dedicated to efficient visual comfort. Maintenance-free, compact and energy efficient, LEDs represent the ideal light sources for accent lighting without any IR or UV content. The Cantax spotlights, equipped with the latest high-power LEDs in warm white or daylight white versions, now provide luminous flux output up to 1080lm – comparable to 50W low-voltage halogen lamps – yet present a connected load of just 14W. Exclusively designed and built by ERCO, the LED lighting technology uses collimating and Spherolit lenses to efficiently direct the luminous flux onto the target surface using either spot or flood characteristics. These figures confirm that this is where the future of accent lighting is to be found.

www.erco.com

ERCO

Circle no. 77 or http://archlighting.com/productinfo

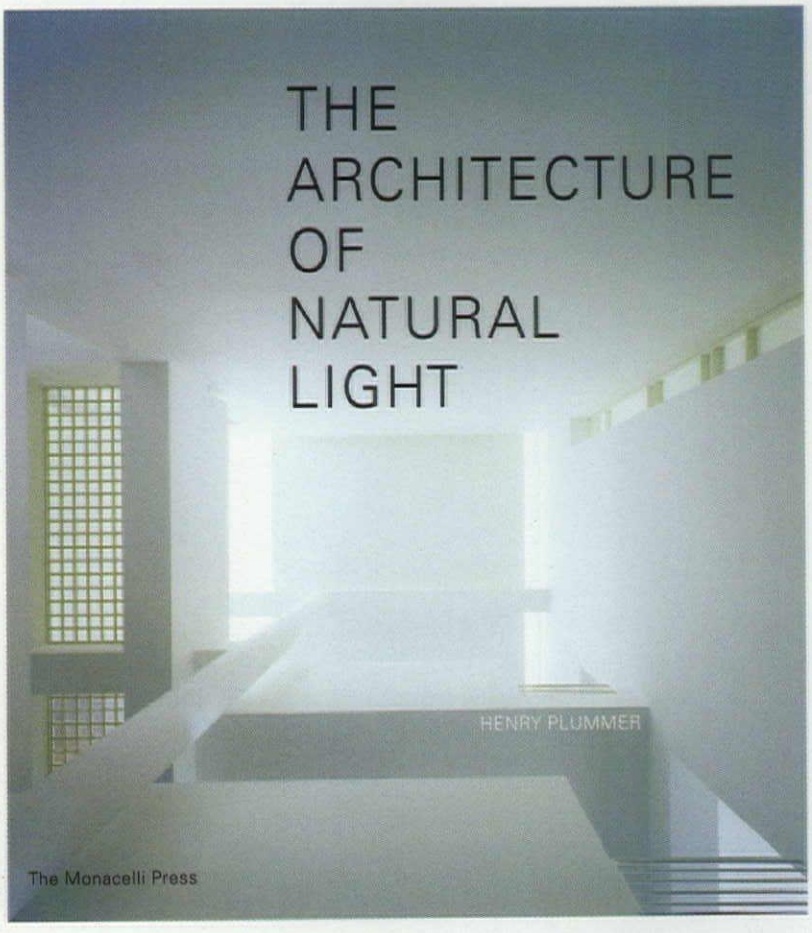
IES Establishes Director of Public Policy Position

To keep pace with the increase in legislative activity regarding energy and environmental issues as it pertains to the lighting industry, the Illuminating Engineering Society (IES), like its compatriot lighting organization the International Association of Lighting Designers (IALD), has established a public-policy position. Taking the helm for the IES in this full-time role is Robert E. Horner.

Horner is well respected in the industry. He spent more than a decade in the employ of Osram Sylvania in several product group marketing manager roles. A long-standing member of the IES, Horner also served the National Lighting Bureau for 10 years as an officer and a member of the Board of Governors.

"The emphasis on energy savings has an impact on the lighting industry in a way that didn't exist five years ago," says William Hanley, IES executive vice president. "Creating this position is one way we can keep members abreast of what's going on."

Horner's responsibilities will focus on developing and coordinating the public-policy interests of the IES to government, regulatory, trade and professional associations, partner organizations, such as the American Institute of Architects, the Alliance to Save Energy, and the U.S. Green Building Council, as well as to the general public. Horner will also work closely with the IES staff, Board of Directors, and appropriate IES committees to identify and prioritize the key issues impacting the lighting community and facilitate responses as required. "Legislative activity has picked up exponentially over the last three to four years," Horner explains. "We have to be more proactive and let people know what's going on." This will entail representing the IES at industry events and conferences, as well as government and regulatory meetings. And in order to communicate directly to IES members, Horner will pen updates in print articles in the Society's publications and on the IES's website at ies.org. **ED**



The Architecture of Natural Light provides readers with a historic overview about the use of natural light in architecture and its application in influential building projects.

The Architecture of Natural Light

A worthy addition to any design library, *The Architecture of Natural Light,* by architect and photographer Henry Plummer, considers the effects of natural light in contemporary architecture. Through its use of stunning color photographs and accompanying illustrated diagrams, combined with Plummer's knowledge and experience in the design profession, the reader is given a solid historical overview about the use of natural light in architecture and its application in the buildings we know and inhabit today.

The 256-page book is organized into seven different sections, each one focusing on a specific quality of natural light: evanescence (the orchestration of light to mutate through time); procession (the choreography of light for the moving eye); veils of glass (the refraction of light in a diaphanous film); atomization (the sifting of light through a porous screen); canalization (the channeling of light through a hollow mass); atmospheric silence (the suffusion of light with a unified mood); and luminescence (the materialization of light in physical matter). Each chapter begins with a discussion of specific examples from architecture, art, literature, film, science, and philosophy in which the specific aspect of light being discussed has been used. This is followed by a series of case studies in which Plummer analyzes contemporary buildings. Here he explains the way in which the architects have incorporated natural light into their architectural designs, the way in which light shapes the space, and its impact on occupants.

The Architecture of Natural Light is a wonderful showcase for how architecture and light intersect and it holds a wealth of information for architects and lighting designers alike. The sampling of seminal projects illustrates not only what has been achieved in the realm of design and light, but what is still yet to be explored. **REBECCA EBSTEIN**

COURTESY THE MONACELLI PRESS

LEVITON®

One stop shopping for energy management.

The broadest selection of lighting and energy management solutions, all in one place.

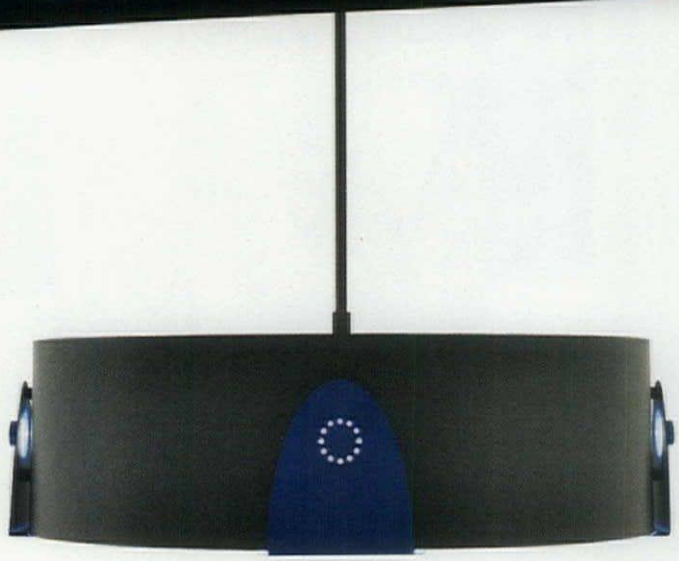
Lighting and energy management is much bigger than any single product. It's about a whole system designed to make buildings more efficient, and building owners more profitable. At Leviton, we have the broadest range of products you'll need to squeeze every last drop of efficiency from your buildings—from Occupancy Sensors and Self Powered Wireless Lighting Controls to Relay Systems and Daylight Harvesting Systems. Whatever the solution, we can help keep you LEED compliant. We also offer online and in-person support to put these products to work, in any building environment. Take a closer look at some of the Smart Choices we're offering at **Leviton.com/LMS**

Circle no. 35 or http://archlighting.com/productinfo

THE FUTURE IS ON®

ADVENT Architectural Lighting Innovations

presents

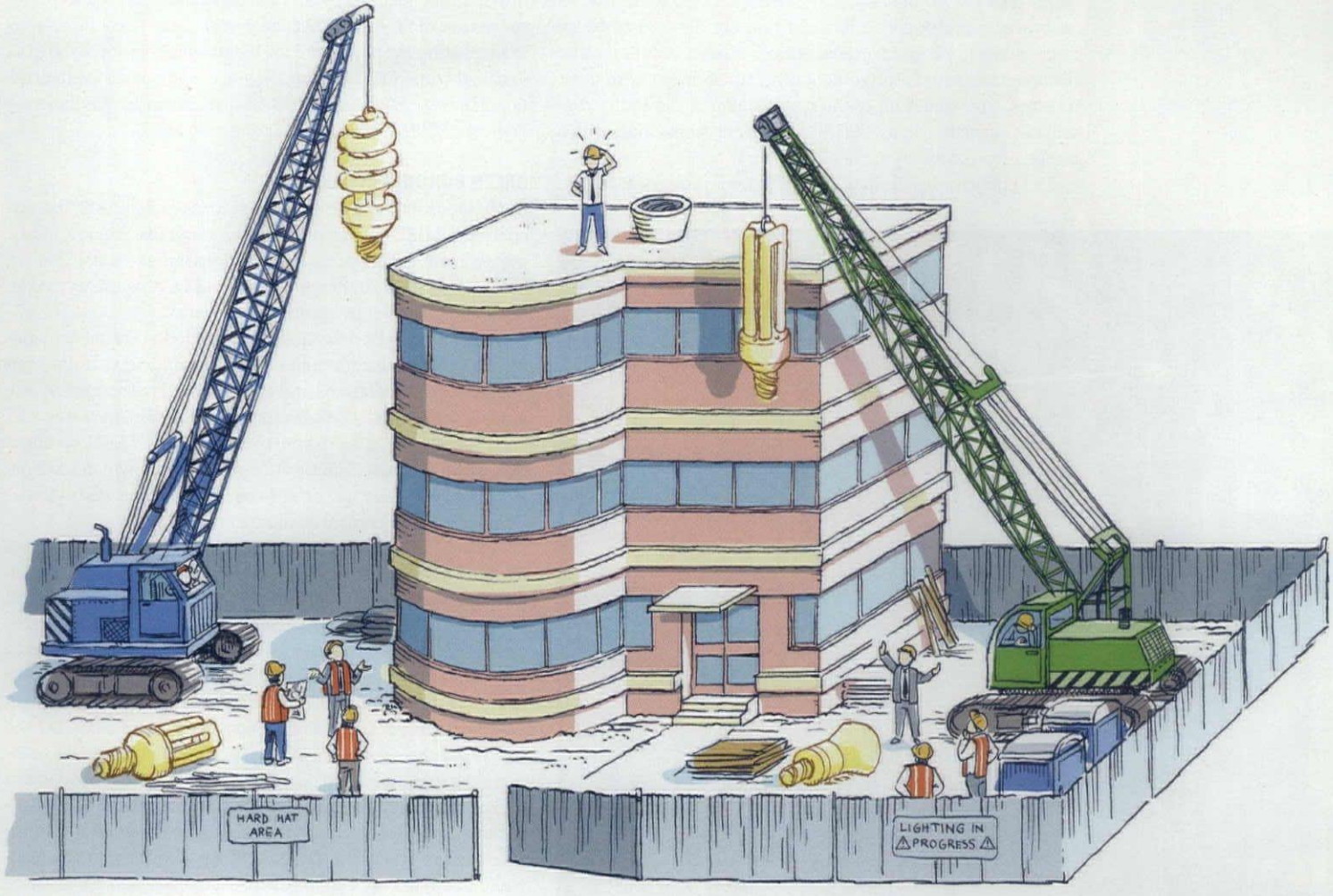


www.specadvent.com

- Architectural grade luminaries
- Designed to fit a range of styles
- Aesthetic and performance based
- Efficient light sources including LEDs
- Broad material and finish solutions

ADVENT™
A BRAND OF SPILIGHTING®
262.242.1420 • www.specadvent.com

Circle no. 50 or http://archlighting.com/productinfo



PAUL HOPPE

Rubik Code, Part Two

WHAT LEED AND THE NEW GREEN BUILDING CODES HAVE IN STORE FOR LIGHTING

In the first part of this article, which appeared in the July/August 2010 issue, we discussed energy codes in the United States and how they are interacting with lighting. Now we turn our attention to green standards and building codes and their contribution to shaping lighting design. We will examine the most well-known green building standard in the United States, the Leadership in Energy and Environmental Design (LEED) rating systems, developed by the U.S. Green Building Council (USGBC), and then the new green building codes that are aiming to transform sustainability objectives into mandatory, enforceable code.

LEED

The USGBC's rating systems have become widely used and influences standards for the design, construction, and operation of buildings. Because LEED is relatively new (first introduced in 1999) and has grown in popularity extremely fast, the process of developing new versions is still evolving. This is not as structured nor as open as the development of energy codes, and because LEED is voluntary, instead of a legal code or ANSI standard, the USGBC is not obliged to follow an open and structured process. (But they are moving in that direction.)

The current version is LEED-2009, and LEED-2012 is in development. Informal groups of Subject Matter Experts (SMEs) led by LEED Technical Advisory Groups were appointed by USGBC staff to work on revisions to each credit for LEED 2012. Lighting-related LEED credits range across three different categories: Energy, Indoor Environmental Quality, and Sustainable Sites. Members of the International Association of Lighting Designers (IALD) serve as SMEs for Indoor Environmental Quality (daylighting and lighting controls for occupant comfort) and Sustainable Sites (light pollution control).

The LEED-2012 Public Review Draft is expected to be published for pub-

lic comment in September, and USGBC responses to these comments will be published thereafter. If the USGBC follows its previous procedure, comments that are deemed to be an improvement will be incorporated into a new draft and other comments rejected, but without any formal dialog with commenters. The final draft of the new version of the rating systems will be voted on by USGBC member organizations, with a target release date of January 2012.

The public review draft of LEED-2012 will provide an indication of what the next version will look like. The credit that addresses light pollution control will be significantly revised to resolve some of the quirks that can prevent very sensitive designs from meeting the requirements. It also will likely adopt the BUG (backlight, uplight, and glare) system developed for the International Dark-Sky Association (IDA) and Illuminating Engineering Society (IES) Model Lighting Ordinance (MLO).

GREEN BUILDING CODES

But what exactly is a green building code? Imagine all the categories in LEED—site sustainability, water use, energy, indoor environmental quality, materials and resources—but written in enforceable code language. This would be a mandatory code, not an optional points-based rating system.

To meet goals for greenhouse gas reduction and sustainability, many cities want a green building standard that they can use as an enforceable code for commercial development. A few cities, such as Boston, Dallas, and Los Angeles, have adopted legal requirements for some equivalence of LEED certification, but not actual LEED certification. Codes, which are legal enforceable regulations, need to be unambiguous and enforceable—you either comply or you don't.

Because LEED is a points-based system in which you can choose what you do to earn points, a LEED building can be many different things. Official LEED certification requires the payment of significant certification fees to a third party and is dependent on the decisions of that third party—something that may be inappropriate and legally questionable for a government to require. For these reasons, LEED does not make a good code and should be not used as one. Because of this, the USGBC has supported the development of green building codes. It envisions the green building codes as the baseline code minimum for building performance, with LEED forging ahead as the voluntary "beyond code" program pushing the envelope of sustainable design. Two green building codes have been in development: Standard 189.1 from ASHRAE, the IES, and the USGBC; and the International Green Construction Code (IGCC) from the International Code Council (ICC) and the American Institute of Architects (AIA). The IALD, along with many other design and construction industry representatives, is participating in the development of both.

