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On The Cover

Al Jamea-tus-Saifiyah University's design incorporates verdant gardens and tranquil spaces that promote relaxation and reflection. Photo: ID Lighting Design



EDITOR'S NOTE

The Most Favorable Light

Light is a

physical and

metaphorical

beacon, both

rom 1990 to 1992, I attended
St. John's University in Jamaica,
Queens, NY. Growing up playing
basketball, I was a rabid fan of the

"Johnnies" and sweet-shooting Chris Mullin, court general Mark Jackson, and the effortlessly smooth Malik Sealy—all led by a legendary coach, the late Lou Carnesecca. When I graduated high school, it was the only university for me, and I loved it.

Earlier this year, my daughter was accepted into St. John's, and we recently made the trip to tour the school, which I had not visited in over 30 years. The transformation was nothing short of astounding: modern student housing options (there were no oncampus dorms when I attended); brighter, renovated classrooms and gathering spaces; and a revamped athletics facility that showcases the rejuvenated St. John's Basketball program.

I paused and took a moment on the Great Lawn, where I regularly sat with friends or completed classwork, and looked out over the campus. In front of me stood the familiar limestone façade of St. Augustine Hall, but to the left was a new, energy-efficient, St. Vincent Health Sciences Center (see "Saints and Sciences" in this issue of *LD+A*.) I turned toward the southeastern corner of the Great Lawn, where St. Thomas More Church rests with its handcrafted

mosaics from Florence, Italy, that illustrate the life of St. Vincent de Paul as well as the founding and evolution of St. John's University. I then said to my wife, "If this

was the campus when I was a student, I may never have transferred."

Light is a physical and metaphorical beacon, both in faith and education. It can draw us in, accentuate what is unique, provide comfort, and guide the way. In my case, the lighting design of the modern campus contributed to a sense of enhanced pride—

even if I was just a small part of the St. John's community.

Speaking of community, I am writing this editorial after returning from LEDucation. This being my second time around the LEDucation "sun," I felt a greater sense of what it is to be a part of the lighting industry. I appreciate all who took the time to speak with me as well as those who offered up constructive criticism about both *LD+A* and the IES. In that vein, I urge you to read Brienne Willcock's "Education" column this month, which focuses on seeking clarity in advocacy. Often, it is focusing the light on the critical and uncomfortable questions that best moves us forward.

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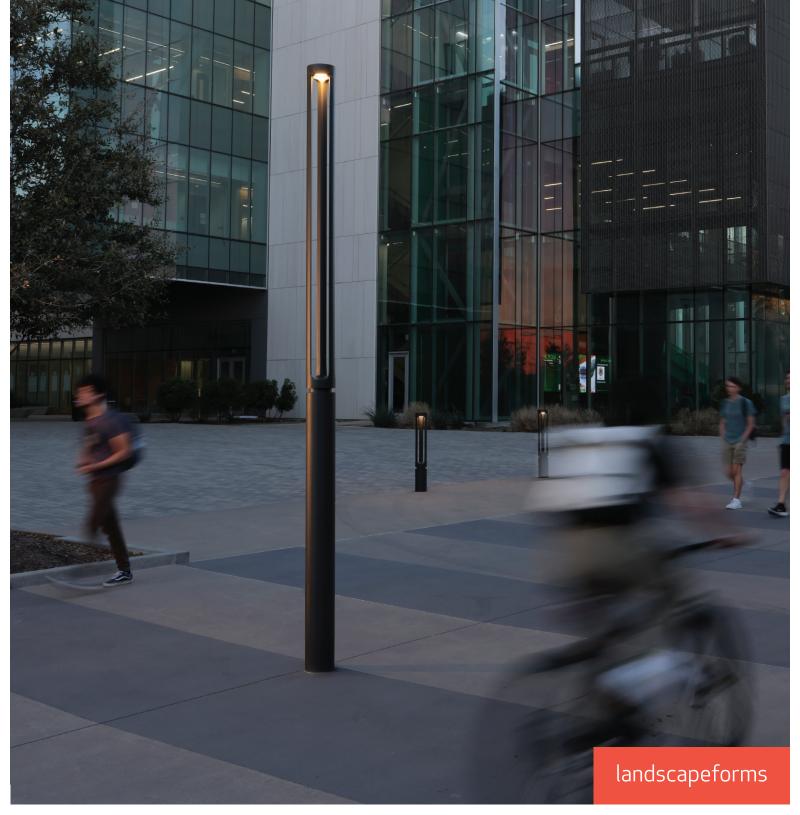
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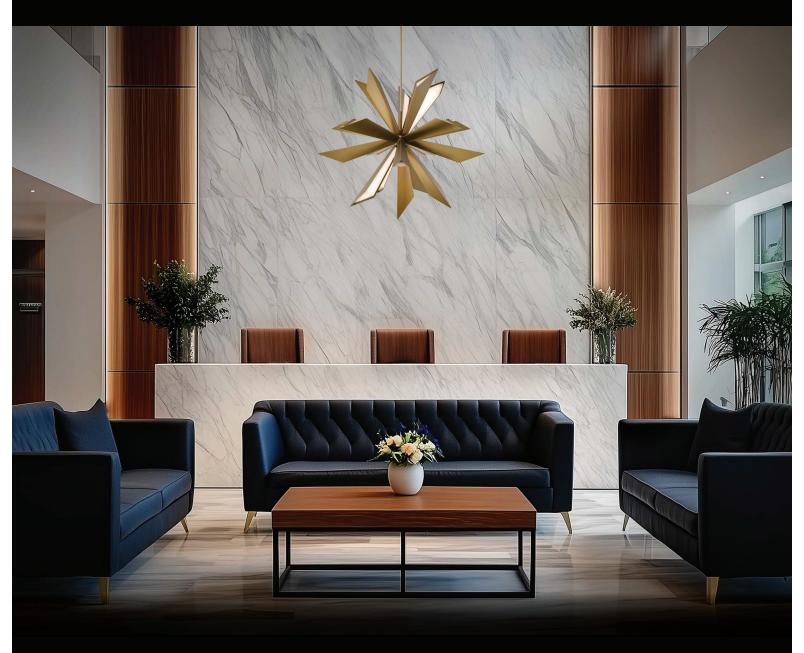
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A Dark Sky in the Spanish Mountains

Lighting system upgrades preserve the environment and benefit locals

The small town of Gavín, with a population close to 100 people and located in the Aragones Pyrenees in Spain, has received an IES Illumination Award of Merit-earning spruce-up by ATP Illuminación. The new ultra-warm, 2200K lighting system is night-sky conscious, energy efficient, and customized for the environmental context—which includes electrical storms that are common in the region. The firm implemented products fit for extreme weather conditions, including Class II luminaires made from polymeric materials without grounding to prevent power surges from electrostatic discharge. Additionally, the team utilized fixtures with diffusers for glare-free lighting in pedestrian areas as well as fixtures tailored through photometric studies to maximize energy efficiency and enhance visibility on roads.



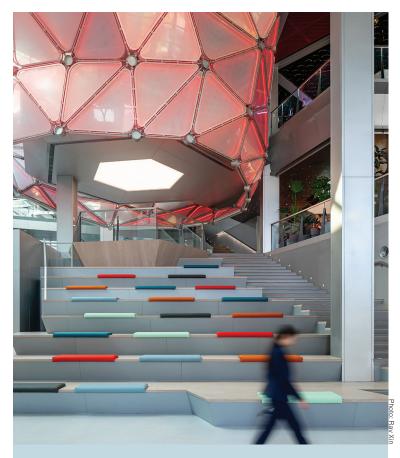
Educational Initiative By NLB, ALA, and The Lighting Agora

The National Lighting Bureau (NLB), American Lighting Association (ALA),

and The Lighting Agora have partnered to produce Simply Light, a new educational initiative to simplify lighting terms. The online learning enterprise currently hosts four videos by three lighting professionals: Mark Roush, Jason Livingston, and Tom Butters, exploring color, color temperature, color rendering index, and lumens.

NLB Chair Mary Beth Gotti said, "By introducing this much-needed simple lighting vocabulary for the everyday users of lighting, we can educate many non-lighting professionals with these concise and informative videos presented by top industry experts."

New content will continue to be released throughout the year, while currently available videos can be accessed via www.nlb.org and YouTube.



A larger-than-life "lantern," inspired by traditional Chinese lanterns and made of a double-layer translucent ETFE film, resides inside the lobby of Deloitte University Asia Pacific China. The overall design of the space by China-based firm aoe highlights four core concepts: future technology, local culture, sustainability, and homage to the campus' original industrial site.



BILLION
The amount the bulbs market is forecasted to grow by 2028.

Source: Research and Markets

MERGERS & MORE:

- A.C. Lighting has been named LumenRadio's Distributor of the Year for 2024
- DMF Lighting has debuted a short film on YouTube, "Light is Everything," that provides a behind-thescenes look at its PhaseX innovation.
- Elemental LED, a North
 American provider of low-voltage linear lighting solutions, has acquired
 Gammalux Lighting
 Systems, a California-based designer and manufacturer.
- New Jersey-based design firm JZA+D has opened an office in New York City.
- KUMUX and K-array have collaborated to integrate the former's circadian-based software into the latter's RAIL architectural line of products.
- Leviton announced a new LIVE experience center with digital displays and a 40-seat reconfigurable classroom in downtown Nashville.

THEY SAID IT:

"Lighting designers need to push more toward being part of a design project earlier in the process...so as not to be looked at as a luxury consultant added to a project 'when budget allows'"

Quincy Drane, "Ask an EP" p. 12



1. May 4-8

LightFair 2025 will be held at the Las Vegas Convention Center. Presented by Light + Building, the event is the premier, biennial architectural and commercial lighting trade show and conference as well as a preferred marketplace, networking, and education destination.

www.lightfair.com

2. June 18-21

Lightovation, the largest residential lighting show in North America, returns to the Dallas Market Center. The event features comprehensive collections of lighting as well as ceiling fans, controls, light sources, and smart and connected lighting systems.

www.dallasmarketcenter.com

3. August 21-23

IES25: The Lighting Conference, IES' annual conference, will be held at the Anaheim Marriott in California. The event includes one day of hands-on workshops and two days of educational sessions, technical paper presentations, and manufacturers' exhibits as well as the Illumination Awards Gala. www.ies.org

4. September 16-17

ArchLIGHT Summit, a commercial and architectural lighting event, will be held at the Dallas Market Center in Texas. It will showcase new products from leading commercial brands and include a full slate of accredited educational and hands-on experiential sessions facilitated by leading minds in design and lighting.

www.archlightsummit.com

5. September 21-25

The IES Street and Area Lighting Conference will be held in New Orleans and focus on improving outdoor lighting through training classes, seminars, and networking sessions as well as an exhibit hall.

www.ies.org

6. October 19-22

The NALMCO Annual Convention and Trade Show will be held at the Hilton Des Moines Downtown in Iowa and focus on lighting management and maintenance. With an emphasis on networking, the event includes business owners, senior-level management, design staff, and lighting technicians.

www.nalmco.org





ASK AN

OUINCY DRANE

This designer at **Hartranft Lighting Studios** and B.U.I.L.D. president is working on creating a more sustainable and diverse lighting industry.