Standard 189.1 was published this January after several years of development and four public-review drafts. It is available for adoption and has gone into continuous maintenance status, similar to other ASHRAE standards.

A drafting committee began work on the IGCC in the summer of 2009. The first draft for public review was released in March, and has entered into a code development process similar to that for the International Energy Conservation Code and other ICC codes. The first edition, IGCC-2012 is expected to be published in March 2012. (According to the ICC, though, the current public review draft is available for adoption.)

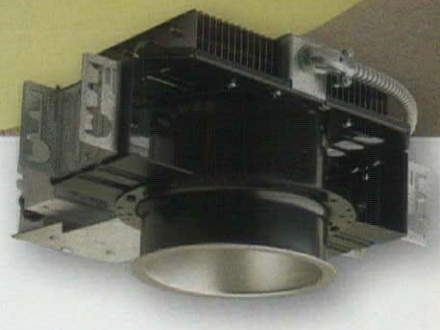
So, coming into this spring, it appeared as though we were going to have two competing green building codes, and this caused quite a bit of consternation. Fortunately, the ICC and ASHRAE realized that competing codes were not in their best interest, nor in the best interests of the design, construction, and code-enforcement communities. In March, they announced a reconciliation. Both codes will continue their independent development processes, but 189.1 will be available as a "jurisdictional option" in the IGCC. This means that a jurisdiction will be able to decide to adopt 189.1 as their green

ESSENTIA™

INTERIOR LED

UNMATCHED PERFORMANCE. *Beautiful Results.*

BetaLED brings you the inside advantage



BetaLED brings its renowned product benefits inside with ***Essentia***, a new line of LED interior lighting that combines a breakthrough in performance and control with an upgradeable, replaceable light source. Commercial spaces can now be brilliantly illuminated and realize tremendous energy savings with a sustainable lighting solution.

The complete ***Essentia*** product line features *recessed downlights* with multiple distributions, *linear and cove lighting*.

Compare Essentia lighting performance.

Contact your local BetaLED agent or **sales@BetaLED.com** to request a comparison LED layout. Learn more about BetaLED's Essentia interior LED luminaires at **www.BetaLED.com/Essentia**

beta LED®
By **RUUD LIGHTING**

Circle no. 69 or http://archlighting.com/productinfo

building code instead of the IGCC, and will need to decide which to require at the time of code adoption. The design team will have to adhere to the selected code.

GOING FORWARD

So which code will be adopted? Since the IGCC is produced by the ICC—the source that code officials turn to—it will carry a lot of weight, and it seems to be gaining momentum because of a strong marketing push from the ICC. In June, the U.S. Conference of Mayors passed a resolution endorsing the IGCC and urged local governments to adopt it. With this attention, will anyone adopt 189.1, even though it has already been published? Once IGCC-2012 is published, will there be any reason for a jurisdiction to choose 189.1 instead of IGCC? Of course, these questions are hard to answer since we do not yet know what the final IGCC will look like.

Assuming that the IGCC becomes the prevalent green building code, what will the lighting related provisions look like? Here are some things to expect:

- Light pollution control using IES TM-15 BUG ratings.
- Auto demand-reduction technology requirements.
- New requirements for automatic controls for lighting, signage, and plug loads.
- Verification and commissioning.
- Energy monitoring.
- Mandatory daylight in many building types, with exact requirements varying based on climate.

Two new ideas in the IGCC are Jurisdictional Requirements and Project Electives. Jurisdictional Requirements are a list of provisions that the adopting authority can choose to include in the code as mandatory requirements. For example, control of light pollution is currently one of these provisions. Project Electives are a separate menu of provisions that the design team can choose from, and will have to comply with, in addition to the main mandatory provisions of the code. They will have to comply with a set minimum number of electives from this list, but they can choose which ones; the minimum number of required electives will be set by the jurisdiction at time of adoption. These two aspects of the IGCC allow the local jurisdiction to tune the code to meet its needs and conditions, and to adjust the stringency.

Assuming the IGCC becomes the green code of choice, how widely and how quickly will it be adopted? No one knows for sure. But if it is widely adopted, building design and construction professionals will have to become conversant in the IGCC, energy codes, and LEED. And they will need to know which version of the IGCC (2012, 2015, etc.) has been adopted by the jurisdiction, and also which Jurisdictional Requirements have been adopted.

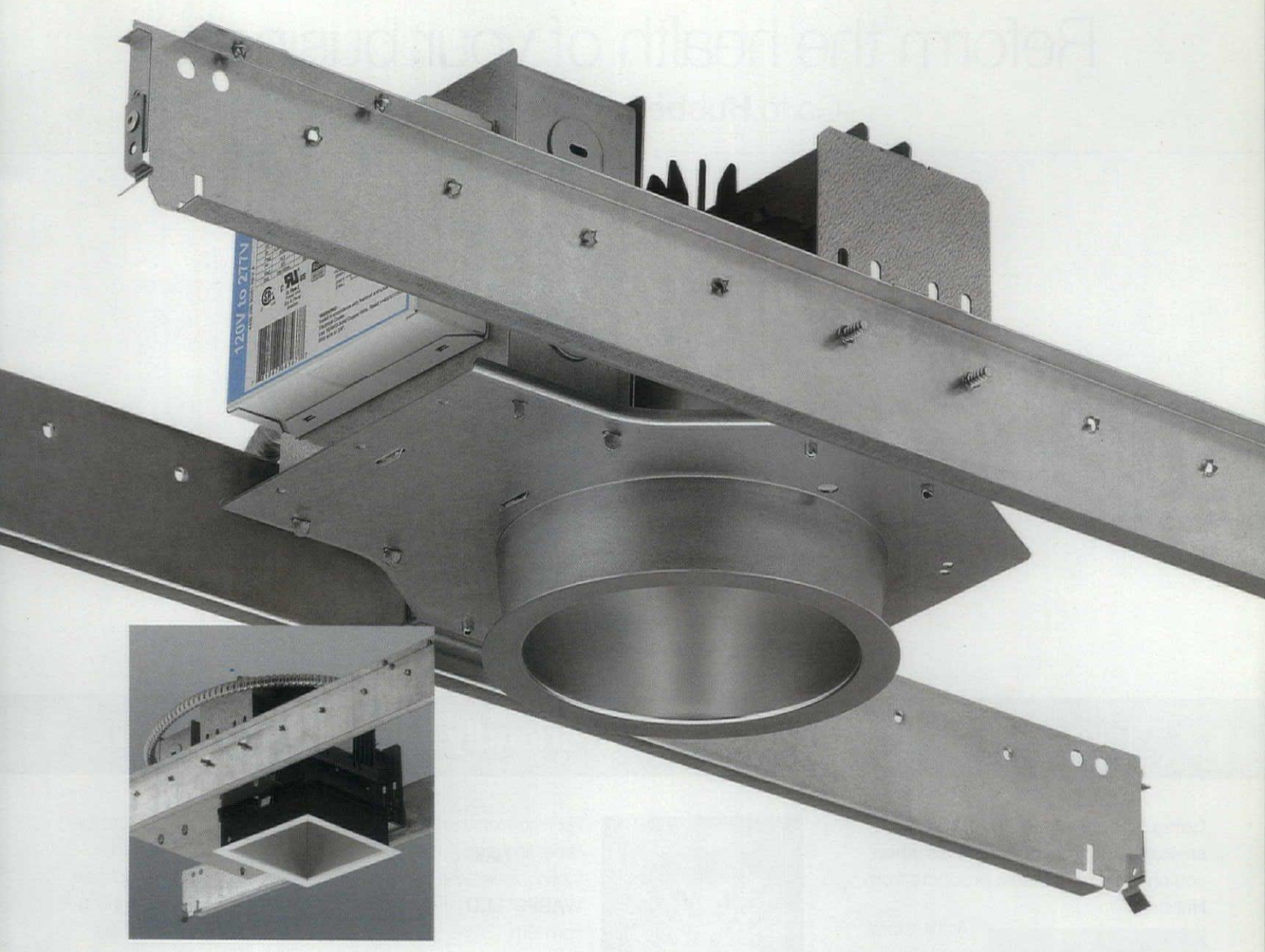
MAKING SENSE OF THE BIGGER PICTURE

Another thing to think about is the relationship between green building codes and energy codes. The energy provisions of the green building codes are designed to overlay the energy code and to make the standards more stringent. But what happens if a state adopts an energy code that is more stringent than the energy provisions of the green building code? This could get very confusing for designers.

If your head isn't already hurting, try this: Say you are designing the lighting for a LEED project in a locality that has adopted a green building code. You will have to design to two different green standards, every design option will have to be tested twice, and two sets of calculations and documents will need to be produced to prove compliance with each provision in both. I hope the USGBC and the ICC are thinking about this.

If green building codes are widely adopted, we design professionals will have our work cut out for us. Not only will we have a responsibility to design to the green building code, but we will also need to understand that code's relationship to energy codes, LEED, and other codes such as the MLO.

GLENN HEINMILLER



Philips Omega LED: A dedication to performance.

Philips Omega's design, engineering, and manufacturing teams have been dedicated to a single end—the creation of the most advanced, precise, and efficient LED downlight in the marketplace. Assembled in Omega's newly-constructed clean room, every Revelation LED downlight integrates MesoOptics® diffusion with proprietary remote phosphor technology to produce one of the most efficient and advanced LED systems available for general downlighting applications. Revelation LED: One more precision optical instrument from Omega.

www.omegalighting.com

PHILIPS
omega

Circle no. 250 or http://archlighting.com/productinfo

Reform the health of your business.

Go to **Hubbell.com/recovery**

HSI=GREEN

HUBBELL SUSTAINABILITY INITIATIVE

Take advantage of **intelligent, earth-friendly lighting** from Hubbell.®

Going "green" can be good for the environment and your business when you choose sustainable products from Hubbell.

AAL - Designer SSL Series

Architectural Area Lighting's **Designer SSL Series** with elegant LED luminaires conserve energy while exclusive MicroEmitter™ technology delivers precisely controlled LED output with minimal glare.

Prescolite® **LiteFrame® LED Downlights** provide over 50 lumens per watt with long-lasting, low-maintenance operation backed by a 5-year warranty.

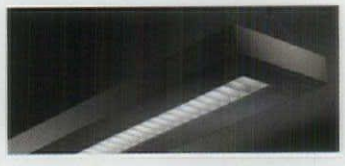
LiteFrame® Commercial Grade LED Downlight by Prescolite®

Kim Lighting® WARP9® LED

For high-tech street and area lighting, there's the **WARP9® LED** from Kim Lighting.® Our EmitterDeck™ design allows easy LED change-out right in the field, for an upgradeable, sustainable solution and far more value than a throw-away fixture.

With the **OMNI™ Dual Technology Occupancy Sensor**, ultrasonic and infrared detection work together with IntelliDAPT® technology to monitor, analyze and self-adapt for true "Install and Forget" operation.

HBA OMNIDT with IntelliDAPT®



PLANK® Luminaire by Alera Lighting

And for sleek, upscale lighting that's compatible with the new A+CLASS™ energy management system, Alera Lighting offers **Plank® Suspended Luminaires**.

Learn about these products and more at the Hubbell Sustainability Initiative website, featuring product information, ARRA stimulus information, and frequent updates via Twitter. Equip yourself and the world around you for a prosperous future.

Visit us at **Hubbell.com/recovery** today.

Think Hubbell First

www.hubbell.com

HUBBELL®

Electrical Systems • Lighting • Power Systems

Circle no. 59 or http://archlighting.com/productinfo

SCOTT ROBERTS

The Task at Hand

ENERGY CONSERVATION AND PERSONAL CONTROL ARE REDEFINING OFFICE LIGHTING SOLUTIONS

There is growing evidence that personal control over lighting is a key determinant of office-worker environmental satisfaction and productivity.[1] For one, the U.S. Green Building Council's (USGBC) LEED rating system clearly recognizes that individual user control is a contributor to indoor environmental quality and sustainable design. And recently, a survey of professionals in the building products and facilities industries identified tasklighting as the most important type of lighting in the office environment, with ambient lighting identified as a close second.[2] However, increasingly restrictive energy codes and growing pressure to design "beyond code" are resulting in general office lighting systems that provide no allowance for tasklights and can leave end users wanting. If tasklighting is to be provided, it must not only be counted as part of the energy solution, it must be anticipated in the design and relied on to do a significant amount of the lighting work.

STRATEGIES FOR CHANGE

Designs for office lighting are trending toward two strategies. One approach positions portable tasklights at primary task areas to supplement a reduced level of overhead lighting. Another uses portable task/ambient luminaires at those locations to provide a balanced illumination with no conventional overhead lighting. Both methods satisfy two important aspects of high-performance workspaces: They save energy and provide personal lighting control.

California's Title 24 Energy Efficiency Standard is advancing the trend toward these "low-ambient" office lighting strategies by providing a limited exemption for furniture-mounted office lighting. This progressive code recognizes that much of the future energy infrastructure for accommodating sustainable growth in our cities will be gained by reducing the electrical demand of commercial buildings, especially office buildings. California un-

Designs for office lighting are trending toward two strategies. One approach positions portable tasklights at primary task areas to supplement a reduced level of overhead lighting. Another uses portable task/ambient luminaires at those locations to provide a balanced illumination with no conventional overhead lighting. Both methods satisfy two important aspects of high-preformance workspaces: They save energy and provide personal lighting control.

derstands that tasklighting and other portable task-specific lighting solutions will dramatically reduce electricity demand, thus also playing a key role in expanding the capacity of the existing power grid to serve a growing population.

However, "low-ambient" solutions present new challenges for a design industry that has traditionally focused on reflected ceiling plans and overhead lighting systems to fulfill primary office lighting needs. Under the newest lean-energy guidelines, conventional lighting solutions fall short, and those that merely anticipate supplemental tasklighting are rarely successful. Properly composed low-ambient workspaces rely on a coordinated effort in which the lighting issues and vision are understood and supported by the owner and/or client, architect, engineer, lighting professional, space planner, and furniture dealers alike.

Failure to align the design process, project documentation, and product delivery with the new reality has recently resulted in a range of missteps and misfortunes. This includes projects where:

- General overhead lighting consumes the entire lighting energy allowance while delivering borderline conditions with no energy allowance latitude for adding tasklights.
- The overhead lighting anticipates tasklighting, but no tasklights were delivered because the tasklighting design, specification, and/or procurement responsibilities were not clearly defined.
- A disconnect or mismatch between the ambient lighting and the tasklighting relative to quantity, quality, lamp color, controllability, or other aspects leaves the occupant unfulfilled.

To secure success, tasklighting should no longer be left to chance or left out of the project's design-to-implementation equation.

LEARNING A NEW LIGHTING GENRE

Tasklights and furniture-mounted task/ambient luminaires differ from traditional ceiling-based lighting in a number of ways:

- They are portable.
- They are not part of the project electrical rough-in.
- They usually do not require an electrician for installation.
- They can be purchased from furniture dealers.
- They operate at 120V.
- They connect to the building via standard power receptacles.
- They do not have traditional control-wiring connections.

To successfully implement an office lighting model that relies largely on portable tasklights and integrated task/ambient luminaires, traditional design processes and practices must evolve to reflect these unique characteristics.

In fact, to maximize user satisfaction, productivity, and energy conservation, it is best to satisfy the personal lighting requirements of the office first, and then add lighting to address luminance ratios and any non-personal, collaborative work activities. Lighting professionals historically have not built their designs around individual task needs and locations, in part because these details often evolve later in the design process. Lighting retrofit projects are one exception where the workstations and visual tasks are pre-existing and quickly become the focus of the lighting scheme. Owners and clients should make early decisions about individual workstations and arrangements and work with their lighting professional to integrate task or task/ambient lighting that best serves the individual workers.

Through this collaboration, lighting professionals will become conversant in workstation design and adopt furniture plans, even early schematic furniture arrangements, rather than reflected ceiling plans as a platform for applying lighting that directly relates to office activities. Early determination of where fixed, hardwired lighting is required and where it is not needed will result in lean lighting solutions that provide and consume no more and no less energy than required. Likewise, workstation designers, space planners and end-users will become more knowledgeable in lighting and visual issues and begin to see tasklighting as an extension of a comprehensive lighting- and energy-management system with critical performance attributes, not just an element of form or fashion.

In absence of this critical collaboration, the lighting professional must resist the temptation to apply indiscriminate fixed lighting to cover any unknowns. Fixed lighting is less accessible to individual users and represents energy that is difficult to reallocate for personal use. Consider the idea that, if the space occupancy is uncertain, it's probably too early to design the lighting.

PLANNING FOR PLUG LOADS

The fact that portable task and ambient lighting operate at 120V and building integrated overhead lighting is typically powered by 277V circuits leads to the misconception that the shift to portable lighting requires additional 120V branch circuits and thus requires larger on-site transformers. On the contrary, the 120V power supplied to most open-office furniture systems is highly underutilized and can easily accommodate the 0.2W to 0.6W per square foot of power consumed by tasklighting or task/ambient systems, respectively. Thus, rather

New energy-saving LED offering sets benchmark for optical performance and versatility.

Featuring Cooper Lighting's patent pending modular LightBAR™ technology and patented AccuLED Optics™ offered in 17 unique optical distributions, the LED luminaires feature a unique application-specific design that allows lumen and energy output to be customized to fulfill the exact needs of the outdoor space—eliminating wasted energy, obtrusive spill light and over lighting of spaces. Producing even, uniform illumination, the new offering provides a benchmark warm white light of 4000K correlated color temperature (CCT)—standard across all products—with no sacrifice in lumen output.

For more information email TalkToUs@CooperIndustries.com or visit our website at www.cooperlighting.com/ads.

Circle no. 25 or http://archlighting.com/productinfo

COOPER Lighting

www.cooperlighting.com

than requiring additional 120V branch circuits and larger transformers, a shift to low-ambient office lighting based on portable task and ambient lighting more often results in a net reduction in wiring and branch circuits due to the elimination of overhead 277V lighting.

Consider that open-office workstations are often arranged in "six-packs" or "eight-packs" (clusters of six or eight workstations) separated by circulation aisles. This arrangement limits the distance one must walk to get to and from any workstation or from one workstation to another. Typically, these workstation "clusters" are furnished with three- or four-circuit modular wiring systems supplied by three- or four-circuit 120V power feeds. Often, one circuit is dedicated to computer loads that can consume 1W per square foot or more. This leaves another circuit for personal and miscellaneous plug loads, and a third circuit is for portable lighting. Applying switching control to the third circuit allows the portable lighting to be switched on and off in unison. Each of the three circuits carries the same capacity (approximately 1W per square foot) and can easily accommodate the entire office lighting load. In fact, with portable lighting power densities at or below 0.6W per square foot, there is often enough capacity to power the workstation video display terminals (VDTs) via the switched "lighting" circuit as well—a good practice that prevents VDTs from unintentionally being left "on" when the space is unoccupied.

The adoption of low-ambient office lighting strategies is also supported by new wireless-control technology that allows plug-load lighting to respond to room daylight sensors, vacancy sensors, and remote manual switches. In the past, portable lighting could not be dimmed remotely because the National Electric Code does not permit standard power receptacles to be dimmed. Wireless controls bridge that gap, allowing office tasklights and other portable furniture-mounted lighting to be included in office energy optimization strategies such as daylight, occupancy, and demand response. Also, radio-controlled relays are easily integrated into existing furniture power circuits and controlled by self-powered sensors and switches that harvest energy from their environment and do not require electrical wiring to facilitate the conversion of existing offices to low-ambient lighting. Whether hard-wired or wireless, plug-load control is becoming a standard for sustainable high-performance building and supports the trend toward task-oriented portable lighting.

SPECIFYING SUCCESS

While it is advisable, if not required, that anticipated portable lighting be acknowledged on the project electrical lighting plans along with the required egress lighting, perimeter lighting, and other proposed fixed luminaires, the electrical distributor and electrical contractor are rarely best suited to implement portable task and task/ambient lighting systems. Experience reveals that project delivery is improved when portable luminaires, their plug-and-play control accessories, and any associated self-powered wireless sensors and controllers are handled by furniture suppliers who can coordinate their placement with other workstation elements, are familiar with system details such as cord management, and are most aware of

last-minute changes in workstation design, quantities, and arrangements. (Furniture suppliers and facilities personnel can easily install and activate plug-and-play and self-powered control devices with minimal training.)

These items are not part of the electrical rough-in work, and they are required on site long after the conventional fixed lighting equipment begins to arrive. For these reasons, and to minimize conflicts and overlap between the trades during the later stages of construction, the portable lighting is best furnished and installed by the project's furniture supplier. This arrangement also assures that the portable lighting is counted for depreciation tax benefits and can contribute to the LEED regional materials credit when they are sourced within 500 miles of the project site.

Accordingly, the project lighting documents must clearly assign responsibility for furnishing and installing the portable lighting to the furniture supplier. However, any wired sensors and/or circuit controllers called for by the design should be identified on the plans to be furnished, installed and activated by the electrical contractor. Of course, the corresponding request for furniture proposals must echo these responsibilities and include plans and specifications for the required portable lighting. This is where the earlier collaboration between the lighting professional and the workstation designer, space planner, and end-user sets provides some assurance that the personal lighting will harmonize with the fixed lighting, fulfill the project requirements and not be overlooked. This crucial connection between the lighting professional and the furniture specifier allows the specifier to call on the lighting expert for assistance and the lighting professional to double-check for compliance.

Creating productive and satisfying workspaces in a new energy-limited era is a challenge, but we have the tools and the technology to deliver. The greater challenge lies in getting everyone aligned on the same page and working toward a single composition.

Success will occur when: Lighting professionals are conversant in workstation design and understand the furniture procurement and installation process; furniture professionals understand the critical role lighting plays in occupant comfort and office productivity; lighting professionals are retained to compose a proper balance of task and ambient lighting, manage the respective energy allotments, specify complementary products, confirm compliance, and coordinate controls; and project documents clearly assign responsibility for procurement, installation, and testing of portable tasklights, building-integrated lighting and wireless controls, respectively.

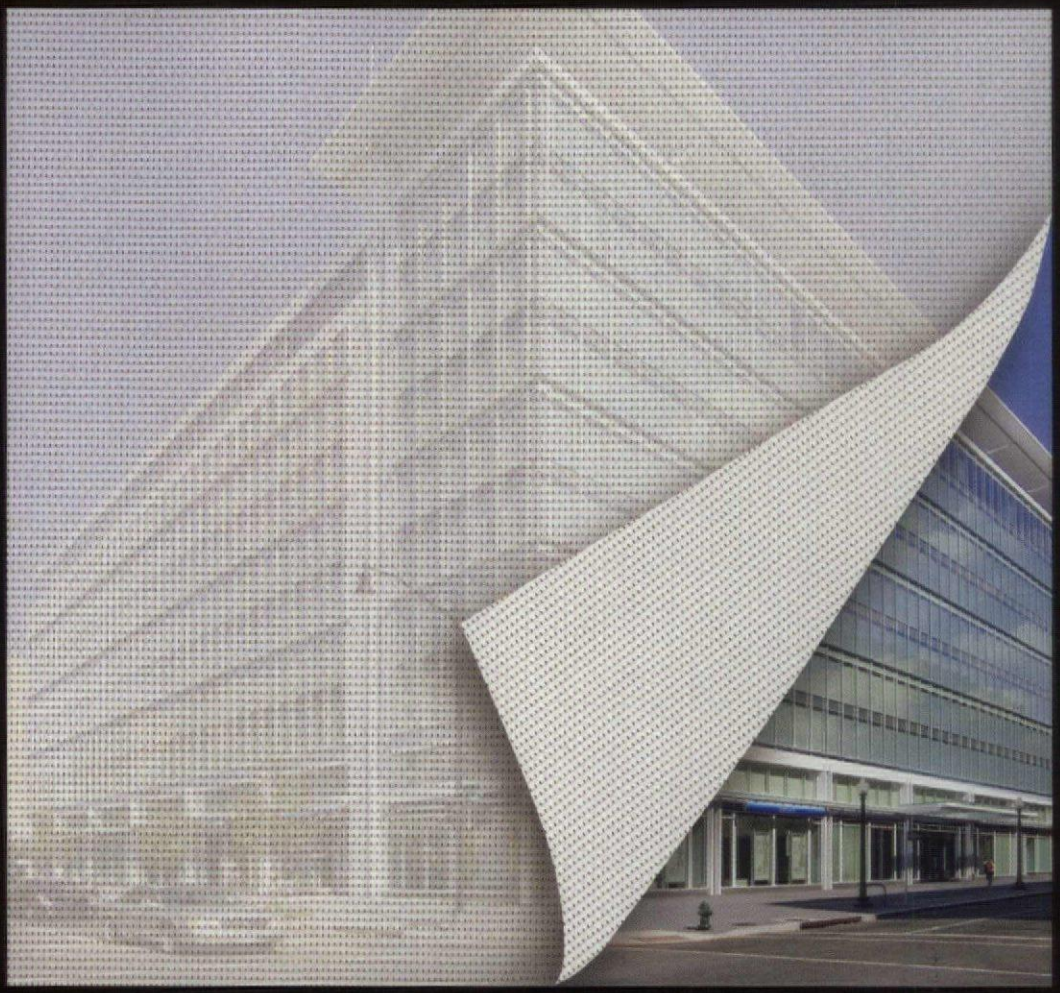
Change takes time, but practice makes perfect. **DAVID PFUND**

David Pfund is president of Tambient at the Lighting Quotient in West Haven, Conn., where he focuses on emerging workplace lighting issues and solutions.

[1] Light Right Consortium. "Lighting Quality & Office Worker Productivity," Research Study, Albany, N.Y., 2003.

[2] Opinion Research Corporation. "Office Lighting Opinion Survey," commissioned by the Lighting Quotient, West Haven, Conn. April 2010.

We're part of the recipe.



Our SolarTrac® WindowManagement® system is part of the new LEED® Platinum-rated USGBC headquarters.

The ingredients:

- monitors sky conditions in real time.
- calculates sun angles according to building and zone criteria.
- automatically adjusts shades to five incremental positions.
- optimizes natural light and avoids glare.
- maximizes views to the outside.
- minimizes solar-heat gain.
- reduces HVAC and lighting costs.
- lessens greenhouse emissions.
- and makes everyone happy.

Visit us at GREENBUILD Expo
Chicago, booth no. 1423
November 16-19

SolarTrac®
Ultimate in WindowManagement®

MechoShade Systems
The Architect's Choice

T: +1 (800) 437-6360
F: +1 (718) 729-2941
usgbc@mechoshade.com
MechoShadeSystems.com

U.S. Green Building Council Headquarters, Washington, D.C.; WDG Architecture; Interiors by Envision Design; Larry Olsen Photography

GreenSpec® GREENGUARD

Circle no. 78 or http://archlighting.com/productinfo

gotham®
solid-state downlighting

THE QUALITY OF LIGHT YOU EXPECT. THE CHOICES YOU WANT.

- Solid-state lighting with integrated energy management, addressing both new construction and renovation opportunities.
- Six-inch aperture size available now, with over 1800 delivered lumens at 50 lumens per watt, optimized for general, task and wallwash applications.
- Superior engineering, blending luminaire efficiency with quiet 45-degree shielding, providing the comfortable illumination you expect from Gotham.

WWW.GOTHAMLIGHTING.COM
An AcuityBrands Company

Find us on Facebook

Circle no. 75 or http://archlighting.com/productinfo

Hello. May I Help You?

NEW LUMINAIRE OFFERINGS FOR HOSPITALITY AND RETAIL VENUES

EDITED BY REBECCA EBSTEIN

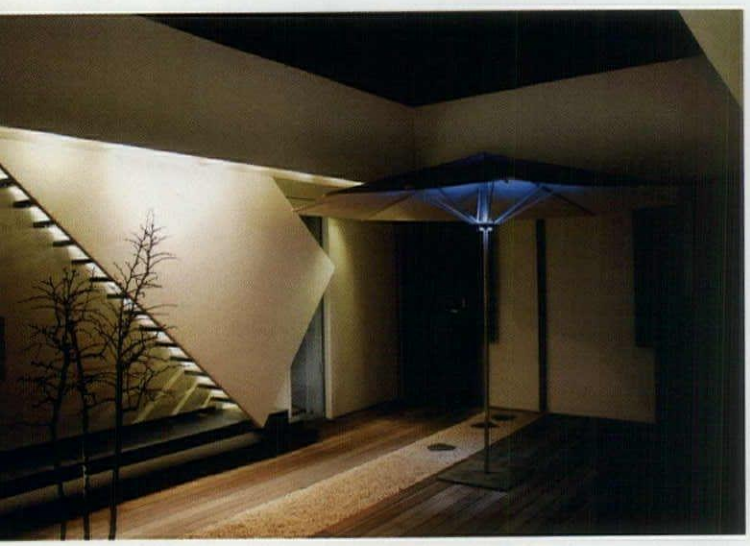
BOVER FORA

Appropriate for both interior and exterior applications, the Fora family of luminaires is available as a pendant, table (shown), or floor lamp. Each fixture has a cylindrical shade constructed of synthetic polyethylene fiber that is highly weather-resistant and enables the luminaire to cast a soft, diffuse light. The shade is available in natural white, graphite gray, and brown. The luminaire's cast-iron base creates a stable structure while also allowing light to hit the ground through its radial, tubular design. In addition, the light source—two 21W energy-saver lamps with screw-in SLS sockets—is protected by a medium-density, ultraviolet-protected polythene globe that creates a watertight fixture with a rating of IP55. *bover.es* CIRCLE 125