Why light?

I always joke about how I received my first pair of glasses so early in life—that it was the unintentional start of my lighting design journey because of how differently I viewed light before and after glasses. However, I choose light because it's a beautiful, intangible medium that can create memories that are both ephemeral and timeless.

What is your favorite project?

Right now, it is being the recently appointed president of B.U.I.L.D. (Black United in Lighting and Design). I am fortunate to work with a group of strong leaders and designers to grow the network and camaraderie of Black lightingindustry professionals. It is rewarding to help build a community that I was looking for when I was in school: A group of designers that I can relate and connect with.

The best part of your job?

The best part of my job is working across different sectors and regions. Having projects located across the U.S. is such a valuable opportunity at this stage in my career. Getting to build a larger design vocabulary, learning various construction techniques, and expanding my manufacturer and representative catalog is amazing. As a new team member to my job, I enjoy having the opportunity to work across all phases of a project depending on which project I'm working on.

The biggest obstacle you have encountered?

One of the obstacles I currently face is finding a better balance in

utilizing my multi-disciplinary design interests in my day-to-day job. I have both an architectural and lighting design background, and I want my work to have more of a blend of the skills from both professions.

What is an important consideration for the future of the lighting industry?

There are two important considerations. The first is that lighting designers need to push more toward being

is working with

thought leaders

and advocates

to find ways to

reuse fixtures

from projects in

tenant spaces...

and repurpose

the 'junked'

but functioning

fixtures to other

projects and

communities

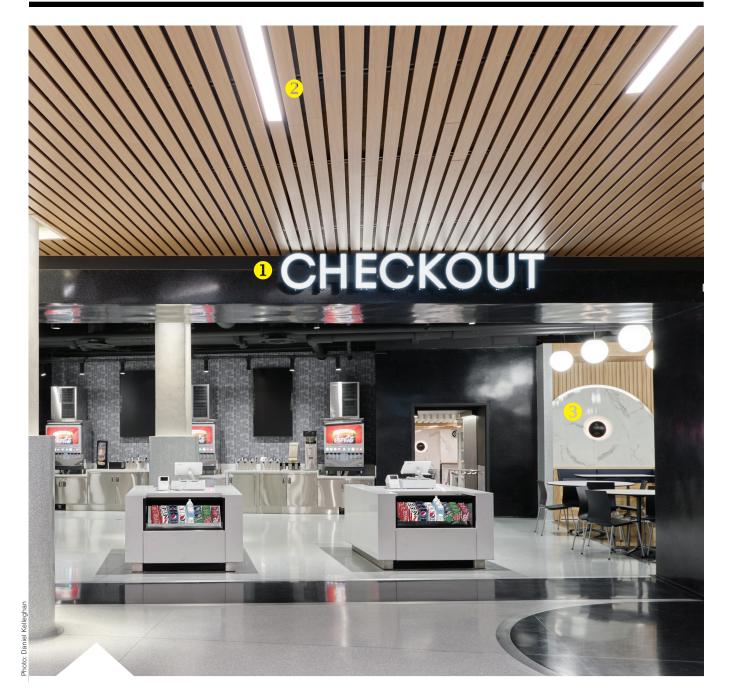
part of a design project earlier in the process and to keep sharing the value A dream project we provide, so as not to be looked at as a luxury consultant added to a project 'when budget allows.' Second, our industry needs to consider up-and-coming, industry-wide changes due to new technology within design as well as the expansion of lighting education.

Do you have a dream job/project?

A dream project is working with thought leaders and advocates to find ways to reuse fixtures from proj-

ects in tenant spaces, which typically have turnover rates of roughly five to 10 years, and repurpose the 'junked' but functioning fixtures to other projects and communities. Specifically, projects and communities that didn't originally have a lighting designer, nor have the funds or outreach to have a lighting designer in their community.

The Emerging Professional column explores issues affecting younger lighting professionals and those new to the industry.



HOW THEY DID IT

"Museum Kitchen"

The renovated food hall at Chicago's Museum of Science and Industry now includes a main cafeteria with four distinct dining areas, art-deco architectural elements that pay homage to the museum's original 1930s opening, and an energy-efficient lighting system

by Maureen Mahr Lighting Design.

IES ILLUMINATION AWARD OF MERIT



Illuminated signage guides guests through the space.



Consistent illuminance levels across fixtures create a unified aesthetic across the food hall.



Architecturally integrated lighting fixtures draw attention to design elements and transaction points while providing general illumination.



Q+A

SUNNY PAREKH

The head of controls at New York City-based **Control Force** discusses the initial challenges and successes of being in business for a year.

How did the idea for Control Force originate?

Control Force was born out of a real problem-there just weren't enough knowledgeable, system-agnostic techs who could step in when things went wrong. Whether it's a gallery opening, high-profile restaurant launch, or major event, lighting needs to be perfect; we saw too many projects struggling with last-minute problems. In addition, we noticed that lighting controls are tricky to understand, and a designer may interpret them one way while a contractor might interpret them another way. We wanted to bridge the gap between manufacturers, designers, contractors, and end-users. So, we built Control Force to be the superheroes this industry needed-bringing expert For anyone knowledge, effective destarting in signs, quick solutions, and the lighting seamless execution to any industry, my lighting control challenge.

What services does Control Force provide and how does the brand differ from competitors?

Control Force can handle deliver on your everything from project promises design and programming to project management, troubleshooting, and long-term maintenance. We're different because we're brand-agnostic. Unlike firms tied to a single manufacturer, we work across multiple systems, giving clients an unbiased solution that fits their needs. Plus, we don't just install and disappear—we stay involved by providing ongoing support. Our services don't stop at lighting controls either. If there's an issue, we'll dig deeper-getting inside lighting fixtures, walls, ceilings, and anywhere else necessary to find the root cause.

Please elaborate on the challenges of starting a new business from the ground up. What advice

would you give others starting a business in the lighting industry?

Building a reputation and earning client trust was one of the toughest challenges in starting Control Force. In an industry where experience is everything, getting people to take a chance on a new company wasn't easy. We had to prove ourselves by showing up, solving problems, and delivering results every time. Word-of-mouth became our biggest asset.

One of our first big wins was helping a high-profile client whose grand opening was at risk due to lighting control system failure. The original manufacturer said it would take over four weeks to send a technician, but

we stepped in that same week and had everything running before their big day. They were so impressed that they signed a long-term maintenance plan with us and brought us on for their future locations.

For anyone starting in the lighting industry, my advice is: be adaptable, prioritize relationships, and always deliver on your promises. The industry moves fast, and reliability is everything. If you can be the team that clients trust to solve

problems when it matters most, you'll build a business that lasts.

advice is: be

adaptable,

prioritize

relationships,

and always

What is the most enjoyable part of working in the lighting industry, specifically in controls?

The most enjoyable part is that no two days are ever the same. Every project brings a new challenge, a new space, and a new opportunity to create something unique. One day, we might be fine-tuning a lighting system in a luxury hotel; the next, we're integrating controls in a high-tech office. Each space has its own personality, design intent, and technical requirements, which keeps things exciting and fresh. The ever-changing nature

(continued on p. 58)

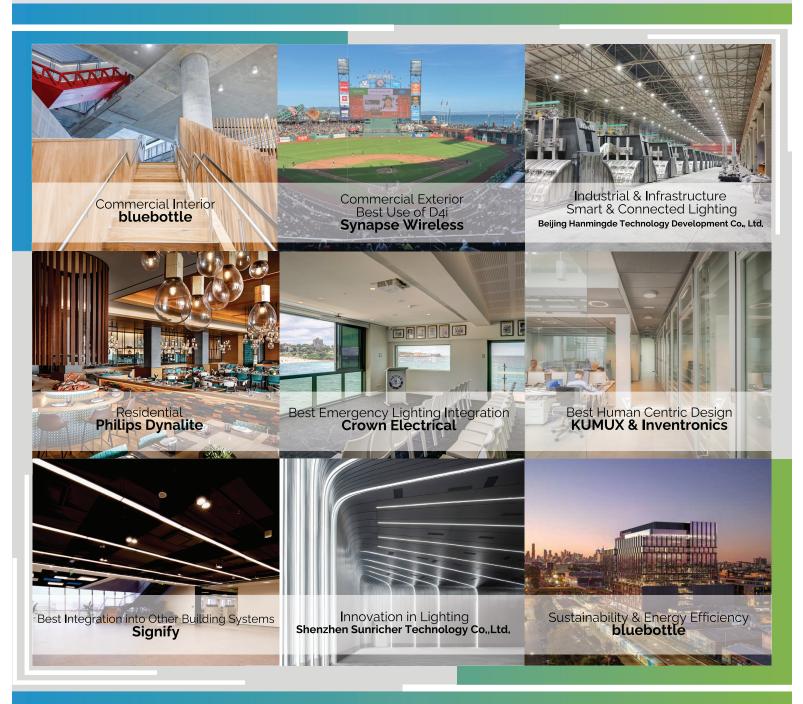






Lighting Awards 2024 / 2025

WINNERS











New Barriers to Learning: A test of wills

here has been a significant change that affects how we learn. People requiring information about a subject used to have to visit a library and hope it had a book on the subject, then wade through to see if the desired content was covered. Alternatively, they could go to a bookstore, pre-Amazon, and buy a book if it was in-stock or wait weeks if it needed to be ordered. Then the public Internet arrived in 1993, but it took decades to evolve to the incredible source of information that it is now.

Accessing information was the primary barrier to learning, but that is no longer true. In our society, everyone has access to more information than at any other time in human history, and that content takes minutes—or seconds—to retrieve. If someone cannot afford the personal tools to access the Internet, public libraries provide them. With few exceptions, this transcends economic disparities with all of us sharing this vast oracle of knowledge.

Futurists predicted that when the Internet evolved to contain the bulk of the world's known knowledge, we would all be much smarter. That did not happen; rather, the opposite occurred. Based on English and math scores and the increasingly divisive nature of society today, we are becoming increasingly less intelligent. In large part, this

is due to the unexpected dominance of misinformation, disinformation, and entertainment. The flood of entertainment has proven to be an addictive distraction from the value that can be derived from the Internet. The algorithms that identify our interests, then feed us more of the same type of content, narrows the scope of what we see and hear. It can compel us to scroll for hours while gaining nothing of lasting value. Long term, as GPS has proven to weaken our navigational skills, this can atrophy broader interests. It is the breadth of our knowledge that allows us to comprehend the interconnectedness and complexity of life and accurately assess threats and opportunities.

Access to information is no longer the primary barrier to learning—it is our will to learn, our ability to choose not to be distracted from learning what can help us in our lives

GG The

The algorithms that identify our interests, then feed us more of the same type of content, narrows the scope of what we see and hear

and careers. There are online courses available, many free, that we can learn from, but we need to choose them over the compelling entertainment and social media options luring us away. Entertainment is not necessarily a bad choice as brief escapism, but its value to our lives is minimal. The rapidly accelerating pace of change in our world makes it critical that we pursue continuous education, not just to excel but to maintain our relevance and careers. The future belongs to those who can adapt the quickest, and knowledge is necessary for informed adaptation.

Everywhere I have worked there have been people who often said. "someone should have told them" and remarked that company communication was subpar. Sometimes this may be valid, but it sounds like they perceive information as reactive, and learning is proactive. Information does not flow to us as we need it, we must seek to find it. We have an obligation to be informed to be successful and effective, and we cannot expect that we will be told everything we need to know. The burden is on us to learn.



Seek Out New Tools

There are new tools that can expedite our learning process. If, for example, you are still using traditional search engines

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Ship Price

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\$24.75



2X2FT Panel

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instead of AI search engines, you are now at a disadvantage. Consider that a traditional Internet search will return a list of potential links to, hopefully, relevant websites, some of which likely contain the answer you seek. An AI search using tools like Claude and ChatGPT, when prompted correctly, return the answer directly to you without the time-consuming steps of clicking on multiple links to extract it. That is technology helping us, and early adopters have an advantage. With this example, you need to choose to use the tool and learn how to prompt it correctly to maximize its effectiveness. Even this requires your will to learn.

We can learn from others. Our society is more mobile than ever, providing opportunities to

engage. I have lived in 10 cities in six states and, fortunately, have been able to travel extensively while learning from almost everyone I meet, if I choose to engage with them. Engaging with others, especially those with differing opinions and interests, is an experiential way of learning. Our culture has also made it possible to withdraw from others. Amazon will deliver your essentials quickly, and most cities have numerous options for groceries and meals to be brought to your door. Our media tools make it seem as if we are experiencing the world from our homes. That is an illusion, as anyone who compares an image of scenic wonders to seeing them in person knows.

It is possible to engage with others online but, again, we only

receive a partial experience. Body language is seldom visible on Zoom, and other telling mannerisms are not typically evident in two-dimensional online experiences. We need the will to get up off the couch and immerse ourselves in the world around us. Isolation can feel easier, but it limits our lives. This is another learning choice, forcing us to use our will to overcome the temptations that distract us and cocoon us from life. A ship in harbor is safe, but that is not what a ship was meant to do.

Navigating Uncharted Territory

We are an evolving species with the pace of change accelerating and information coming at us like a firehose.

(continued on p. 58)



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The Future of Rebates: Controlled Lighting

ommercial lighting rebates remain widely available in the U.S. but appear to be at an evolutionary crossroads as LED saturation increases, with programs finding themselves incentivized to promote lighting controls more heavily. In this column, I will review major trends based on BriteSwitch's RebatePro database while previewing what the future of lighting rebates may look like based on a new study by utility consulting firm DNV.

In review, utilities and energyefficiency organizations offer commercial lighting rebates to entice customers to install energy-efficient equipment, primarily in existing buildings. They have undeniably impacted product development, accelerated adoption of energy-efficient lighting, and reduced the need for power generation. The three most common rebate models are prescriptive downstream, prescriptive midstream, and custom. Of these, prescriptive downstream is most popular, where customers install a qualifying product and receive a cash reward. Lighting has always been a leading product category in rebate programs, traditionally offering high-volume, low-cost energy savings.

According to BriteSwitch, 77% of the U.S. is covered by an active program. In 2025, average rebates per LED product slightly increased, likely due to inflation, with the most popular product types shown in **Figure 1**

33

Some programs recently changed to allow LED-to-LED upgrades, a sign that programs are casting a wider net to harvest energy savings

and **Figure 2**. A big opportunity moving forward is in states implementing bans on popular linear and compact fluorescent lamps that are going into effect between 2024 and 2029. As fluorescent lamps stop being available, building owners can be enticed to leverage rebate dollars to convert en masse rather than piecemeal.

As for lighting control rebates, they remain widely available and substantial. In most of the U.S., if a lighting rebate is available, so too is a controls rebate, with the most popular standalone control options shown in **Figure 3**. Historically, these rebates have been consistent and lucrative, positioning lighting controls as an attractive upfront addition for lighting upgrades.

Meanwhile, networked lighting control (NLC) rebates continue to grow in availability. NLCs are intelligent systems in which devices are connected within a network to enact control strategies for greater flexibility, substantial energy savings, and non-energy benefits realized through documented building data. In 2025, 474 programs are currently incentivizing this control option in prescriptive rebates, including some midstream (instant) rebates realized at the point of sale, according to BriteSwitch. These rebates vary in incentive type, with the most popular being a rebate adder for NLC-controlled LED luminaires.



Continued Vitality

Again, the future of commercial lighting rebates will heavily prioritize lighting controls. We can see signs of it starting already. First, I will explain why.

The Department of Energy estimated that LED lighting achieved a near parity with traditional light sources in the commercial building sector in 2020. A 2024 study by DNV estimated that 60% of installed linear luminaires are now LED, which places LED adoption in the late majority phase. The remaining legacy market includes many smaller buildings and otherwise less-accessible projects, which are more challenging to convert. This is putting considerable pressure on rebate programs to meet their energy savings goals.

In the past, 10 to 25% of rebate programs would run out of funds prior to the end of the program year. In recent years, this percentage has steadily reduced, with an increasing number of programs ending the year with unspent funds. As a result, rebate programs have begun offering substantial bonuses ranging from 10 to 100%. According to BriteSwitch, a record 40 programs ended 2024 with such bonuses, and 5% were already offering them at the start of 2025. It can pay to check if bonuses are available when exploring rebates.

Some in the industry speculated that utilities would no longer offer rebates. But today they are as vital as ever, given projected increases in energy consumption due to various trends,

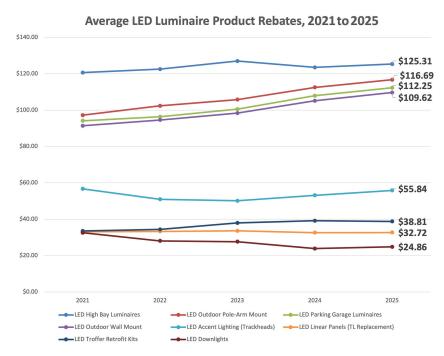


Figure 1. Popular LED luminaire categories featured in prescriptive commercial lighting rebate programs in 2021 to 2025, with average rebate amounts per product for programs in the U.S. and Canada. Data source: BriteSwitch RebatePro for Lighting rebate database, February 2025.

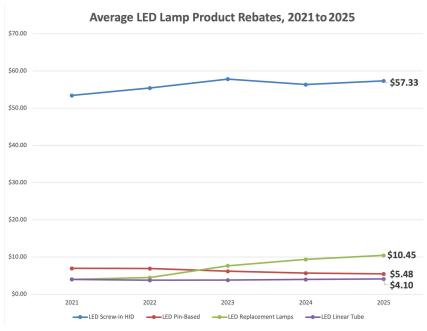


Figure 2. Popular LED lamp categories featured in prescriptive commercial lighting rebate programs in 2021 to 2025, with average rebate amounts per product for programs in the U.S. and Canada. Data source: BriteSwitch RebatePro for Lighting rebate database, February 2025.

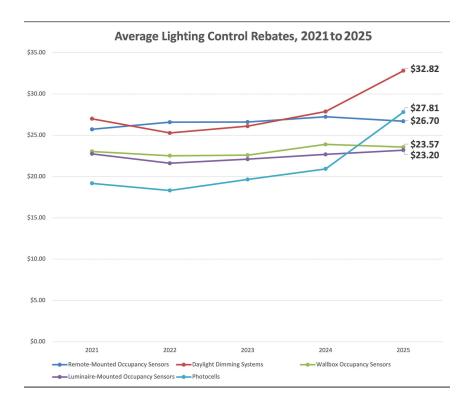


Figure 3. Popular standalone lighting control categories featured in a majority of prescriptive commercial lighting rebate programs in 2021 to 2025, with average rebate amounts per product for programs in the U.S. and Canada. (Networked control systems are not included, as programs are still relatively unstandardized.) Source: BriteSwitch RebatePro for Lighting rebate database, February 2025.

notably the construction of more data centers in the emerging AI era. Lighting's traditional role as low-hanging fruit for energy savings, however, is certainly diminishing as LED adoption increases and the remaining market is more challenging. As a result, and welcome news to our industry, rebate programs are evolving to expand their energy-saving opportunities and maximize the energy-saving value of each rebate transaction.

Evolutionary Progress

Some programs recently changed to allow LED-to-LED upgrades, a sign that programs are casting a wider net to harvest energy savings. Meanwhile, lighting controls are starting to be positioned more prominently

in rebate program catalogs, with the lighting control rebate placed alongside the LED rebate instead of the back of the catalog; about 20% of programs now do this. Finally, some programs are starting to require that to receive an LED product rebate, the product must be controlled. For example, Mass Save changed its prescriptive downstream rebate to incentivize luminaires only if they include integral controls.