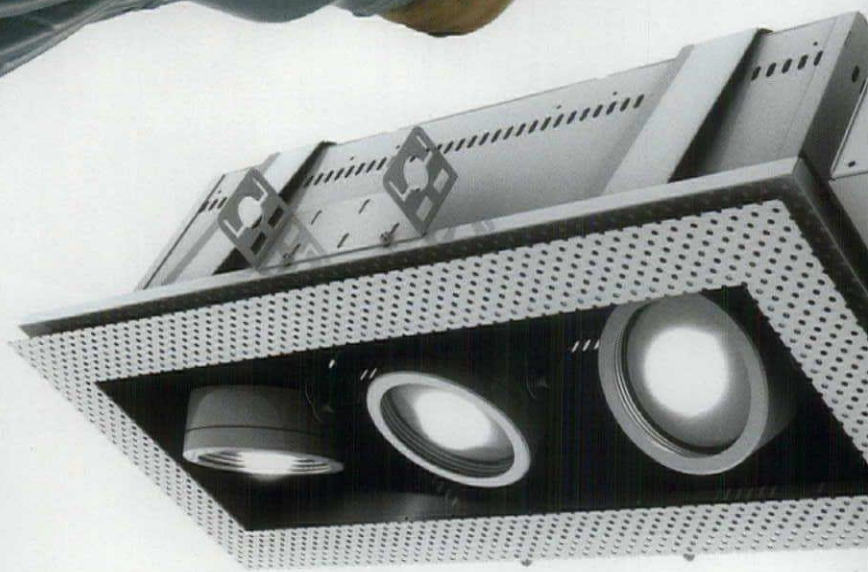
AXO LIGHT POLIA

Made of curved, varnished metal sheets, the Polia wall sconce is designed to look like the pages of a book being turned. It can be mounted either vertically or horizontally and measures approximately 11 1/4 inches tall by 7 1/2 inches wide by 3 3/4 inches deep at the widest point. The luminaire uses linear halogen energy-saving lamps, with a maximum of 120W for the vertical option and 160W for the horizontal. In addition, Polia conforms to U.S. ADA regulations, and comes in three different finishes: textured white, cor-ten weathered steel, or white with a front section in basalt gray. *www.axolight.it* CIRCLE 126

GE LIGHTING LED RETAIL PAR38
Perfect for retail applications, GE's new LED Retail PAR38 lamp is suitable for energy-efficient display and spotlight fixtures. The PAR38 lamp emits 850 lumens while using less than 16W of energy and, according to the manufacturer, offers enhanced color quality, advanced optics, reduced glare, and increased energy savings. The PAR38 lamp has a CRI of 82, which brings out the color of merchandise while reducing the potential for fading and discoloration. It also has a rated life of 25,000 hours at L70, which, according to the manufacturer, will help reduce maintenance and labor, as well as disposal costs. The lamp has been tested by GE's CALiPER-certified laboratories. *gelighting.com* CIRCLE 127



VIABIZZUNO OMBRELLA
Ombrella functions both as a shading umbrella (with a stainless-steel-and-aluminum structure and a white acrylic fabric canopy) and as an exterior luminaire. Indirect light is provided by four 3W RGB LEDs, while direct light is supplied by six 3200K and three 1W white LEDs fitted with 25-degree lenses. Ombrella can be used as a stand-alone fixture or linked together to a synched fitting system controlled via handset. It is powered at low-voltage 24V by its own electric power supply. *viabizzuno.com* CIRCLE 128



BELFER PZ SERIES
Belfer's two new series—PZ Trim and PZ Trimless—are designed for both retrofit and new construction applications in retail lighting. Available in one-to-four lamp options, these fixtures use the company's patented Axis light system that, according to the manufacturer, allows each lamp to adjust 33 degrees without losing illumination in the fixture cavity. The PZ luminaires use either halogen MR16 or metal halide PAR30 lamps and have an overall height of 5 inches, which can accommodate low ceiling conditions. The fixture also features a movable connection box that can be adjusted to suit any site, an electronic transformer that provides quiet and cool operation in any environment, and a less-than-two-week ship time for fixture rough-ins. *belfer.com* CIRCLE 129

The Best LED Lighting

Illuminates & Enlightens

Indoor | Ambient | Intelligent

RT LED

Lithonia Lighting is pioneering intelligent, controllable, adaptable LED lighting solutions.

"We were immediately pleased with the color temperature and controllability of RTLED."

- Associate Vice President Shelley Kaplan, Babson College

"RTLED delivered as promised and Lithonia Lighting confidently supported the product."

- Architect Jeffery Herr, San Diego State University

- High quality volumetric lighting
- Embedded controls reduce overlighting
- Plug-and-play connectivity with Cat5 cable
- 50,000-hour system life at L80 depreciation

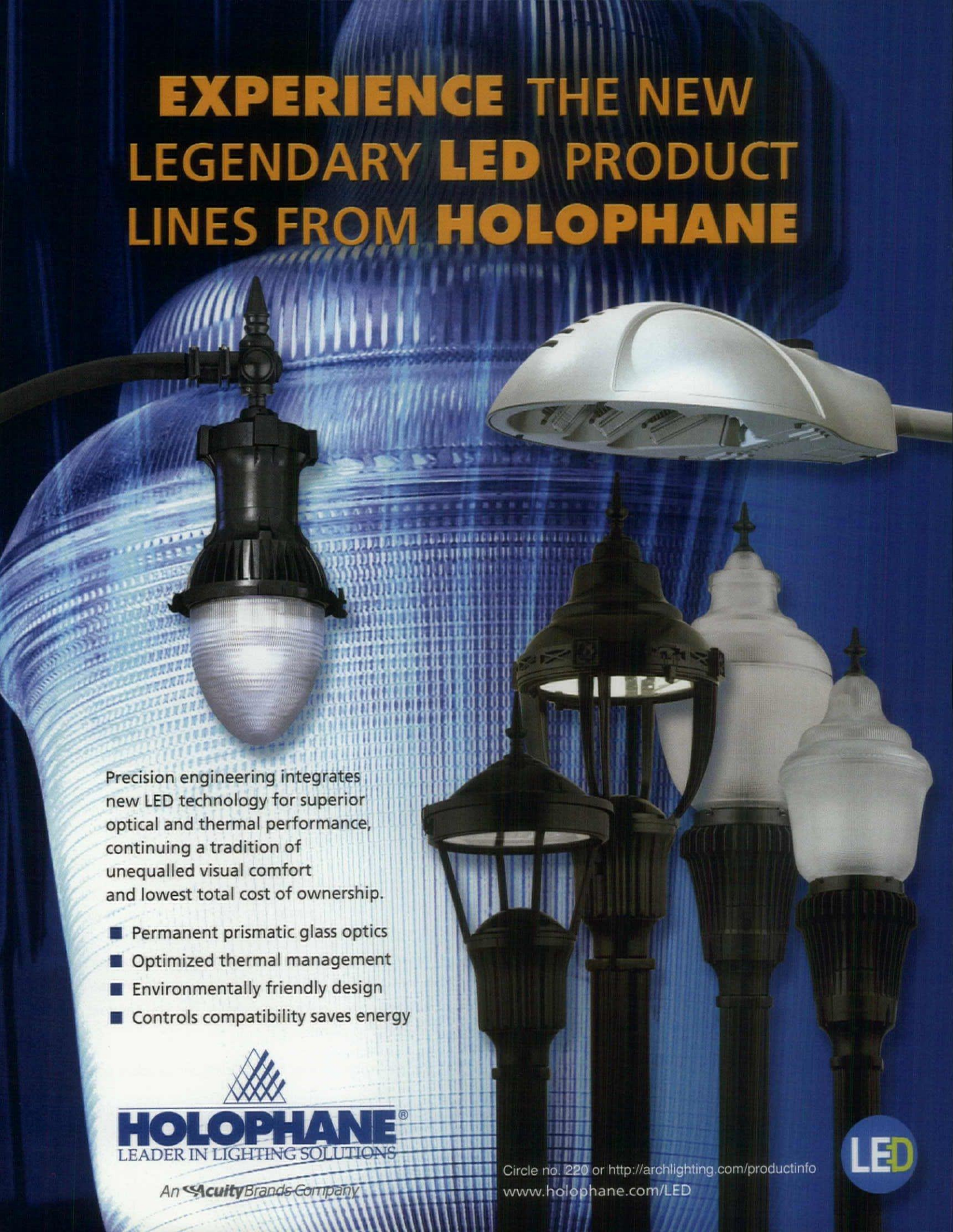
Beyond cost and sustainability benefits, better lighting can improve emotional well-being and productivity. Our exclusive RTLED lighting systems recognize all these opportunities. They are designed to meet your current and future needs. They consider the big picture and help you see it more clearly. They produce more light, save more energy and solve more problems. So when tomorrow's changes become your new challenges you can rest assured Lithonia Lighting has already addressed and overcome them.

Visit www.lithonia.com/RTLED/AL for free white papers, case studies and product spec sheets.

LITHONIA LIGHTING®

An AcuityBrands Company

Circle no. 44 or http://archlighting.com/productinfo


EXPERIENCE THE NEW
LEGENDARY LED PRODUCT
LINES FROM HOLOPHANE
Precision engineering integrates new LED technology for superior optical and thermal performance, continuing a tradition of unequalled visual comfort and lowest total cost of ownership.
Permanent prismatic glass optics
Optimized thermal management
Environmentally friendly design
Controls compatibility saves energy
HOLOPHANE®
LEADER IN LIGHTING SOLUTIONS
An AcuityBrands Company
Circle no. 220 or http://archlighting.com/productinfo
www.holophane.com/LED
LED

Bethesda Garden

LANDSCAPE AND LIGHT TRANSFORM A BACKYARD INTO A SUBURBAN OASIS

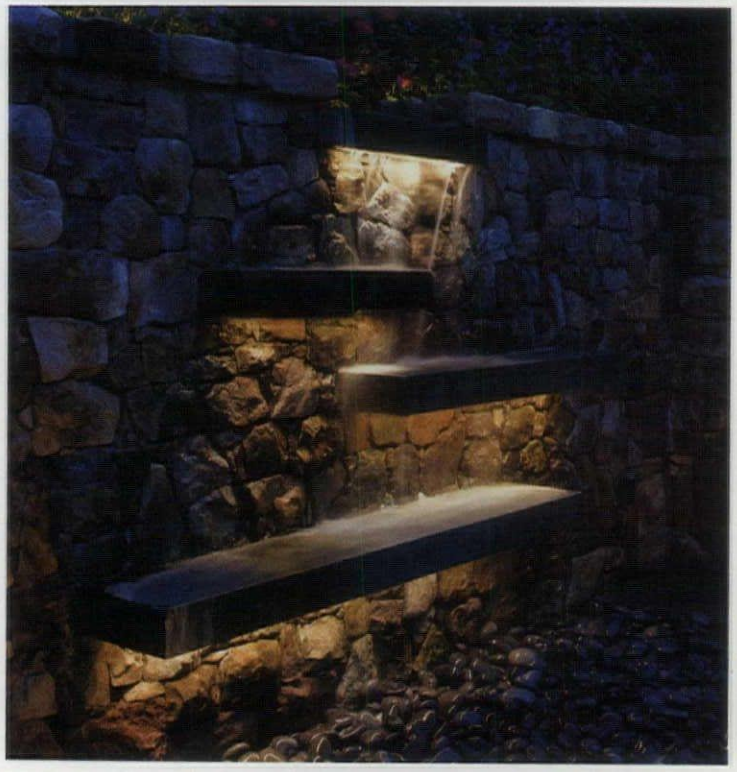
Project Bethesda Garden, Bethesda, Md. **Landscape Architect** Ching-Fang Chen, Bethesda, Md. **Lighting Designer** Gilmore Lighting Design, Bethesda, Md. **Masons** Williams & Williams Landscaping, Herndon, Va. **Photographer** Jeffrey O'Connor, Washington, D.C. **Manufacturers** B-K Lighting, Prolume, Tivoli

An artistic use of light in a residential setting best describes this backyard and pool area in suburban Washington, D.C., but it almost didn't come to pass. Although the clients had hired lighting designer Debra Gilmore for the interiors of their Bethesda, Md., home, they hadn't realized that they could call on her expertise for the exterior landscape lighting as well. By the time Gilmore was back on the project, several months had elapsed since the interiors were complete, and a landscape plan was already in place. Construction of a stone retaining wall—as a good portion of the site around the patio and pool is a steep, sloped area—was well under way, so her task was to find the "moments" in the architectural landscape where it would make the most sense to add light. "It takes a big budget to spread light out over a large area," Gilmore explains. "So our approach is to delineate by area."

With the view from the client's kitchen window and back steps in mind, Gilmore decided to first concentrate her lighting efforts on the water feature at the retaining wall on the far side of the backyard. The waterfall is composed of four flagstone slabs of differing lengths, ranging from 2-feet-long to 5-feet-long, that cantilever from the wall in a staggered formation. With input from a lighting manufacturer that she had collaborated with before, Gilmore developed a custom high-output white LED striplight with a damp-listing to graze the stone wall. Each linear LED array is housed in an extruded acrylic channel, which fits into a 3/4-inch-wide-by-5/8-inch-tall edge detail on the underside of the flagstone slabs. Halogen accent fixtures with adjustable stems, located in the bed of river rocks below the waterfall, provide an endcap of light for this luminous feature. The overall effect is serene as the lighting captures the flow of water, the texture of the stone wall, and the flagstone slab edges to create a harmonious composition.

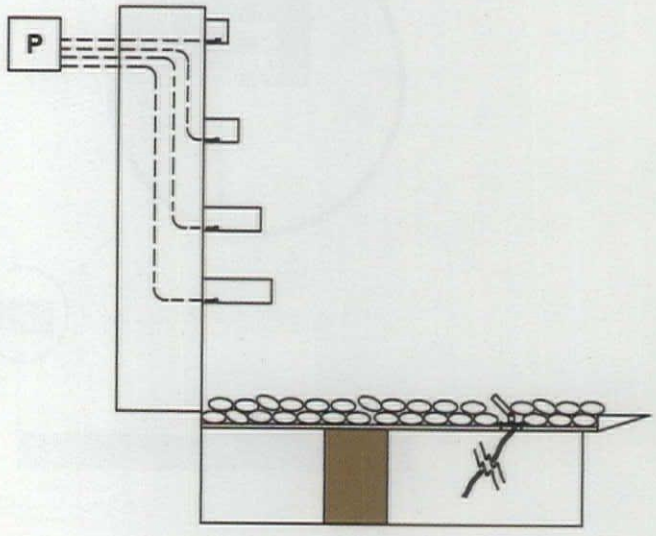
Rounding out this scene is a second layer of light, achieved with two theatrical projectors with dichroic filters, each of which is mounted on a 20-foot-tall pole at the corners of the house. They are cross-aimed to achieve a floodlighting effect on the hillside garden area above and beyond the retaining wall. A mock-up helped demonstrate this set-up for the client to alleviate their concerns about the height of the poles.