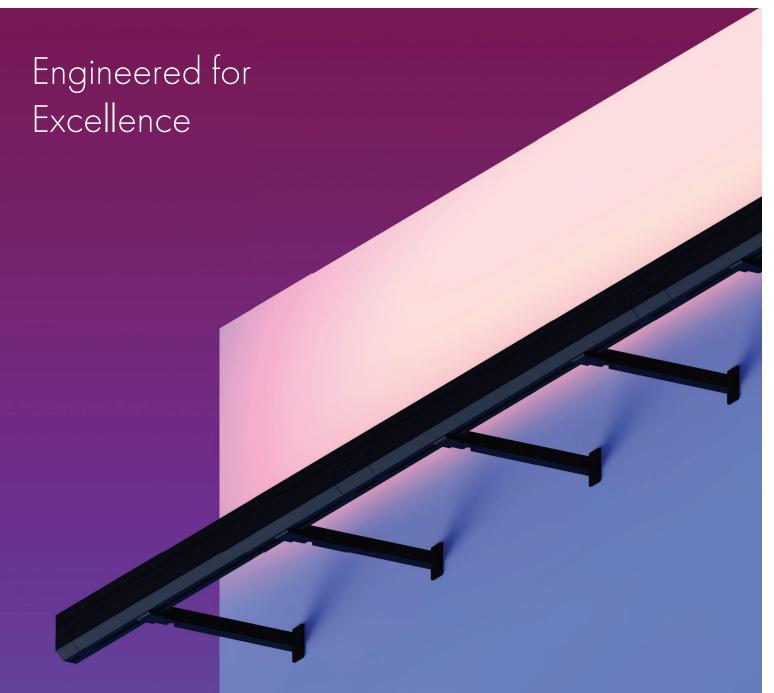
These are exploratory steps as rebate programs grapple with the challenge. In its 2024 study, DNV identified six lighting incentive opportunities it touted as next generation: LED-to-LED upgrades, advanced lighting controls, lighting system redesign with LED luminaires, lighting

demand-side management, germicidal UV, and tunable lighting, grading each on its attractiveness for rebate programs. Of these, the two highest rated are LED-to-LED upgrades with an "A" rating and advanced lighting controls with a "B" rating. This suggests that the early inroads by rebate programs into focusing on these opportunities will likely accelerate, though these programs will have to adjust their economic valuations.

For decades, commercial lighting rebates have offered a powerful incentive for building owners to adopt energy-efficient lighting and controls. While rebates require effort and pose a degree of risk, numerous building owners have used them to help fund the installation of new lighting and controls.

The overall outlook for commercial lighting rebates in the U.S. in 2025 is very strong, with widely available rebates supported by freely available, detailed listings of qualified products in the DesignLights Consortium's Qualified Products Lists. These rebates are particularly attractive for projects involving solutions adding lighting controls, including networked lighting controls. While capturing lighting upgrade projects may be more challenging as LED adoption increases, rebates can be even more critical to capture this business.

Gary Meshberg, LC, CLCP, LEED-AP, Member IES, is chair of the Lighting Controls Association (a council of NEMA) and strategic projects sales director, Building Control Systems for Legrand North America.



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Investing in Change Seeking clarity in lighting advocacy

ou hear it everywhere—at conferences and crossroads, on bar stools and Zoom calls, in Lyfts and Slack-the lighting industry, in all its facets, doesn't advocate well. We've spent a lot of energy trying to find identity within the whole-maybe without realizing it, we've fractured some of our credibility and productivity along the way. We've also fallen into assuming personal business strategies or methods of individual influence are effective when scaled to an entire community.

Yet, the industry wants a plan for resiliency; one that champions quality lighting design, meaningful and adopted standards, and diversity that is recognized and valued. We say we want education at every level, for everyone, on every topic... but the implied, and sometimes outright demand, is: more information, faster, and free, preferably in bite-size chunks, no long reading assignments, and with a certificate attached.

We hear a lot (weekly, at times) that IES standards (a form of education) should be free, but the investment to publish, support in fees, market, etc., is an annual investment (just at the IES, not including other standards developers) of well over \$500,000. The biggest shift in our industry isn't about technology anymore, it's in the approach to learning: we

demand more but invest less.

Downsized organizations like IALD and the IES, emptied offices, disappearing staff... these aren't just growing pains. They're warning signs. They show us what happens when advocacy is treated as optional: survival mode takes over, and long-term vision fades.

A Community, Not Just Interest Groups

An article in designing lighting1 featured thoughts from respected lighting designer and IES Past President Paul Mercier, who said, "We have to begin acting as a large community, not a collection of small special interest groups, so that we can work together to create a stronger lighting industry. As a community, we can approach challenges with more hands and a greater ability to make progress. Then, our legitimacy can rise to that enjoyed by architects, interior designers, and engineers."

33

We are fragmented in ways that make advocacy difficult resources are split, strategic goals are often selfsustaining... and staff shortages further weaken collective influence

Mercier's observation is uncannily timed with my reading of Community: The Structure of Belonging² by Peter Block, who writes, "The essential challenge is to transform the isolation and self-interest within our communities into connectedness and caring for the whole. The key is to identify how this transformation occurs. We begin by shifting our attention from the problems of community to the possibility of community...A key insight in this pursuit is to accept the importance of social capital to the life of the community. This begins the effort to create a future distinct from the past."

Diving into lighting organizations, the following list of those with influence and/or origins (primarily in North America) represents specific values, services, and needs.

- American Lighting Association (ALA)
- American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
- Asian Lighting Community (ALC)
- Association of Outdoor Lighting Professionals (AOLP)
- Black United in Lighting and Design (BUILD)
- Business of Light (BOL)
- DarkSky International (DSI)
- Equity in Lighting
- Illuminating Engineering Society (IES)



- Institute of Electrical and Electronics Engineers (IEEE)
- International Association of Lighting Designers (IALD)
- International Association of Lighting Management Companies (NALMCO)
- International Commission on Illumination (CIE)
- International Landscape Lighting Institute (ILLI)
- International Ultraviolet Association (IUVA)
- Lighting Controls Association (LCA)
- National Association of Electrical Distributors (NAED)
- National Association of Innovative Lighting Distributors (NAILD)
- National Electrical Manufacturers Representatives (NEMRA) Lighting Division
- National Electrical Manufacturers' Association (NEMA)
- National Lighting Bureau (NLB)
- North American Coalition of Lighting Industry Queers (NACLIQ)
- · Women in Lighting
- Women in Lighting and Design (WILD).

This list isn't exhaustive, but it's clear: we are diverse, technical, valuable, and crave representation. Many of you may invest in being a member of five or six of the aforementioned organizations. There's another clear, uncomfortable truth: we are fragmented in ways that make advocacy difficult—resources are split, strategic goals are often self-sustaining rather than indus-

try-focused, and staff shortages further weaken collective influence.

A Shared Foundation for Advocacy

If we're going to build something stronger, I suspect we should start with shared truths. I believe those 20+ listed groups would agree—at least in part—on the following:

- **1. Lighting is vital** to people and to the realization of design ideas.
- Lighting varies in quality and cost, and understanding those differences is valuable.
- Lighting professionals deserve recognition for their expertise as well as fair pay.
- Lighting can be productive, and it can be a nuisance.
- 5. Lighting depends on other disciplines to be impactful.

These truths provide a foundation for effective advocacy. But a foundation alone isn't enough. Without a clear path of responsibility (and accountability) and concrete goals, we will continue to fall short. If a single group could have successfully led this effort alone, we'd likely have already achieved what Mercier describes: legitimacy equal to architects, interior designers, and engineers. Though if those folks we admire sought out the lighting industry (ahem, googled), which on this list of organizations would come up first? What would their impression be? Would it be respect? Concern? Confusion?

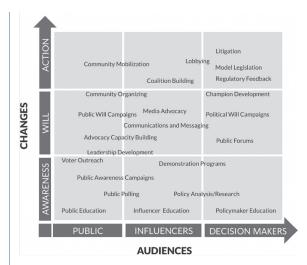


Figure 1: "The Advocacy Strategy Framework" is a tool for thinking about the theories of change that underlie public policy advocacy strategies.

A Framework for Moving Forward

Looking at advocacy frameworks, one feels particularly compelling for our industry: "The Advocacy Strategy Framework" developed by Julia Coffman and Tanya Beer. Their model organizes advocacy around two key dimensions: "audience," such as the public, influencers, decision-makers; and "stages of change," such as awareness, will, and action (**Figure 1**).

This framework offers a structured way to move beyond merely identifying problems (as Block warns against) and into actionable possibilities for our industry. Coffman and Beer outline key strategic questions and measurable outcomes for each strategy:

- 1. How is the strategy positioned?
- 2. Who specifically is the strategy trying to influence, and how?

- 3. What are the underlying assumptions about how change happens?
- 4. Who else is working on this, and how?
- 5. How will the strategy evolve over several years?
- 6. What interim outcomes indicate progress?

The fourth question is especially relevant given our industry's fragmentation as we evolve beyond being problem-focused. As Coffman and Beer note, "Advocacy often features multiple voices working on the same issue—aligned or in opposition... Mapping multiple advocacy strategies onto the same framework helps identify where different organizations are positioned, how they add value, and potential points of conflict or synergy."

The deeper-dive in just this one area encourages critical questions such as:

How are advocates comple-

- menting one another?
- Is there unnecessary duplication of effort?
- Are strategies unintentionally working in opposition?
- What does the opposition's positioning indicate about how advocates should respond?

Rethinking Our Collective Strategy

While "The Advocacy Strategy Framework" is one of many approaches, it highlights an important reality: advocacy is not just about representation and education—it's about purpose. Even if all 20+ lighting organizations never fully align—and I am not suggesting they should—some could clarify their roles within a broader strategy. Instead of just representing their members, they could actively contribute to industry-wide progress. Some may find their

strongest positioning in a specific quadrant of the framework. Others might tighten their mission, focusing on their role in driving change, rather than preserving (or fixing) the past.

Maybe small steps are possible: for every sponsorship asked for, can a group outside of lighting be identified for outreach as a condition of support? For every event, could inviting a non-lighting guest be incentivized? What if an honorarium for a talk was increased if a representative from an adjacent discipline (landscape architecture, interior design, etc.) was a copresenter (think finder's fee)?

If Block is right, then the lighting industry must recognize its greatest strength isn't in individual efforts, but in its collective social capital. At the IES, we have made meaningful progress lately by way of an outreach pipeline, measurable engagement with non-lighting organizations, and have additional plans. But there's a long road ahead, and much of it depends on education and investment.

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Brienne Willcock is director of Education and Standards for the IES.



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Job Jumping Navigating today's shorter stays

s a recruiting firm in lighting, electrical, and controls, every day our team speaks with hiring managers and human resources professionals in our industry. As the conversation turns to candidates' backgrounds, the length of time candidates stay at their companies often comes up and an interesting dynamic arises: Many people (particularly hiring managers) feel that today's candidates have much shorter tenures than 10 to 15 years ago. Employers bemoan what they frequently refer to as "job jumpers"-candidates that have roughly 1 to 2 years, on average, for their last three job stays. There is a reason for employer trepidation when hiring someone with very short job stays. There is often truth to the statement "Past performance is indicative of future behavior," and depending on who you ask, it is said that it takes 6 months

to a year before an employee truly becomes profitable. So, it is understandable why many employers cautiously approach the hire of a candidate with a track record of job jumping.

What appears to be happening is that although the average job tenure overall does not seem to be significantly lower than previous years, as Baby Boomers are retiring—and Gen X employees will soon follow—the majority of our workforce will comprise Millennials and Gen Z, who have a history of shorter job tenures.

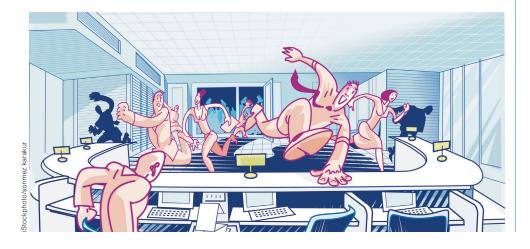
What are the options for employers? While there are no simple answers, I would like to present three tips that may reduce the chances of a bad hire when interviewing those whose résumés include shorter job stays.

 Inquire about their reasons for leaving their previous jobs. Couch the question in an open-ended way 33

We can expect these shorter stays to most likely continue for the foreseeable future

to encourage candidates to elaborate. Carefully listen as they describe how/why they left each position. Is there a pattern? Are employers leaving your candidates more than candidates are leaving their employers? How do they talk about each of their former employers? Negativity and blaming former companies is a red flag. Geoff Smart's book Who? The A Method for Hiring recommends the use of these two follow-up responses to your candidate's answer: "How's that?" and "Tell me more." If a candidate becomes defensive or speaks negatively about a previous company, you'll be glad you asked before making a hiring decision.

2. Dive deep into checking references. Conduct a series of detailed reference checks with your final candidates. Wherever possible, reference checking should be conducted by a third party. As an employer, having a company representative call a reference might prompt them to respond with a bland or overly positive reference just to help the candidate get the job. Because they know the candidate, they are often reluctant to share any "nonglowing" information about the candidate, which may



be details worth knowing. If possible, do not disclose the name of the company to the reference to keep things confidential and allow the reference to speak freely during the conversation.

3. "I" versus "We." One of my previous columns dealt with a subtle technique during interviews that I first saw in Business Insider: it involves listening to the way candidates talk about their achievements. Somone who is aware and proud of their specific accomplishments will often answer your question in the first-person singular, "I". Those who answer most questions with "We" may not have quanitfiable achievements in which they played an important or leading role. The best candidate will often use a combination of firstand third-person phrasing, which indicates someone who is proud of their individual accomplishments yet also enjoys working in a team.

In the future, will Millennial and Gen Z candidates end up staying at their companies for longer periods as they move into the later stages of their careers? It's hard to predict, but we can expect these shorter stays to most likely continue for the foreseeable future.

Paul Pompeo is president of The Pompeo Group (www.pompeo. com), an executive recruiting firm in lighting, controls, electrical, and IoT.

Why Do Candidates Seem to Have Shorter Stays than 10 Years Ago?

The "dot.com boom" (also known as the "Internet bubble" or "tech boom") of the late 1990s until the early 2000s refers to a time where Internet-related tech companies attracted significant attention from venture capital firms and other investors. During this time, there was a hiring frenzy by these companies, resulting in the best and brightest being recruited from multiple industries (including lighting and controls) with promises of huge financial paydays. The majority of these firms were short-lived, but some of the best senior managers in our industry can point to a 6-month to 2-year period away from industry around that time.

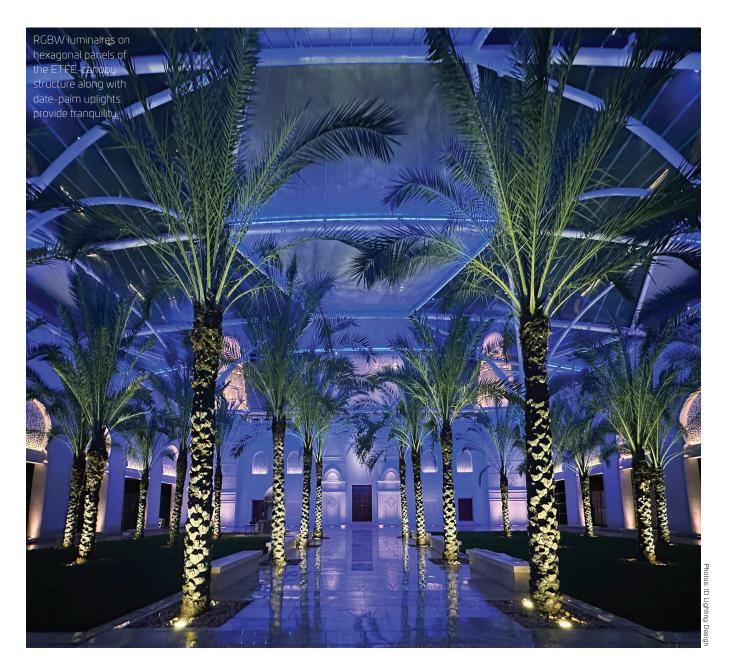
The "Great Recession" of 2007 to 2009 was a global phenomenon and the biggest economic downturn since the Great Depression nearly a century earlier. There were substantial layoffs among many companies, which abbreviated the job stays of countless lighting professionals during this time.

The post-Baby Boomer generational shift is also a factor. According to offboarding services provider Kept, "...a noticeable shift has occurred in employee tenure, particularly among Gen Z and Millennials, who tend to spend less time with employers compared to previous generations." Kept adds that the average Baby Boomer worker had an average job stay of 8.25 years. Gen X workers average about 5.2 years per position, with Millennials and Gen Z clocking in at average tenures of 2.75 and 2.25 years, respectively. For a variety of reasons, Millennials and Gen Z often tend to have a very different concept of work/life balance than their predecessors.

Candidates: Why You May Want to Stay a Little Longer

It's been discussed here (and elsewhere) how the 2000s has seen progressively shorter job stays for many candidates. But there are also reasons why you should consider sticking around, even though the immediate benefits may not seem obvious. Candidates with 3 to 5 years per company, on average, are often the first candidates employers review. In their eyes, they see stability and often feel that a longer-stay professional is the better bet. The candidate who demonstrates the ability to stick with it at each company often seems more dependable to hiring managers, executive recruiters, and human resource managers. Is that always the case? No, but as the saying goes, "Perception is reality"—at least often it is in the case of someone viewing your résumé.

The short-term win of securing higher salaries by switching jobs frequently is offset by the fact that staying longer at a company significantly increases your chance of a promotion—bringing a raise and increased responsibility. Listing a promotion on your résumé is very attractive to employers, and that new position frequently ends up being more satisfying jobwise. If you're a high-performer, employers often are willing to invest more in you if they feel you will be staying for a while.

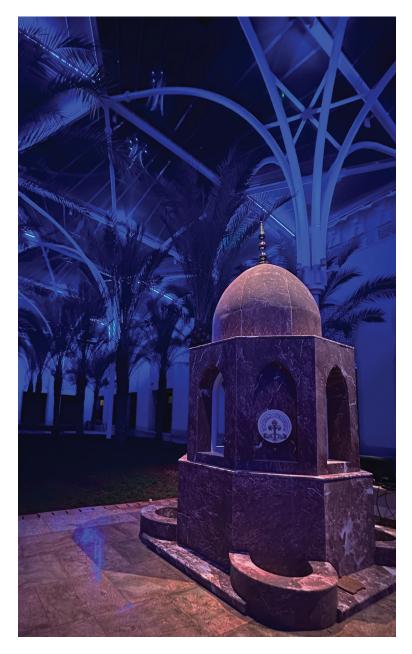


A KENYAN CAMPUS OASIS

A courtyard is central to Al Jamea-tus-Saifiyah University's serenity

By David Shiller

I Jamea-tus-Saifiyah University's Nairobi campus stands as a testament to the seamless integration of historical inspiration and contemporary design. Drawing from the rich architectural heritage of the 10th-century Fatimid era, the campus design incorporates verdant gardens and tranquil spaces that promote relaxation and reflection. The central courtyard, a focal point of the campus, embodies this design ethos with its serene atmosphere and carefully curated elements. In 2023, the addition of a state-of-the-art, ethylene tetrafluoroethylene (ETFE) canopy further enhanced the courtyard's usability, providing shelter from the elements while adding a modern architectural layer to the historic setting.



The courtyard's design echoes Fatimid-era courtyards, characterized by intricate floral motifs and a harmonious blend of open space and architectural elements. Flanked by arcades and serving as an extension of the campus mosque, the area fosters a sense of spiritual connection and community. Rows of date palms and fountains further contribute to the peaceful ambiance, inviting students and visitors to pause and reflect.

The lighting design for the area is more than just a functional consideration; it's an orchestrated narrative that bridges traditional architecture with the modern ETFE canopy, showcasing history with modernity. The primary goal of the project was to create an environment that accentuates the

Left: Canopymounted accents illuminate the campus mosque's portal medallion and the drinkingwater fountain.

Right: Blue light from the canopy and contrasting warm 2700K uplights create drama on arcade walls.



courtyard's architectural highlights; gentle use of color allows for low light levels while providing a dynamic visual contrast. Additionally, the lighting scheme addresses multiple design intents, including wayfinding, stage lighting, and nighttime security, all achieved through programmed groupings of luminaires.

"The space needed to serve as both a sanctuary for prayer and reflection and a dynamic event venue with adaptable lighting scenes," explained Insiya Divan, principal designer at ID Lighting Design. "We specified a highly adaptable, Ethernet-based, programmable system to create complex scenes that allowed transitions between a meditative atmosphere and lighting that supported high-capacity event-focused settings."

Sustainability and light pollution control were also essential, given the site's proximity to a national park and wildlife reserve. To add to the design challenges, the project's specialized lighting requirements were uncommon in the region and necessitated a hands-on approach to ensure timely procurement and adherence to budget constraints.

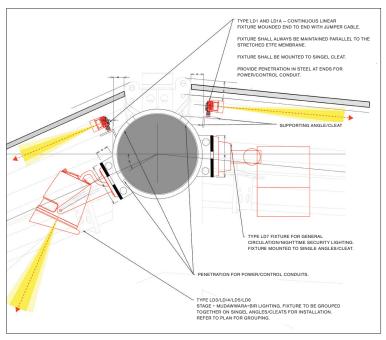
"Our design approach focused on the seamless integration and concealment of luminaires to preserve architectural integrity while enhancing both historic and modern elements, emphasizing





verticality, depth, and materiality," said Divan. For example, 8-deg, narrow-beam grazers accentuated the curvature of the steel arches, while low-profile accent lighting highlighted intricate stone details against a backdrop of contrasting low ambient light.