Next, Gilmore turned her attention to the house. Taking her cues from the waterfall, she illuminated the flagstone steps that lead from the kitchen and family room out to the patio with five, 4-foot-long linear arrays, this time with amber LEDs. "I wanted to be playful and mirror the asymmetry of what was happening in the wall," she says. Small in scale but not without major impact, these vignettes of light transform the backyard's hardscaped surfaces into something soft and fluid, and create a lighting vocabulary that complements this residential setting. **ELIZABETH DONOFF**



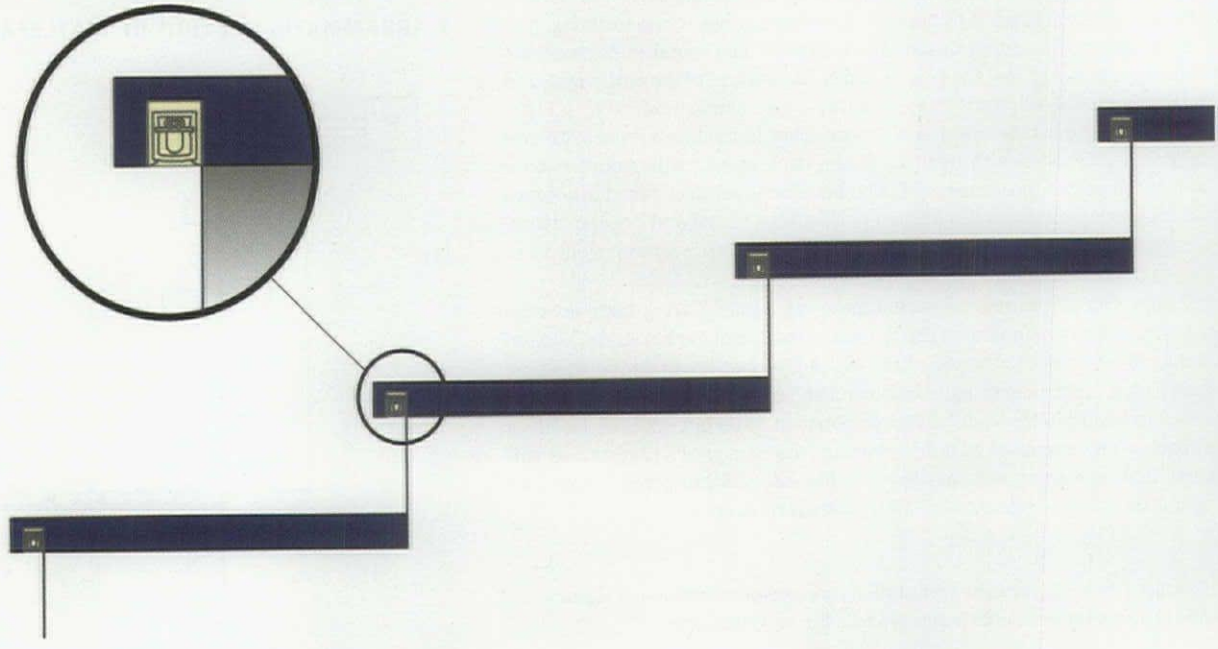
High-output white LED striplights are tucked on the underside of cantilevered flagstone slabs to illuminate this waterfall feature in a suburban backyard garden.

DIAGRAMMATIC SECTION OF WATERFALL AT RETAINING WALL

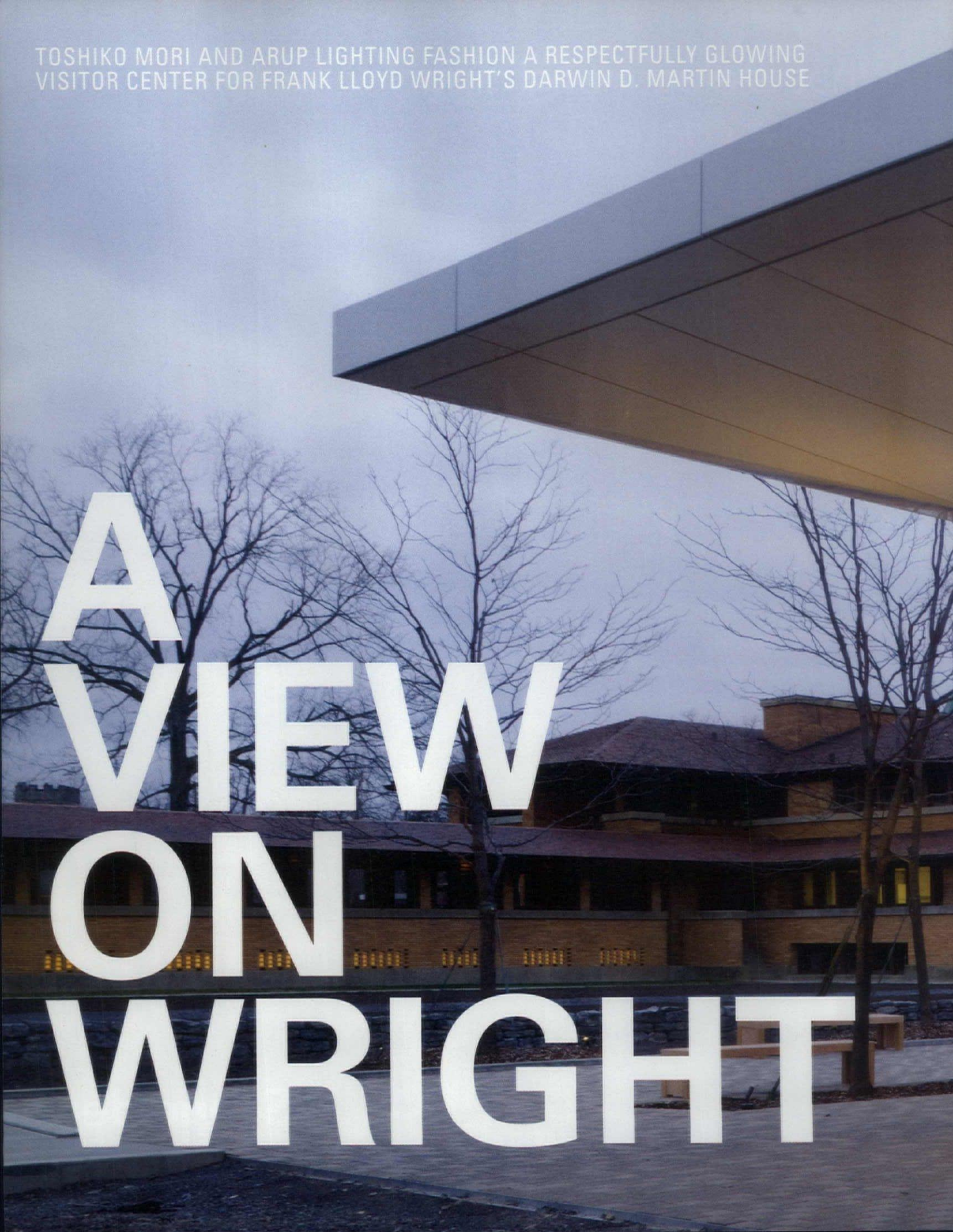


Arranged in a staggered formation, amber LEDs in 4-foot-long linear arrays provide a warm, diffuse light for the flagstone steps leading from the kitchen and family room (above). The LED strips are incorporated into the nosing detail of the step treads (below).

LIGHTING DETAIL AT STEP TREAD



TOSHIKO MORI AND ARUP LIGHTING FASHION A RESPECTFULLY GLOWING VISITOR CENTER FOR FRANK LLOYD WRIGHT'S DARWIN D. MARTIN HOUSE



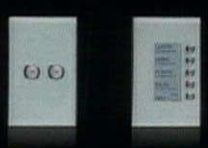
A VIEW ON WRIGHT

What is elegant lighting without control?

Harness your lighting and energy usage with C-Bus Control Systems

C-Bus Control Systems from Schneider Electric put you in control of your lighting levels, your comfort and your energy costs. Using stylish, architecturally inspired touch screens and keypads, C-Bus automates the task of controlling lighting and HVAC loads, significantly reducing energy costs. Whether you wish to control lighting in a single conference room or an entire campus, think of lighting controls from Schneider Electric to provide the upmost in control and style.

Visit: www.SEreply.com (keycode: w168w)



Keypads

Touch Screens

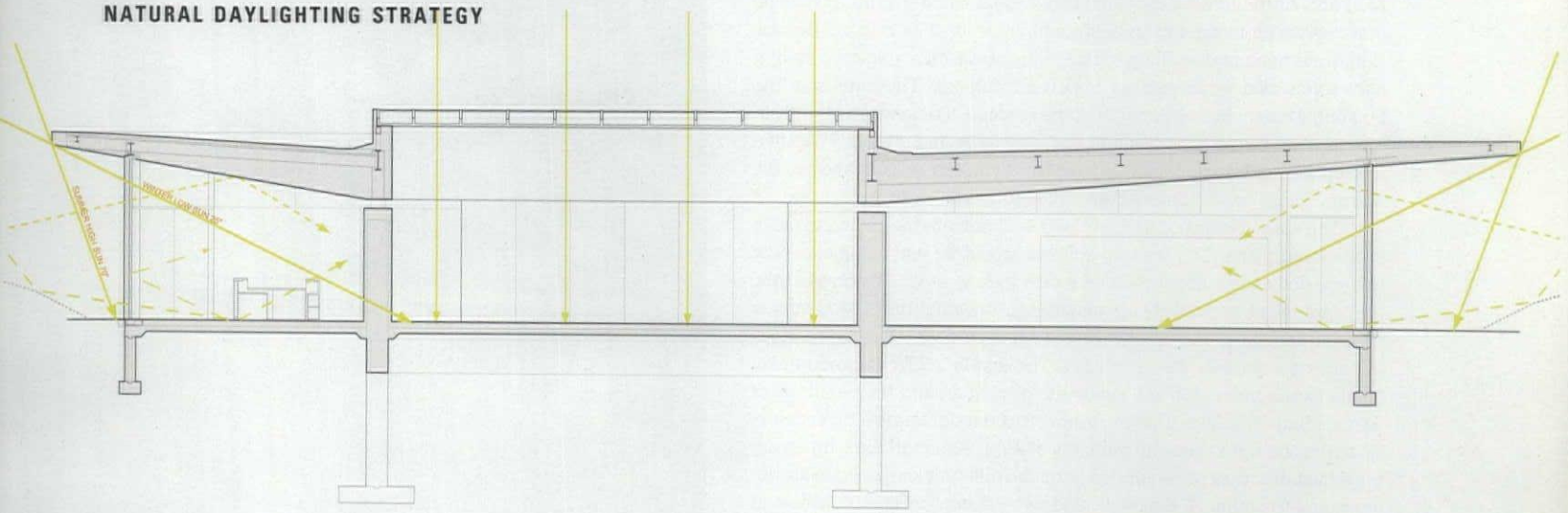
Make the most of your energy℠

Schneider Electric

Circle no. 198 or http://archlighting.com/productinfo

Transparency and light are the architectural motifs employed by architect Toshiko Mori in her design for the new visitor center at the Darwin D. Martin House Complex in Buffalo, N.Y. A study in contrasts that responds to the original Frank Lloyd Wright masonry structure, the new pavilion makes use of natural light as its principal source of illumination by day (this page). As seen in a cross section of the building, Arup Lighting's extensive solar analysis (facing page) aided the team in maximizing the slope of the pavilion's inverted hipped-roof structure, height of the glass curtain wall, and reflectance characteristics of the material finishes to create a thoroughly luminous space, even on overcast days.

NATURAL DAYLIGHTING STRATEGY



Details

Project Eleanor and Wilson Greatbatch Pavilion at Frank Lloyd Wright's Darwin D. Martin House Complex, Buffalo, N.Y. **Client** Martin House Restoration Corporation, Buffalo, N.Y. **Architect** Toshiko Mori Architect, New York **Lighting Designer** Arup Lighting, New York **Structural Engineer** Skidmore, Owings & Merrill, New York **MEP Engineer** Landmark Facilities Group, Norwalk, Conn. **Civil Engineer** Watts Architecture & Engineering, Buffalo, N.Y. **Façade Consultant** Front, New York **Environmental Consultant** Transsolar, Stuttgart, Munich, and New York **Graphic Designer** 2x4, New York **Photographer** Paul Warchol, New York **Project Cost** $5 million **Project Size** 7,775 square feet **Watts Per Square Foot** 0.55 (not including exhibit lighting)

The Darwin D. Martin House Complex (1903–1905) in Buffalo, N.Y., stands as one of the early shining examples of the Prairie School, as well as one of Frank Lloyd Wright's most elaborate residential designs. The building's heavy brickwork, strong horizontal lines, hipped roofs, and banded windows typify a style that was replicated in hundreds of other works by Wright and his followers across the United States. It also functioned as a test-bed for many of the ideas that Wright put into practice for his first commercial project, the Larkin Administration Building in downtown Buffalo. (Darwin Martin was the secretary of the Larkin Soap Co. and helped to get Wright the job.)

While both of these works are extremely significant milestones in Wright's development, as well as in all of American architecture, time has not proved too kind to them. After Martin's death in 1935, the residence was neglected, sold by the family and then volleyed by a series of owners who did not attempt to maintain its original integrity. The Larkin Administration Building fared even worse; in 1950 it was demolished. A similar fate may have befallen the Martin House had it not been for the Martin House Restoration Corp., which was founded in 1992 with a mandate to bring the property back to its 1907 condition and turn the site into a museum. In addition to the preservation work, the organization needed a new pavilion, a place to house interpretive displays, to host lectures and cocktail parties, and to provide basic services to visitors. A competition for design services was initiated and Toshiko Mori Architect won the commission.

Designing a contemporary building to sit adjacent to the work of one of the masters is no small task. To find the right balance between respect and confidence, architect Toshiko Mori employed both complementary and contrasting design motifs for the 7,775-square-foot visitor center. This resulted in a long, low pavilion of which the dominant feature is a sculptural ceiling that resembles an inverted hipped roof. In lighting terms this meant opening the interior to ample amounts of controlled daylight and a minimal application of electrical illumination. "The Martin House is one of the early examples of an open-plan interior," Toshiko Mori explains. "There are no rooms on the ground floor. Subtle manipulations of ceiling height and a modulation of natural light create a sense of openness or privacy. It's appropriate for residential purposes, but my building is public."

With the exception of the west elevation, which has a concrete-faced core containing the pavilion's only private spaces—public restrooms, a kitchen, and a coatroom—Mori clad the pavilion entirely in floor-to-ceiling glass panels. This floods the interior with daylight, and its direct contrast to the Martin House's solid-brick exterior and low-lit interiors was intentional.

But it is at the inverted hipped roof, where the ceiling plane is transformed into a luminous surface, where architecture and lighting are fused. The sloping planes were carefully calibrated to optimize the amount of natural illumination that enters the building, while the roof's overhang protects the exterior from overheating by shading it from direct exposure to the sun. This allowed Mori

to specify the clearest, low-iron glass possible. Triple-glazed to insulate against Buffalo's harsh winters, the 18-foot-high-by-7-foot-7½-inch-wide panels are joined by slim stainless-steel mullions and correspond to the column spacing of the house's pergola. The pavilion's transparent façade puts Wright's architecture on display. Meanwhile, a skylight in the middle of the ceiling delivers direct sunlight to the center of the building, making it the brightest area of the pavilion during the day.

This liberal use of light during the day is turned on its head at night. Mori and Arup Lighting developed an elegant electric lighting scheme that creates an intriguing low-light ambiance ideal for cocktail parties. "I'm quite against over-illumination," Mori says. "It's vulgar." The dim light levels also serve another important purpose: They preserve the building's transparency throughout the evening, a time when brightly lit interiors will turn glass walls into inwardly reflecting mirrors. "We tried to keep the lighting really subtle so at night you can look out and see the Martin House," says lighting designer Matt Franks of Arup Lighting.

"The idea," Franks continues, "was to illuminate the ceiling to make it a floating plane. The lighting scheme would be very simple, almost like you don't think about it when you're looking at it." To achieve this, the team relied exclusively on uplighting. "Downlighting," Mori states, "can be unsightly, and creates bright spots on floor." Two types of luminaires accomplish the uplighting. The first is a 39W in-grade metal halide fixture imbedded just inside the glazing around the perimeter of the building. The Arup Lighting team went through quite a bit of analysis to get the right level and intensity of light. Although the fixtures are not adjustable, they are equipped with two different lenses—one six degrees and the other 20 degrees—and two different reflectors, wide and medium beam. Once on site, the team mixed and matched the lenses and reflectors to get an even wash of light across the ceiling.