The narrow-beam grazers were also employed to cast a soft, indirect glow that highlights the canopy's form while preventing unwanted light spill. At the base of each column-cluster, accent luminaires with an 8-deg beam angle elongated lenses, and honeycomb-louvers graze the arched steel of the column-cluster, adding depth and texture to the architectural details. Upper-luminaire shielding prevents direct light spill into the night sky. The result is a glare-free space with low ambient lighting, and special architectural elements highlighted beneath the canopy structure.



Top Left: Luminaires are placed at the base of columnclusters on the arched steel beams.

Bottom Left:

The preliminary mounting of low-profile RGBW linear grazers to custom prefabricated steel angles.

Right: The project's design serves various purposes, including wayfinding, stage lighting, and nighttime security.

"Custom beam-mounted accent fixtures were used for highlighting key architectural elements," Divan explained. "These fixtures featured custom edge-diffusing lenses to softly illuminate intricate stone medallions and sculptural features. In-ground and surface grazers were strategically placed within architectural recesses. These 2700K warm-white fixtures emphasized the historic façades through contrast and shadow. RGBW-A luminaires with Ethernet-based controls created addressable fixtures for dynamic programming. They enable preset scenes for daily use and synchronized lighting for performances and community events."

Preventing Light Spill

The university proactively sets regional benchmarks for sustainability by minimizing resource waste and prioritizing renewable solutions. The exterior lighting for the translucent ETFE canopy posed a unique challenge-how to illuminate the membrane effectively without contributing to light pollution. The design incorporated rigorous optical control, shielding, and precise luminaire placement to prevent light spill. Lighting simulations were conducted and fixtures with very narrow beam optics (7 to 10 deg) and custom louvers were employed to deliver targeted illumination, reducing glare and unnecessary light dispersion. The Ethernet-based control system further enhanced efficiency by automating shut-off schedules, optimizing energy use, and preserving dark-sky conditions and environmental integrity.





"The courtyard remains an inviting, well-lit space for quiet reflection and vibrant events, enhancing student and community engagement," Divan shared. "Low indirect lighting at 5 to 15 lux fosters a calming environment, supporting the spiritual and meditative functions of the space. The careful layering of light brings out the depth and detail of historic stone elements, ensuring their visual prominence even at night...[and] the ability to program dynamic lighting scenes ensures that the space can adapt to different uses, from everyday student activities to large-scale events, without requiring manual intervention."

The illuminated courtyard of Al Jamea-tus-Saifiyah's campus serves as a model for how thoughtful design can create functional and inspiring spaces, celebrating the past while embracing

Left: Before sunrise, 2400K illumination highlights the stone medallion against contrasting "daylight"-hues from canopy grazers.

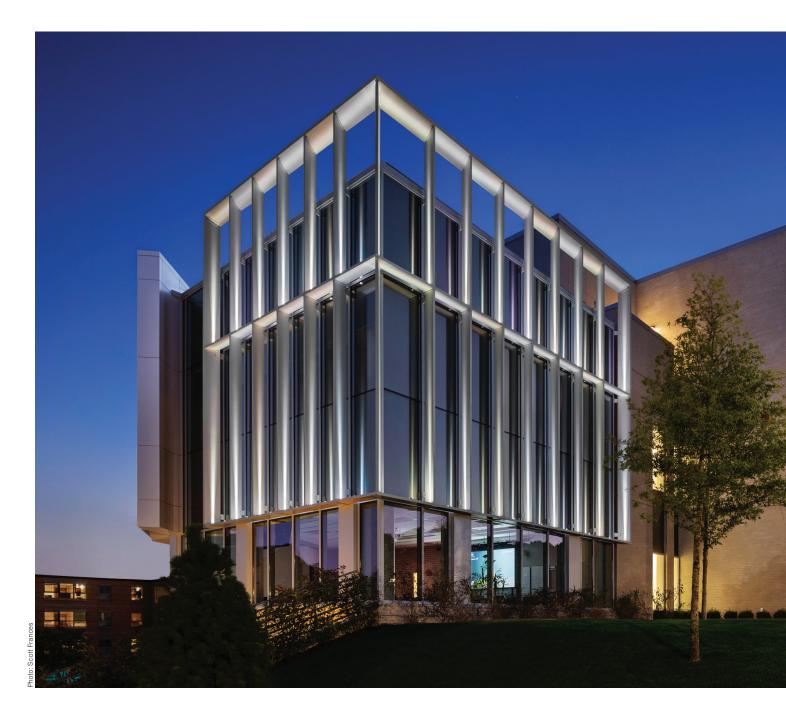
Right: A general/ evening preset scene illuminates the medallion. the future. The successful integration of historic architecture, modern technology, and sustainable design principles has created a space that will be cherished for generations to come.

Output

Description:

THE DESIGNER | Insiya Divan, LEED AP, IES Member, IALD, is principal designer at ID Lighting Design.

THE AUTHOR | David Shiller is president of Lighting Solution Development, a leading business development consulting firm to the lighting industry. He is also publisher of *LightNOW*, an online lighting industry trade publication, as well as a 20-plus-year veteran of the lighting industry and a member of the American Lighting Association.



SAINTS AND SCIENCES

Readying next-generation caregivers

By Craig Causer

or more than 155 years, St. John's University has looked to St. Vincent de Paul for its inspiration and vision. While the patron saint of charity was more familiar with candlelight than LEDs and advanced lighting controls, he advised, "Make it a practice to judge persons and things in the most favorable light at all times and under all circumstances."

As one of the largest educators of healthcare personnel in the New York metropolitan area for nearly a century, St. John's is well-versed in schooling those striving to work in the service of others. Located adjacent to the campus's Great





Top: Largelensed downlights and perimeter coves illuminate each individually controlled patient bay, while continuous linear lighting supplies the central workspace.

Left: Each bay of the louvered corners hosts individual fixtures that emit white as well as a full range of colorchanging light for programmable scenes. capture systems. Advanced Simulation Laboratories are equipped with state-of-the-art technology to support healthcare education training in a real-life clinical setting. To enhance this hands-on learning environment, multifunctional healthcare lighting and advanced controls systems have been installed to provide a realistic and immersive healthcare experience.

"This building provides students with the ability to learn in real-world simulation spaces," said Kate St. Laurent, Lighting Studio lead at CannonDesign. "With healthcare-rated fixtures and functional lighting controls, students can immerse themselves in the real-world experience. Being able to adjust the lighting for simulated patient comfort and turning the lights on to full brightness for an emergency exam procedure is crucial to set students up for success."

In the middle of the Health Sciences Center's laboratories is a three-story, skylit study commons. To simplify maintenance, artificial lighting is delivered through an A.Light magnetic track system that encircles each opening across all three floors. This allows fixtures to be accessed, adjusted, and maintained from their installation level. To enhance the architectural features of the atrium, Vode cantilevered linear lights softly illuminate the wood paneling and signage, while recessed linear lights provide a gentle glow in the sawtooth skylight when natural daylight is absent.

The project prioritized environmental sustainability and occupant well-being. LEED Silver-certified and Net Zero-ready, the building features rooftop photovoltaic arrays and a geothermal heating system. Designed to maximize natural light, the

Lawn, the new, 70,000-sq-ft St. Vincent Health Sciences Center provides a cutting-edge learning environment for students in the university's Nursing, Radiologic Sciences, and Physician Assistant programs.

The facility is home to state-of-the-art simulation labs, teaching labs, classrooms, and faculty offices, with Assessment Flex Labs and Hi-Fidelity Simulation Centers comprising approximately 25% of the building's assignable floor area. Students are provided with clinical skills training within "hospital" settings and are observed through one-way glass as well as remotely via audio-visual





sawtooth skylights help reduce overall lighting demand, and as a fully electric facility, the Health Sciences Center possesses a lighting power density of 0.56 watts per sq ft. In addition, multiple lighting control zones allow occupants to customize illumination based on their tasks and preferences.

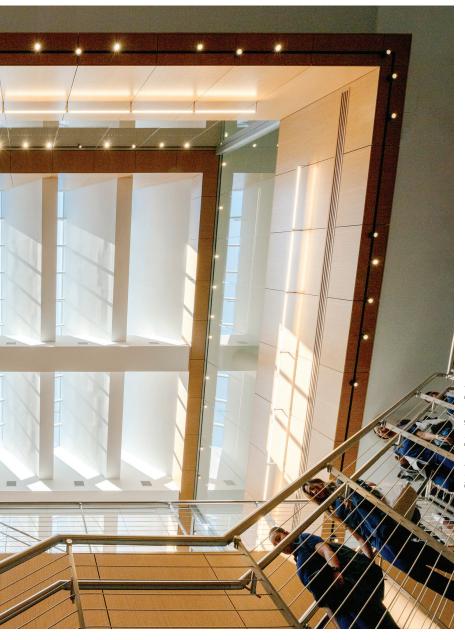
"The project implemented 100% LED luminaires, and an Acuity nLight control system that ties back to the building management system," St. Laurent added. "The contribution of the daylight from the sawtooth skylight is projected to save 22% of the electric load alone. As an all-electric building, keeping lighting power density lower than the already strict NYC ECC 2020 code was important for the overall building's success."

The threestory atrium emphasizes architectural surfaces, with sawtooth skylights providing abundant daylight to the heart of the building.

Melding Modernity and History

The stone façades of St. John Hall and St. Augustine Hall, which were built in the mid-1950s to mid-1960s, are some of the most prominent features on the St. John's campus. The more traditional and stately stone stands in stark contrast to the neighboring modern and dynamic Health Sciences Center. As both the project's architect and lighting designer, CannonDesign integrated the building into the existing historical and recreational heart of the campus while also positioning it as a unique focal point.

Due to its expansive exterior windows, the Health Sciences Center glows from within. As a result, CannonDesign employed corner lanterns to





create a striking visual impact by contrasting interior and exterior elements. Multiple holiday scenes were programmed into the lighting control system, allowing for dynamic displays, while each frame can also be individually adjusted for unique, one-time scenes. Visible from various points across campus, the lanterns serve as a beacon, emphasizing the structure's significance and innovation.

"The building's location was both strategic and challenging," St. Laurent said. "The northern façade faces the Great Lawn, and a more historical architectural style, [so] the lighting design is simpler here, with its illumination reliant primarily on light poles. The south façade is more bold, with planes of the façade washed in light, lit handrails,

Top: Magnetic track heads wrap all three atrium levels ensuring consistent illumination while providing easy maintenance and adjustability without lifts.

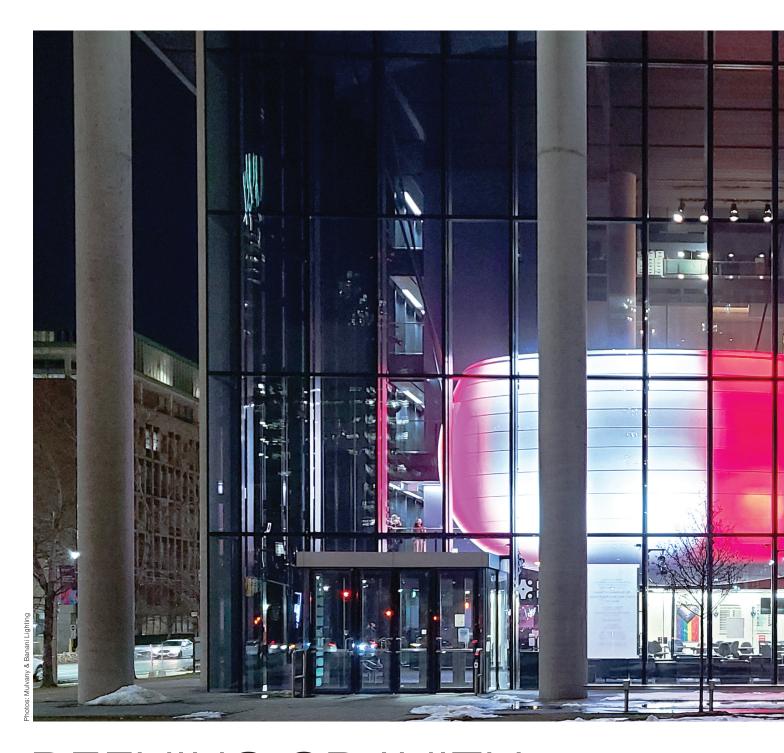
Right: Patient room simulation spaces supply students with realistic lighting and equipment. step lights and other details. And then the two lanterns, which are at the east and west ends of the building, are beacons that can be seen from almost all vantage points. These lanterns have individually addressable RGBW blades of light, [and] the client has the ability to change the lighting effects depending on the day to create engaging scenes that will engage all on the campus—not just the students who use the building regularly." \odot

THE DESIGNER | Kate St. Laurent, LC, IALD, is Lighting Studio lead at CannonDesign.

John Connley is a project designer, formerly at CannonDesign.

Barrett Newell, LC, IALD, is a project designer at Cannon Design.

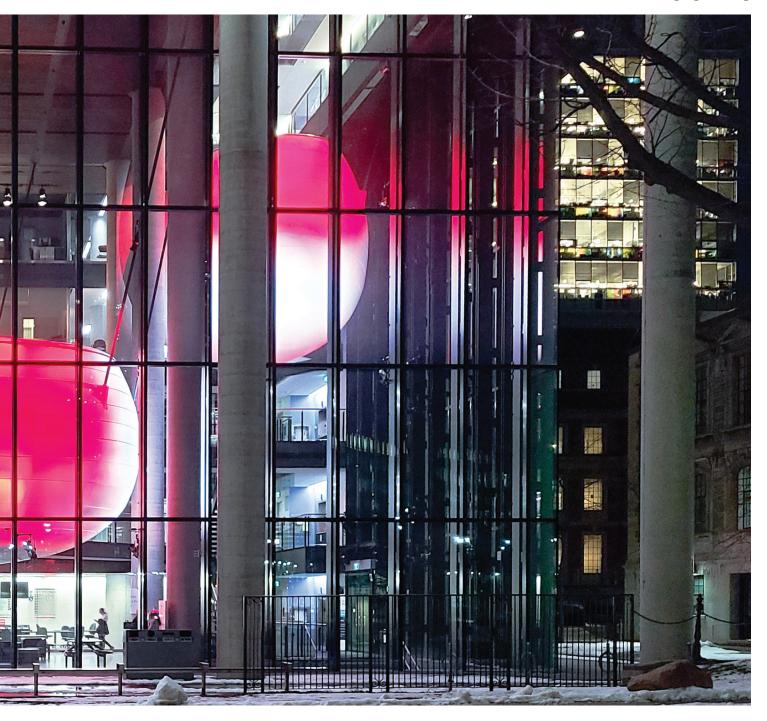
Peijun Shi is a junior designer, formerly at CannonDesign.



DEFYING GRAVITY

Retrofit LEDs highlight "levitating" classrooms at the Leslie Dan Faculty of Pharmacy

By Michele Zimmerman



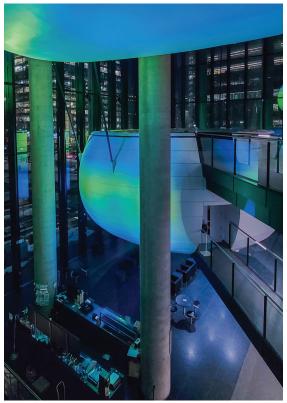
therworldly pod classrooms inside the atrium of the Leslie Dan Faculty of Pharmacy at the University of Toronto in Canada bring a whole new meaning to visual learning. Two orb-shaped classrooms seemingly hover above the atrium, producing a "mystical aura" that can be seen both from within and through its transparent base. However, the pods' luminance began to wane over time, and design firm Mulvey & Banani Lighting was commissioned to rejuvenate the lighting system.

A programmable system with an array of color schemes was integrated into the lighting surrounding the classrooms.

The renovation project, completed in 2022, brought a one-time symbol of futuristic architecture and state-of-the-art lighting back to its original radiance. Hired in 2021 to conduct a feasibility study, Mulvey & Banani Lighting was then tasked with providing long-term, low-maintenance retrofit solutions that would enhance energy efficiency.

The lighting design's most innovative feature is its dynamic illumination of the two orb classrooms: the larger ovoid room is approximately 44 ft by 37 ft by 20 ft while the smaller is approximately 36 ft





Top: Fixtures have been positioned to ensure optimal coverage on the orbs, with heights ranging from 10 to 40 ft above finished floor.

Left: The lighting design strategy employed LED color-changing fixtures at new positions to create blending effects not previously possible.

by 25 ft by 20 ft. The unique learning spaces are accessible to students and faculty via a catwalk. By implementing sophisticated DMX-programmable fixtures, the levitating orbs were transformed from static, single-color elements into a canvas of creative expression. Now, instead of being limited to one uniform color, the university can craft intricate light patterns, layering colors and creating nuanced visual experiences that can shift seamlessly to match different events, moods, or themes.

"One of the key challenges of this project was balancing the preservation of the atrium's original architectural design with the integration of modern lighting technology," said Joseph Patrick, lighting designer with Mulvey & Banani Lighting and lead designer on the project. "The existing system had aged significantly, which resulted in diminished brightness and outdated controls that were no longer capable of delivering the dynamic visual impact the space originally had. The floating classroom pods...required a carefully designed lighting approach to restore their ethereal presence while introducing new capabilities...Achieving uniform





illumination on the curved surfaces of the orbs with new LED fixtures required strategic repositioning, as well as precise coordination to avoid unwanted shadows or glare."

To address these hurdles—while enhancing illumination and focusing on the relationship between the classrooms and surrounding walls—all fixtures are positioned on vertical, schedule 40 pipes that run along the glass atrium mullions. All luminaires are ellipsoidals, with framing shutters that use either a 90- or 36-deg barrel. Each fixture has a 36-in. side arm and is either top hung or bottom hung on the side arm depending on the fixture's aim or focus on the pods. To ensure the continued ease-of-use for university staff, a lift is employed to reach high fixtures and a ladder is used to access fixtures located at low positions.

The new fixtures combined with the DMX control allow for a series of fresh capabilities to celebrate a multitude of events and themes including special occasions, holidays, seasonal themes, city-wide celebrations, and formal academic events. Just a few of the customizable scenes include one red

The Leslie Dan Faculty of Pharmacy's transformative lighting retrofit reinvigorated its pod classrooms. and one white pod to celebrate Canada Day, allorange for National Day for Truth and Reconciliation, and the various colors of the Pride flag.

On a nightly basis, the floating pods glow a soft white and transition through ambient scenes, allowing the building to remain visible to passersby while maintaining energy efficiency. Patrick added, "The DMX protocol facilitates precise adjustments in color, intensity, and transitions." Though these scene changes are programed, the flexibility of the system allows for manual overrides by university facility workers when necessary—once again increasing the new lighting scheme's longevity, ensuring it remains an eye-catching and ethereal component within the True Blue campus.

Output

Description:

THE DESIGNER | Joseph Patrick, BFA, LC, Member IES, is a lighting designer with Mulvey & Banani Lighting.

Alan McIntosh, BA, CLD, Member IES, IALD, is vice president at Mulvey & Banani Lighting.

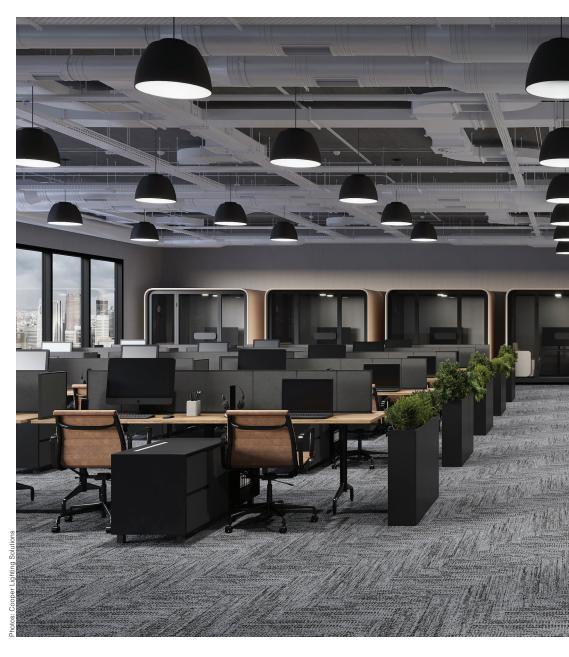
he world of lighting design is undergoing a transformative shift thanks to the advent of 3-D printing technology (also known as additive manufacturing). This innovative technique is empowering designers to overcome traditional manufacturing limitations.