The metal halide fixtures are only used on the pavilion's three glazed elevations. T5 linear fluorescent fixtures, the second luminaire type contributing to uplighting, take over at the west face, which is occupied by the core. Positioned atop the concrete walls and shining onto the ceiling, the T5s fill in with the same even spread of light that the metal halide fixtures deliver from the floor. With all of this uplighting, the designers were able to keep the ceiling pure in form, unadulterated by recesses or other blemishes. The mechanical systems were also kept away from the ceiling. They were placed within the concrete core, from which they could be more discretely threaded through the building.

The only other non-exhibition fixtures in the public areas of the visitor center are MR16s that light an alcove, and more T5 fluorescent fixtures backlighting a donor wall of wooden slabs and translucent acrylic. LED striplights in the casework, which houses the center's interpretive displays, also add to the general illumination, though just enough to dramatically frame someone's face or cause a sweating cocktail glass to glow and sparkle.

But the real triumph of Mori's design is the quiet yet sophisticated way it employs advanced building technologies. Its minimal structure and in-floor radiant heating and cooling systems allow the formal echoing of Wright's motifs to come to the foreground. They also relate to the Martin House's own integration of systems and architecture (the building's wide piers house gas, electrical, and heating elements). And the subdued lighting scheme—which primarily relies on daylight, an essential aspect of the pavilion's sustainable approach—gives full weight to the visitor center's connection to Wright's work. It starts a conversation that plays on the differences between the two structures—glass vs. brick, light vs. dark—as well as their similarities—continuity between interior and exterior spaces, and the use of strong horizontal lines. With every gesture, Mori's design for the new visitor center keeps Wright in mind, while staying true to her own architectural style. If Wright could respond, there's no doubt that he would be very pleased to be engaged in this architectural dialogue across the ages. **AARON SEWARD**

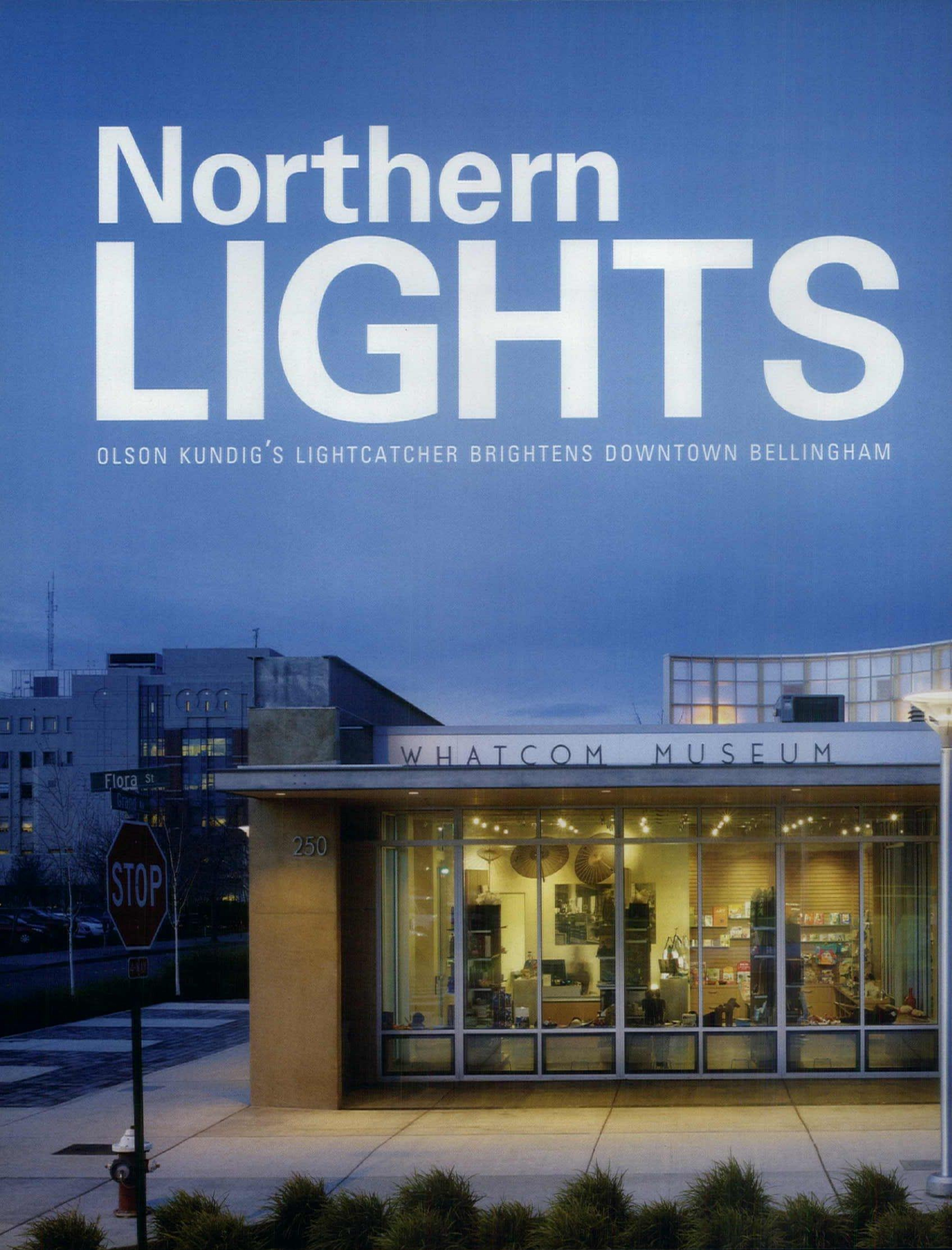
The pavilion's structure—an inverted hipped roof—speaks to the architectural geometries of the Martin House, and allowed Mori to design a long, open space free of structural obstructions, save for the four columns that support the roof and frame a large rectangular skylight that delivers natural light to the center of the space. The ceiling plane is kept clear of light fixtures so that it can function as a giant reflector. The ceiling's luminous properties are most apparent at night when the light from the 39W inground metal halide uplights—located along the perimeter of the pavilion at the base of the curtain wall—bounces off the surface and the entire plane glows. T5 linear fluorescent fixtures hidden in the top of the concrete core (which houses back-of-house support spaces) on the west elevation provide additional uplighting. LED striplights in the exhibit display cases add a hint of accent light (above).

ELLIPTIPAR COVELIGHT (STYLE 305)
This asymmetrical T5 kit delivers precise optical control for superb projection of light from perimeter coves. It is compatible with 28W T5 and 55W T5HO lamps in 2-, 3-, 4-, or 5-foot lengths. At 2 5/8 inches high, it can fit within the narrowest coves, while its two bright, anodized aluminum parabolic reflectors drive light across any surface, minimizing glare and maximizing efficiency. Placed atop the concrete core of the Martin House Visitor Center, this luminaire picks up where the inground uplights leave off for an uninterrupted wash of light across the ceiling. elliptipar.com
CIRCLE 130

WE-EF INGROUND UPLIGHT (MODEL 611-3050)
With its 39W ceramic metal halide lamp, this flush-mounted inground uplight is ideal for applications, indoors or out, where precise beam control is required. It features a "no-tool" removable lamp-ballast-reflector module for easy maintenance, a sturdy stainless-steel body and lens frame in a brushed finish, and clear tempered glass lens for walk- and drive-over applications. Measuring 9.8 inches in diameter at surface grade, 14 3/4 inches is needed for inground depth. At the Martin House Visitor Center the luminaires were located in a perimeter trench and outfitted with two different lenses—one six degrees and the other 20 degrees—and two different reflectors—wide and medium beam—to achieve an even distribution of light across the ceiling plane. weef.de
CIRCLE 131

Northern LIGHTS

OLSON KUNDIG'S LIGHTCATCHER BRIGHTENS DOWNTOWN BELLINGHAM




EXIT

Details

Project The Lightcatcher at the Whatcom Museum, Bellingham, Wash. **Architect** Olson Kundig Architects, Seattle **Lighting Designer** Candela, Seattle **Structural Engineer** Magnusson Klemencic Associates, Seattle **Mechanical Engineer** TAC Engineers, Seattle **Electrical Engineer** Sparling, Seattle **Civil Engineer** Wilson Engineering, Bellingham, Wash. **Landscape Architect** Charles Anderson Landscape Architecture, Seattle and Scottsdale, Ariz. **LEED Consultant** David Nelson & Associates, Littleton, Colo. **Photographer** Benjamin Benschneider Photography, Seattle **Project Size** 42,000 square feet (overall); 5,000 square feet (courtyard); 3,000 square foot (green roof learning exhibit) **Project Cost** $11.6 million **Lighting Cost** $40,000 (approximately) (Lightcatcher only) **Watts Per Square Foot** 0.2 (Lightcatcher only)

"Bellingham is famous for being a city that craves daylight," says architect Jim Olson, half jokingly, of the small Washington city located on the Pacific coast between Seattle and the Canadian border. As principal of the Seattle-based Olson Kundig Architects, Olson knows first-hand the vagaries of Pacific Northwest weather—the rain, the pea soup fog, and the low winter sun. The cool, gray climate proves a challenge for contemporary architectural designs that feature glassy expanses and bright spaces. So, maximizing sunlight was Olson's first priority when the firm submitted a proposal to the design competition in 2004 held by the City of Bellingham and the Whatcom Museum for a new museum building.

The museum staff and city leaders selected Olson Kundig's project from a number of international entries. The committee was looking for a design that would stand tall alongside two other civic landmarks: the red-brick Old City Hall, built in 1892, and the Art Deco Mount Baker Theatre, built in 1927. Because each features a tower, Olson wanted to create a contrasting structure. "They wanted this building to be a third icon," he explains. "Both of those structures stuck up into the air. But rather than create an object, we wanted a building that surrounded a public space." The outcome is the Lightcatcher, a 37-foot-tall, 180-foot-long translucent wall that curves around a public plaza, and creates the entry point to the new two-story, LEED Silver museum. The building houses Whatcom's expansive collection of art, which focuses on the Pacific Northwest and its artists. (This becomes the third building in the museum's campus, along with the Old City Hall and the Syre Education Center.) It is a design that is both suitable for postcards and ready to foster community participation in the museum's activities.

During the day, the west-facing Lightcatcher filters sunlight into the museum's lobby and circulation spaces, an area the designers call the Light Gallery. Composed of an 18-inch-wide metal frame clad with translucent glass on the outside and the inside, it is designed with sustainability in mind. In addition to directing light to the interior, the double-skinned glass wall also naturally ventilates the museum when the weather is warm. When it's cool outside, as it often is in Bellingham, the double wall helps insulate the interior. Yet, the Lightcatcher is most dramatic in low light and at night; that is when its wall glows like a giant lantern. Kundig worked with Seattle lighting design firm, Candela, to create the desired effect. The scheme positions more than two dozen fixtures equipped with two 32W T8 fluorescent lamps and a narrow specular reflector in the glass-wall cavity at its base. The luminaire's tight distribution keeps the light directed into the void between the panes. The two-ballast fixture is connected to daylight sensors (the

The Lightcatcher—a 37-foot-tall, 180-foot-long curving translucent wall—is the defining architectural element in Olson Kundig Architects' competition-winning entry for the Whatcom Museum's new LEED Silver building (above). Designed to stand alongside other civic landmarks in Bellingham, Wash., the Lightcatcher serves multiple functions: as the entry point for the new facility, the backdrop for the museum's public plaza, and as a means for bringing natural light into the museum's interiors (facing page).

LIGHTOLIER 26036 SERIES
This low-voltage track-mounted spot luminaire fits neatly into the wood-slat ceiling in the gallery spaces. UV-filtered, 75W AR111 lamps in spun aluminum housings, each with an integral magnetic 120/12V transformer, clip into the track and provide accent light for the sculptures and paintings. lightolier.com
CIRCLE 132

LINEAR LIGHTING RC23 SERIES
Candela and Olson Kundig worked closely together to develop a custom installation detail for this recess-mounted direct linear fluorescent located in the wood-slat ceiling system. The luminaire uses a single 4-foot-long, 62WT5 lamp. The steel housing fits neatly in the ceiling and the flanges are custom painted to match. A matte aluminum parabolic louver modulates the light source. The fixture is connected to a time-controlled low-voltage relay, so there is no need for dimming or switching. linearltg.com CIRCLE 133

lights turn off when there is enough natural light) and can be individually switched to control the intensity of the light. The upper portion of the Lightcatcher wall is backlit by ceramic metal halide floodlights with 150W lamps mounted on the museum roof.

Color is critical in giving the wall its welcoming feel and its vibrancy. The architect and the lighting designer experimented with a number of ideas—including LEDs—as a way to paint the Lightcatcher in an array of hues, but soon zeroed in on fluorescents. They allowed the architect and the museum staff to incorporate two colors they felt were representative of the Pacific Northwest's palette—salmon and canary yellow. In fact, Olson had a precise golden-yellow hue in mind—the shade of agates, quartz stones that are found on the Pacific coast. "When you hold agates up to the sun, they just glow," he explains. "I am more inspired by nature than anything else."

The team constructed a series of full-size mock-ups, experimenting with glass, color, and texture to arrive at a solution that combines materials: yellow and pink gel sleeves over the fluorescent lamps, fritted glass (three different amber-colored densities—dot variations from tight to open—are used across the wall) and a yellow-painted finish for the interior of the wall's support structure. "The sandwich wall is so unique that no one knew how light was going to react with it," recalls Mary Claire Frazier, (now-retired) principal for Candela. "Once built, it was full of surprises. In the courtyard at night what you see is a soft glow from interior lights, but also different pieces of the structure pick up the amber and salmon light. Up close, it creates a depth, which makes for interesting patterns. But when you pull away from the wall you see the blended shade. During the day, the interior space changes dramatically if a cloud goes across the sun. The transformation is magical—all brightness and color."

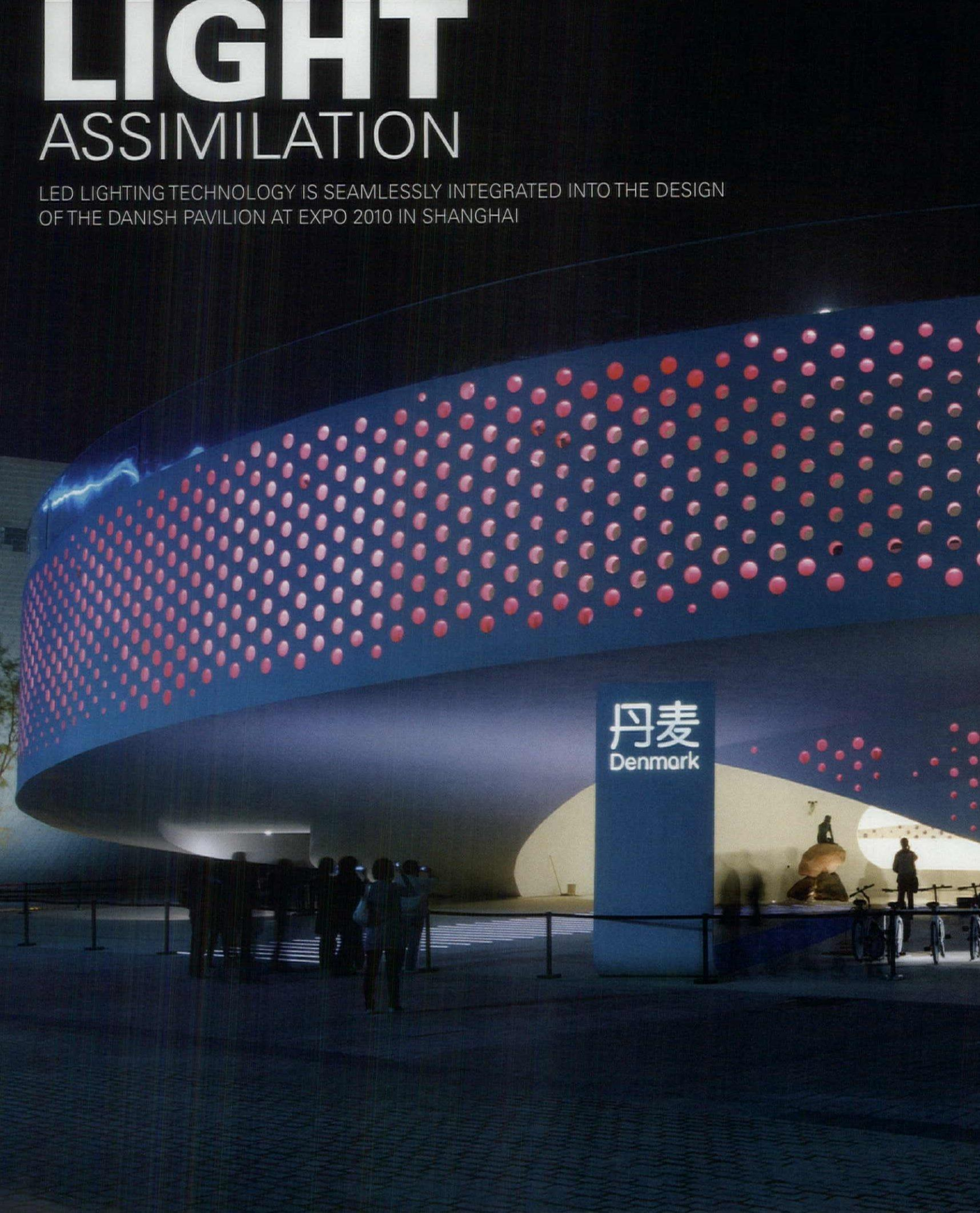
Olson Kundig's and Candela's love of nature and attention to detail are echoed throughout the museum where each material choice references the region. Concrete floors are stained dark and polished to evoke reflections on a watery surface, while the wood-slat ceiling in the Light Gallery is stained to resemble driftwood that washes up on the beach. The Candela team carefully fit recessed linear 62W T5HO fluorescent fixtures in between the slats for general lighting, and low-voltage track with adjustable accent fixtures equipped with 75W AR111 lamps highlight the temporary artworks in the Light Gallery. The Whatcom galleries exhibit a wide range of art and natural-history artifacts, as well as archival photographs and documents, so it was important to limit the amount of natural light in those rooms. Candela outfitted the galleries with the same low-voltage track used in the lobby (this time surface-mounted on the concrete ceiling) and surface-mounted 32W compact fluorescent cylinders as worklights for cleaning and installation.

The beauty of the Lightcatcher is that it manages to simultaneously illuminate the interior and the exterior of the Whatcom Museum, bringing warmth to the lobby while shaping an outdoor community space. The glass wall is designed so that films can be projected onto its surface and so that artists can use it for light shows, bringing Bellingham residents together for events. "Most museums are cold; most museums could go in any city," Olson says. "For me, glowing light is as iconic as anything in the Northwest." **MIMI ZEIGER**

Color is critical to the Lightcatcher's transformation throughout the day. The architect and the lighting design team selected two hues evocative of the Pacific Northwest's palette—salmon and canary yellow—and outfitted the two-lamp linear fluorescent fixtures positioned in the wall's cavity at its base with theatrical gels in each shade. The luminaires are connected to daylight sensors and turn off when there is enough natural light. They can also be individually switched to control the intensity of the light. The wall really comes to life at night when the upper portion of the 18-inch-wide structure is backlit with additional ceramic metal halide floodlights mounted on the museum's roof (facing page). A low-voltage track system with adjustable accent fixtures illuminate the paintings and sculptures in the galleries (above).

LIGHT ASSIMILATION

LED LIGHTING TECHNOLOGY IS SEAMLESSLY INTEGRATED INTO THE DESIGN OF THE DANISH PAVILION AT EXPO 2010 IN SHANGHAI



HOLOPHANE LINEAR FLUORESCENT HIS SERIES

This surface-mounted, two-lamp T8 linear fluorescent fixture is installed at the base of the Lightcatcher cavity. A specular aluminum reflector with 95 percent reflectance and no backlight combines with narrow-beam optics to direct light into the glazed cavity. Theatrical gels with UV filters, in canary yellow and salmon, along with dual switching moderate the color and intensity of the light. Daylight sensors turn off the luminaires on bright days, allowing the sun to shine directly through the fritted wall. holophane.com CIRCLE 134

Denmark's pavilion for Expo 2010 in Shanghai showcases the country's cultural heritage and technological advancements. The Bjarke Ingels Group, the Copenhagen-based architecture firm that lead the multidisiplinary design and engineering team, connects to the Expo's theme of "Better City, Better Life" by exploring the idea of mobility. The Pavilion's form is a curvilinear tube complete with bicycle lanes, and a basin filled with water shipped from Copenhagen Harbor. The basin provides the setting for Hans Christian Andersen's *Little Mermaid* statue, which was temporarily relocated to Shanghai for the duration of the Expo (far right). Curvilinear forms are integrated at different scales, such as the seating bench that runs through the pavilion like a ribbon of light (right).

Details

Project Danish Pavilion, Expo 2010, Shanghai **Architect** Bjarke Ingels Group (BIG), Copenhagen **Lighting Design** Centre for Advanced Visualization and Interaction (CAVI), Aarhus University, Aarhus, Denmark **Structural Engineers** Arup, Advanced Geometry Unit, London; Arup, Shanghai; and Tongji University Design Institute, Shanghai **Exhibit Design** 2+1 Ideas Agency, Copenhagen **Photographer** Leif Orkelbog-Andresen, Aarhus, Denmark **Project Size** 2,800 square meters (approximately 30,138 square feet) (overall); 300 meters (approximately 984 feet) (length of façade)

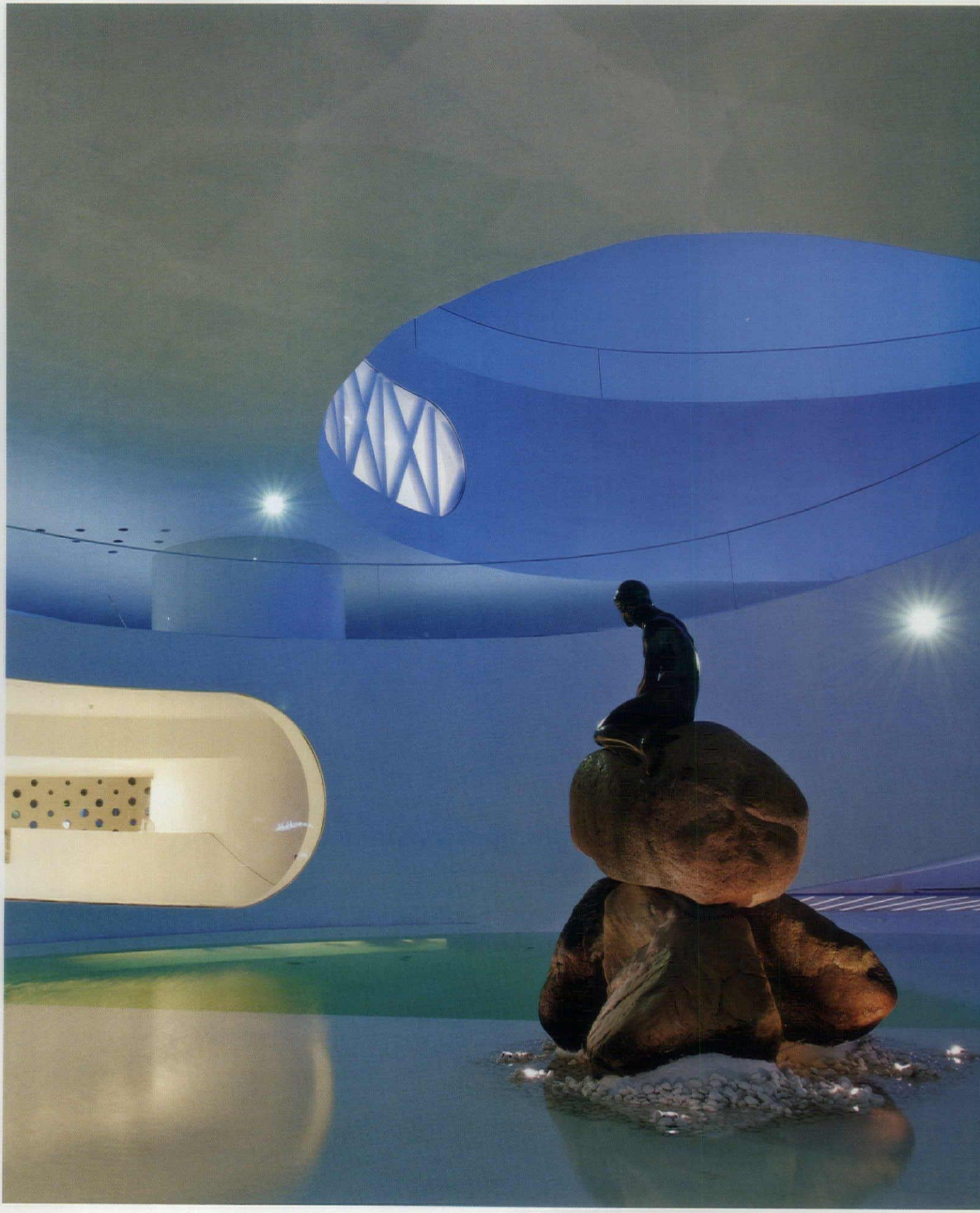
An international exposition provides the rare opportunity for nations to showcase the positive characteristics of their own cultural heritage and technological achievements. The design of a national pavilion is a challenging endeavor, as architecture is burdened with the responsibility of expressing the varied and complex identity of an entire country within a single building. Lighting design is equally demanding, as light plays a critical role in delivering an optimal visual expression of this identity for Expo visitors. It is especially notable when lighting design and architecture are successfully integrated in the expression of a united conceptual trajectory.

For its design of the Danish Pavilion at the Expo 2010 in Shanghai (one of approximately 200 pavilions from different countries), the Bjarke Ingels Group (BIG) sought to highlight mobility as a means to achieve the Expo theme of "Better City, Better Life." Given the historic reliance of both Denmark and China on the bicycle as a form of environmentally friendly transportation, BIG imagined the Danish pavilion as an "infrastructure for bicycles." The form of the pavilion is a sweeping, curvilinear tube, which the architects claim to be reminiscent of "a bicycle lane, looped around itself." The radial structure frames a large basin containing 1 million liters of water shipped from Copenhagen Harbor. In the center of this basin sits the beloved Copenhagen landmark—Hans Christian Andersen's *Little Mermaid* statue—whose temporary loan to the Expo and relocation to Shanghai created quite a stir back home.

The opportunity to create a thematic structure based on flow prompted the design team to celebrate the dynamic qualities of the pavilion experience. The spatial choreography of the pavilion anticipates a series of connected episodes: Visitors enter at grade level where they view the basin, traverse the sloped gallery space to the roof, ride a bicycle through another exhibition space, and return to the main Expo area. In collaboration with the Centre for Advanced Visualization and Interaction (CAVI) at Aarhus University, Denmark, and lighting manufacturer Martin Professional, BIG sought to emphasize the constantly

CUSTOM LED SOLUTION
MARTIN PROFESSIONAL

For the design of the pavilion's interactive façade, the team developed a custom solution that uses 3,500 full-color LEDs. Each LED has a lumen output of 60 and is controlled by custom software that interprets data received from sensors that monitor the amount of light in the pavilion and the temperature. The LED fixture is mounted above a sandblasted acrylic tubing in the double façade so that the small hole openings (above) appear to be illuminated with a ring of light.



changing nature of the building with advanced lighting sensors and controls.

The most visible component of this strategy is an interactive façade that pulsates with animated yet subtle energy at night. The media wall incorporates over 3,500 full-color LED lamps, each of which is controlled by custom software that interprets data from daylighting and temperature sensors placed throughout the pavilion. Martin's Leif Orkelbog-Andresen says that "by incorporating dynamic lighting as an integrated part of our surroundings, we can vitalize the spaces around us and expand their possibilities so that in addition to being sites for profitable business they are communicative and interactive; in other words, living façades, which fascinate, inspire, and inform."

Originally conceived as a billboard of the Copenhagen skyline, the exterior media wall underwent a design transformation based on input from Arup, the structural engineer for the project. Because BIG desired a column-free space, Arup suggested that the envelope become more structurally rigid—thus eliminating the possibility of the original, delicate filigree pattern. However, the architects embraced the loading diagram of the new diaphragm, which allowed the perforation of holes of different radii in locations where forces were not being transferred. According to BIG associate partner Kai-Uwe Bergmann, "This in turn informed where we could perforate or not, and thereby we lost the skyline, but instead we gained the admiration of all engineers who worked on the building as it was the first time in their professional lives that their stress calculations could be seen in real life."

LED fixtures were incorporated within this structural diaphragm unobtrusively. Each perforation was wrapped with sandblasted acrylic tubing between the outer and inner faces of the wall, and a single LED fixture was mounted 5 to 30 centimeters above each tube. The translucent plastic transforms the point source of light into a ring of evenly distributed illumination. The apparent effect is that the entire interior cavity of the exterior wall is illuminated by a diffuse, hidden source.

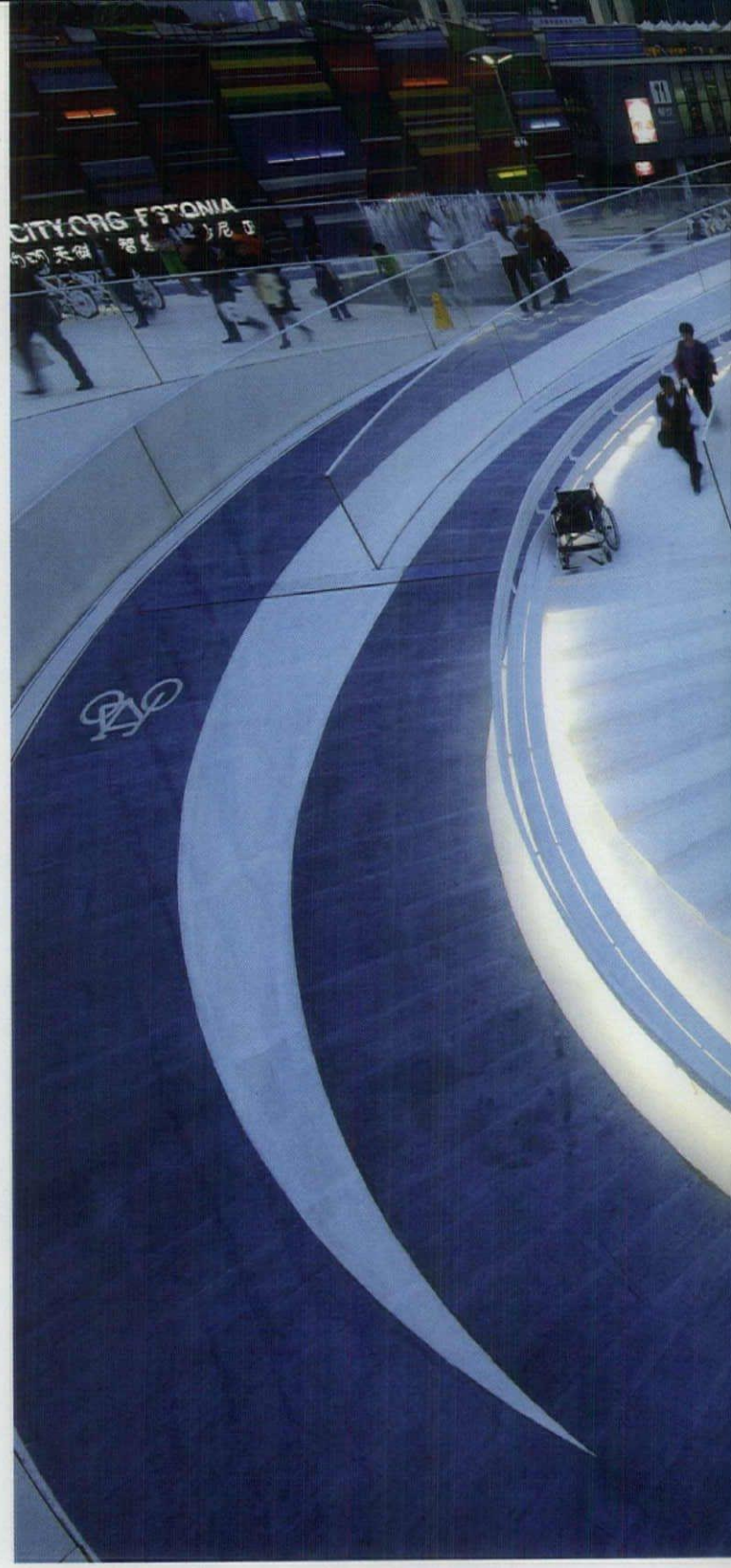
Once the locations of the perforations were finalized, the coordinates of each LED source were mapped within an AutoCAD model of the project—allowing the Aarhus University consultants to translate the coordinates of the holes into pixels for their custom animations. "We now use the functionality on several projects which is the key to get smooth-moving graphics on odd-shaped and changing pixel distances within the same project," Orkelbog-Andresen says.

In addition to its cleverly illuminated structural envelope, the Danish Pavilion also exhibits technical features that would not have been possible with previous lighting technologies. The LED strips integrated within the seating and countertops, for example, only became available in the appropriate size and light output within the past year. According to Orkelbog-Andresen, "Most of them are only 14 millimeters wide and 9 millimeters high including an aluminum bar and encapsulation for an IP67 rating. Also the LED in the façade was not available technology just a year ago. We actually tested several new technologies on the project."

It is the seamless integration of these technologies that sets the Danish Pavilion apart from many others. Form, light, and structure are completely assimilated in support of a strong conceptual framework. As a result, Expo visitors are impressed by the coalescence of art and technology embodied within the pavilion—an inhabitable sculpture designed to celebrate movement, bathed in simulated Nordic light.

BLAINE BROWNELL

To learn more about Brownell's visit to Expo 2010 in Shanghai and his impressions, read his "Shanghai Diary" series, part of his Mind & Matter blog at architectmagazine.com, bit.ly/9RW2A8.

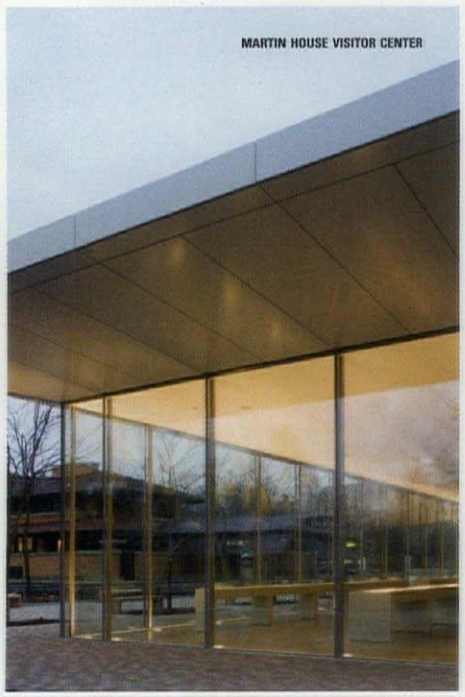


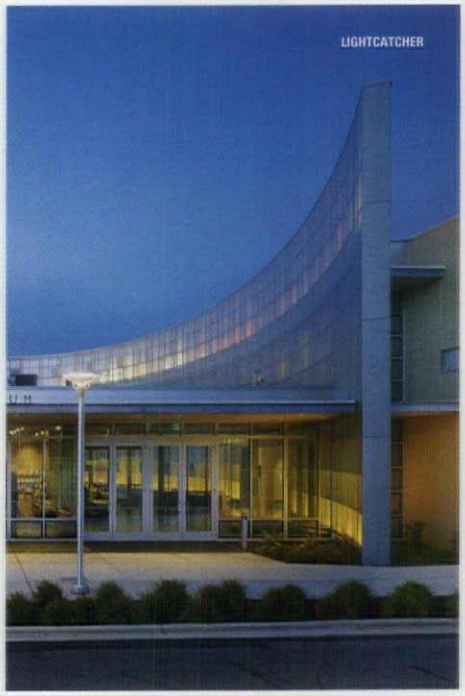
The Danish Pavilion at Expo 2010 in Shanghai celebrates the cultural affinities between Denmark and China in their historic reliance on the bicycle as a mode of transportation. The architects conceived of the Pavilion's structure as a "bicycle lane, looped around itself," and Expo visitors can explore the Pavilion both on foot and on wheels (above).

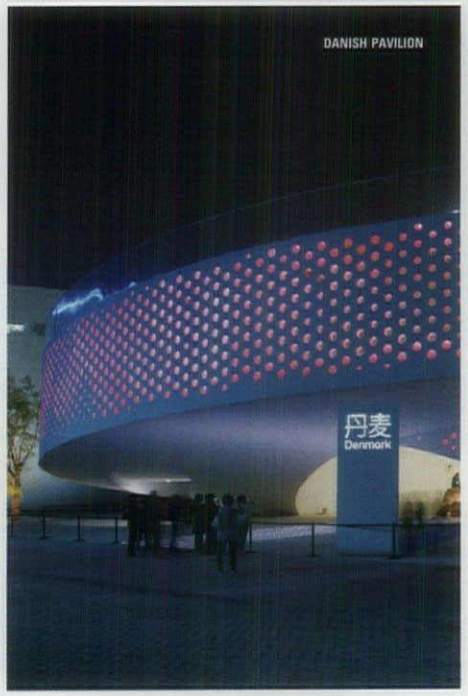
CUSTOM LED SOLUTION
MARTIN PROFESSIONAL

For the Pavilion's seating and countertops, another custom LED lighting solution was created. LED strips are installed under the counters, exhibit shelving, and seating bench that runs continuously through the pavilion. The strips are mounted inside an aluminium bar and, to achieve an IP67 rating, are covered with an encapsulation material to protect against dust, high humidity, and rain.

SPECS


MARTIN HOUSE VISITOR CENTER


LIGHTCATCHER



DANISH PAVILION

Eleanor and Wilson Greatbatch Pavilion at Frank Lloyd Wright's Darwin D. Martin House Complex, Buffalo, N.Y.

Edison Price Downlights in the back-of-house-spaces—public restrooms, kitchen, and coatroom—located in the core.

Elliptipar Asymmetric linear T5 fluorescents positioned atop the concrete walls of the core for additional roof uplighting.

We-ef Inground uplights at perimeter of glass curtain wall for roof uplighting.

Lightcatcher at the Whatcom Museum, Bellingham, Wash.

Columbia Lighting Back-of-house fixtures.

ETC Architectural dimming controls and interface throughout the project.

Lam Lighting Exterior and interior cove lighting.

Lightolier Gallery accent fixtures and tracklighting with 50W and 75W AR111 lamps; gallery fluorescent cylinders with 32W compact fluorescent lamps; recessed metal halide downlights and wallwashers; exterior ceramic metal halide cylinders.

Linear Lighting Indirect-direct T5HO pendants in the office areas and conference room.

Holophane Lightcatcher linear fluorescent fixtures with two 32W T8 lamps with salmon and yellow gel sleeves, narrow specular reflector, and tight-beam optics.

Insight Lighting Linear fluorescent T5HO wallwashers.

Kim Lighting Exterior recessed steplights.

Prescolite Downlights in back-of-house spaces.

Translite Sonoma MR16 accent fixtures in the lobby and tracklighting.

Danish Pavilion, Expo 2010, Shanghai

Martin Professional The pavilion uses 3,500 high-power LEDs for a custom design solution for the façade and an IP67-rated custom linear LED luminaire for the seating and the countertops throughout the Pavilion.

Additional lighting equipment includes the following fixtures: FlexDOT S1, Inground 200, Exterior 200, MaxModule Cerebrum, Ether2DMX8, smartMAC, and Magnum 1800.

PAUL WARCHOL PHOTOGRAPHY; BENJAMIN BENSCHNEIDER; LEIF ORKELBOG-ANDRESEN


Lighting
the look that works
American
Fluorescent
design, efficiency, technology
For up-to-date lighting options, go to al.american fluorescent.com
Circle no. 245 or http://archlighting.com/productinfo

AD INDEX

PAGE	ADVERTISER	CIRCLE NO.
3	Acriche	30
61	American Fluorescent	245
20	Apollo Design Technology	227
9	Artemide	95
28	Barn Light Electric	63
LED 28	BetaLED	405
21	BetaLED	69
LED 12	Bulbrite	163
2	Cathode Lighting Systems	234
29	Columbia Lighting	39
27	Cooper Lighting	25
LED 9	Cooper Lighting	233
LED 2	Cree	228
31	CSI	87
LED 15	DIAL	401
LED 19	dmfLIGHTING	407
15	ERCO	77
LED 3	Focal Point	406
34	Gotham	75
38	Holophane	220
24	Hubbell	59
30	Hunza	190
LED 7	Kim Lighting	-
17	Leviton	35
C3	Litecontrol	27
LED 27	Lithonia Lighting	230
37	Lithonia Lighting	44
C4	Lutron	37
33	MechoShade Systems	78
13	Molex	203
4	NoUVIR Lighting	71
C2-1	Peerless	34
LED 5	Philips Gardco	408
LED 16	Philips LUMILEDS	404
23	Philips Omega	250
41	Schneider Electric	198
5	SELUX	53
18	SPI Lighting	50
2	Super Bright LEDs	236
7	SYLVANIA	237
10	Tersen Lighting	199
32	The Lighting Quotient	96
LED 11	Visa Lighting	409
22	WattStopper	57

Francesca Bettridge

COMPOSING LIGHT THROUGH NARRATIVE

Serendipity has played a great role in Francesca Bettridge's career. When Bettridge was a graduate student at the Open Atelier of Design in New York City, legendary lighting designer Carroll Cline sat in on her end-of-year review. Impressed with her work, Carroll asked her to join his firm. It was a fantastic hands-on opportunity to learn everything and write her own script in the nascent years of the lighting profession. Early evolutions brought Jim Nuckolls and Stephen Bernstein into the office, and in 1985, Cline, Bettridge, and Bernstein established their own practice. The rest as they say is history. With a prolific career that has spanned more than 25 years, Bettridge has worked with the best in the design world and put her own sophisticated and elegant stamp on the lighting profession. **ELIZABETH DONOFF**

You worked with one of lighting's greats, Carroll Cline; what do you take away from the experience?
A collaborative design process and a shorthand form of communication. I have a similar working style with Stephen [Bernstein].

How does your art background translate to your work?
I'm interested in understanding composition and light, and how that can convey an emotion through narrative.

What advice would you give a young lighting designer?
Work for a firm whose work you respect, a place where you'll be able to ask questions. Initiative will help gain experience, but you have to be patient, it will take a few years until you are really valuable to a firm.

Is there a way to expedite an accumulation of knowledge?
There's no easy route, but it does help to be a good listener.

How do you work with high-profile architects but still have your lighting knowledge recognized?
It's the way you communicate. You have to know when to jump in and offer ideas, and other times you have to accept that the design parameters have already been established before you've even arrived.

What's one of the challenges practitioners face today?
Keeping up with all the information and technological changes.

Where do you see lighting heading in the next decade?
Lighting designers will become even more involved in the fine-tuning of codes. Saving energy is our moral imperative, but I hope we can still save design, and maintain a sense of fun in our profession.

SIOUX NESI

THERE IS A PRECISE MOMENT WHEN A PROMISING NEW TECHNOLOGY LEAPS FROM THE EXPERIMENTAL AND SOARS INTO THE MAINSTREAM. THIS OCCURS WHEN A TECHNOLOGY IS LEVERAGED IN WAYS THAT MAKE IT CLEARLY SUPERIOR – IN EFFICIENCY, IN AESTHETIC, IN EXPERIENCE.

FOR LED, THIS IS THAT MOMENT.

Circle no. 27 or http://archlighting.com/productinfo

MAiNSTREAM INTERIOR LED FIXTURES FOR GENERAL LIGHTING
PENDANT · WALL SLOT · WALL MOUNT · RECESSED

LITECONTROL

employee owned | customer driven

/Litecontrol Become a Fan of Litecontrol litecontrol.com

Lutron — save energy in the perfect light

NEW next generation **EcoSystem®** can save **SAVE 60%** of your building's lighting energy.

Improve comfort and productivity with this easily expandable system. **EcoSystem** is a commercial lighting control system that utilizes wired or wireless communication and seamlessly integrates daylight sensors, occupancy sensors and ballasts to create the perfect light.

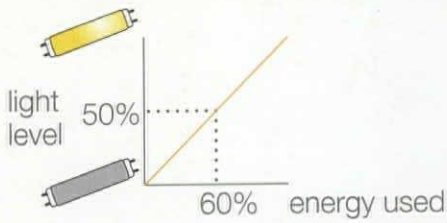
NEW EcoSystem H-Series Ballast

$79 List Price

- Reliable fluorescent dimming down to 1%
- Digitally addressable ballasts allow for simple lighting reconfiguration with no changes to wiring
- New low price makes EcoSystem H-Series the perfect ballast option for any space

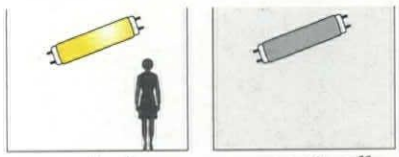
NEW Energi Savr Node™

- EcoSystem Energi Savr Node integrates wired or wireless daylight sensors, occupancy sensors, and EcoSystem ballasts to dim fluorescent lights and save energy



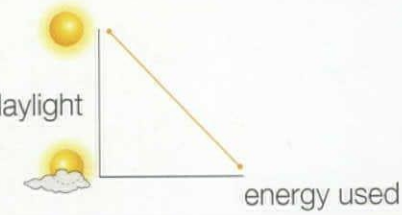
Occupancy Sensors

- Sensors automatically turn lights off when a room is vacant
- **NEW** Radio Powr Savr™ occupancy/vacancy sensors are easy to retrofit with wireless communication and 10-year battery life
- Can provide up to 20% lighting energy savings



Daylight Sensors

- Automatically dim or turn off overhead lights when daylight is available
- **NEW** Radio Powr Savr wireless daylight sensor is simple to retrofit with no new wiring
- Can provide up to 20% lighting energy savings



For more information about Lutron Ecosystem solutions—or to schedule an on-site lighting energy assessment—call **1.888.LUTRON1** or visit **www.lutron.com**

LUTRON®

save energy with Lutron™ ®

Circle no. 37 or http://archlighting.com/productinfo