The words "3-D printing" may evoke different thoughts depending on personal experience, but the leaders in 3-D-printed luminaire manufacturing are invested in advancing the techniques from laboratory scale to industrial production. The advantages associated with 3-D printing overcome many common customer issues, including inflexible customization options, difficulty meeting sustainability goals, inconsistent product quality, long lead times, and unreliable delivery. While traditional manufacturing technology typically addresses at least one or two of these problems, the true value of 3-D-printed luminaires is their ability to offer customers a combination of all these benefits.

Performance is likely the highest priority for any commercial-grade architectural luminaire.

3-D-printed luminaires deliver a high-performance portfolio with specification-grade light engines, superior color rendering, high efficacy, ranges of lumens, low maintenance, and long life. Additionally, they can be personalized with an assortment of in-stock and on-demand colors, textures, and shapes for virtually unlimited design possibilities.

Perhaps most impressive is the speed with which 3-D printing can fulfill an order, end-toend. The process of designing, customizing, manufacturing, and delivering 3-D-printed lighting can take just a fraction of the



A NEW ERA OF DESIGN FLEXIBILITY

How 3-D-printed lighting overcomes traditional limitations

By Rajat Bhayana



time required for traditional manufacturing processes. For example, Cooper Lighting Solutions was awarded a project for AutoStore, the world leader in robotic lighting, after a traditional manufacturer could not meet the client's tight deadline for customized lighting. By utilizing 3-D printing capabilities, AutoStore's concept was transformed into reality within just 10 days.

A Sustainable Option

Sustainability is a growing concern in the lighting industry, and 3-D printing offers opportunities to reduce waste, energy consumption, and a manufacturer's carbon footprint. The additive manufacturing process inherently reduces material waste compared to traditional subtractive manufacturing methods, and 3-D printing makes it possible to manufacture only the

High color rendering allows 3-D printing to deliver functionality and aesthetics.

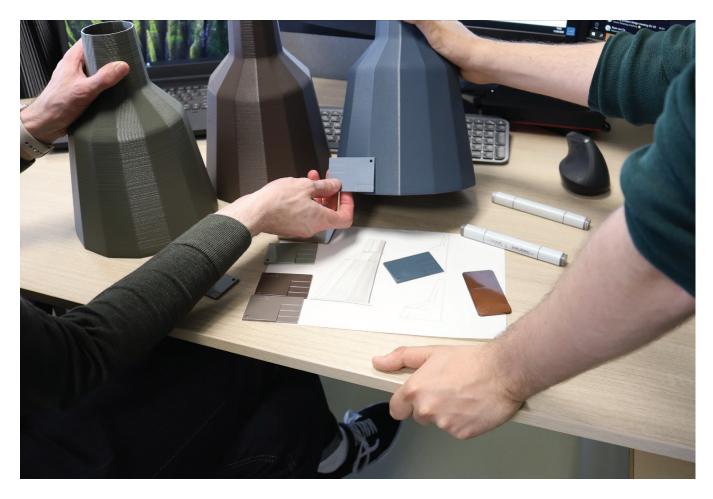
necessary components for each project, minimizing inventory waste and the need to warehouse luminaires for future use. Each 3-D project's information is stored digitally, so if more of a particular luminaire is needed, manufacturing them using 3-D printing is much faster and easier than traditional methods. Lighting manufacturers that have access to multiple 3-D print hubs located throughout North America can also enable localized manufacturing, resulting in a significant reduction in transportation emissions.

Additionally, additive manufacturing can create lightweight and energy-efficient luminaires. The recycled or mass-balanced, bio-circular plastics often used as filament enable durable, lightweight luminaires that can be easily installed.

Real-World Applications

But how does the technology measure up in combining functionality and aesthetics for wide-ranging applications? In high-end retail environments, 3-D-printed luminaires can create immersive and visually stunning retail experiences. Imagine captivating "Winter Wonderland" displays replicating the illusion of ice and snow using translucent materials that allow for a dynamic interplay of light and movement. These types of fixtures can also reinforce a brand's identity and create unique shopping environments using colors, textures, and shapes.

Custom 3-D-printed pendants in metallic golds and silvers can elevate the ambiance of hospitality spaces, adding a touch of elegance and warmth to areas such as hotel lobbies, restaurants, and



waiting areas. Interactive installations can be employed that create dynamic lighting experiences that respond to the environment or user input can be augmented with 3-D-printed lighting.

In general, the technology can create intricate luminaires that enhance façades, atriums, and other public spaces. Unique focal points can be created, where custom, 3-D-printed chandeliers, wall sconces, and table lamps exude luxury and sophistication.

Opportunities for Improvement

As with most new technologies, there's room for improvement, starting with the materials used to create 3-D-printed luminaires. While popular materials like resin and nylon allow for creative designs,

Top: An assortment of colors, textures, and shapes provide virtually unlimited design possibilities.

Right: The endto-end additive manufacturing process can take a fraction of the time required for traditional manufacturing.



they don't always hold up well over time—especially when they are exposed to heat. To avoid this pitfall, look for 3-D-printed luminaires that are made of stronger, more-heat-resistant materials such as massbalanced, bio-circular plastics.

Another challenge for some companies offering 3-D-printed lighting involves large-scale production. If an



additive manufacturer doesn't have access to multiple print hubs nationally or globally, chances are that printing in bulk with such a company would take more time compared to traditional methods. If time is of the essence, designers should consider working with lighting manufacturers that have the tools, resources, and capabilities to print luminaires quickly and efficiently.

To ensure the successful implementation of current 3-D-printed lighting solutions,

designers should consider the following best practices:

- Prioritize sustainability by choosing environmentally friendly materials and energyefficient lighting sources.
 Look for the Declare label for an extra measure of assurance about the health and environmental impact of a 3-D-printed product.
- Use the customization benefits of additive manufacturing to design luminaires that are easy to install and maintain.
- 3. Ask for samples from your

3-D printing can combine functionality with aesthetics for many applications, including retail, hospitality, and residential.

- additive manufacturer. Conduct rigorous testing to ensure the durability and performance of 3-D-printed components.
- Embrace innovation. Learn about the latest advancements in 3-D printing technology.

Into the Future

From personalized home lighting to large-scale architectural installations, the potential applications for 3-D-printed lighting are limitless. The growth of additive manufacturing of lighting in the U.S. has been gradual and is expected to accelerate its upward trajectory as knowledge of its capabilities becomes more widespread.

The future holds promise for the development of new materials with enhanced properties. Technological advancements will likely lead to increased production speed and reduced costs. Additive manufacturing will continue to focus on enhanced sustainability with more eco-friendly materials and processes.

Output

Description:

THE AUTHOR | Rajat Bhayana, product manager at Cooper Lighting Solutions, has more than 13 years of industry experience, including over 8 years in lighting product development. He specializes in guiding products from concept to completion and is passionate about driving innovation in the lighting industry.



EYES ON THE BALL

The evolution of sports lighting

ention the topic of sports facilities and you are likely to hear a discourse on what amounts to evolution or, more specifically, the challenges of the industry and the way manufacturers have created products—and builders have developed methods—to ameliorate those issues. Examples include noise-reduction products and systems in pickleball, which came in response to complaints from neighbors living near facilities, as well as the recycling of synthetic turf.

Lighting is no exception to this developmental arc. According to the American Sports Builders Association (ASBA), the organization for sports facility design, construction, and supply, a few key trends have been identified as drivers in the industry. Sport-specific methods and products continue to increase athlete function and spectator enjoyment—although some of the most significant recent

By Mary Helen Sprecher advancements have been in the containment of light and the reduction of spill, glare, and overhead glow, all of which are chief causes of complaints from neighbors of athletic facilities.

"Shorter mounting heights for fixtures can have less impact on neighbors and keep the price down for materials and foundations while still meeting the lighting requirements," noted Bill Hein, founder and partner of NLS Lighting. Awareness is also growing, said Hein, "that light skims off the surface of a court or a field. As a result, windscreens are a necessity." Unfortunately, he added that many facility managers, upon hearing complaints from neighbors about light trespass or sky glow, will measure the readings only for horizontal footcandles within the playing area and not perform a study of light outside that territory. There is, say lighting manufacturers, more to sports lighting than what a light meter shows.

Even when field or court owners purchase more energy-efficient and easily aimable LED systems, the use of poles that are too tall can counteract the positive impact the new systems are intended to bring; in numerous cases, this is because the old poles, which formerly held high-intensity discharge lamps, are reused to save money.

Sports facility contractors and lighting manufacturers are increasingly concerned over the impact of lighting on local wildlife, wetlands, and tidal areas, leading to the need for studies that show both what stands to be affected and how to lessen the impact of illumination, such as through dimmable lighting. Lighting systems that can be controlled offsite via a mobile app, and those with motion detectors, are gaining in popularity, particularly when security is a concern.

Areas where dark-sky tourism is a selling point require communication with community representatives, conservation groups, and others so that an acceptable lighting plan can be developed. "For outdoor sports lighting, environmentally friendly lighting is a trend generally being influenced by cities, towns, and municipalities that have adopted more-responsible lighting practices," said Bruce Frasure, founder, owner, and president of Frasure Sports Reps. "In many cases, they are implementing these practices into their local zoning ordinances. The intent is to minimize glare, reduce light trespass, and limit lighting that pollutes the night sky."

Frasure added that those ordinances are being backed up by organizations with solid expertise

in environmental impact. "Organizations such as DarkSky and Design Lights Consortium offer testing programs that allow lighting manufacturers to certify their products as being environmentally friendly. Various court-based sport projects are in or near residential areas, HOAs, and resorts where minimizing the impact of the lighting system is critical. Advancements in the optical capabilities of LED fixtures allow for the added control."

LEDing the Way

One safety trend that has emerged has been the padding of light poles to keep athletes safe. Additionally, new technology, including LED systems that cover more playing area, as well as the use of netting in place of fencing, have led to a need for fewer poles and fixtures, saving money for facility owners on materials, installation, and foundation costs.

"One of the leading trends in sports lighting for outdoor facilities is the implementation of linear fence-mounted LED lighting systems," noted Nick Schultz, channel sales manager of 10-S Supply and Tweener Lighting Systems. The technology provides the ability to leverage cost savings and often allows facility owners to bypass structural permitting requirements.

For indoor sports facilities, LED systems are now prevalent in new construction and renovation and are the preferred approach; however, other systems are still used. Lighting can be direct, indirect, or a combination of both. Direct lighting produces better modeling (or 3-D definition) but has greater potential to create glare; particular attention must be paid to the location and shielding of direct lighting fixtures so that players are not blinded by light during a game. There is growing awareness of the importance of this in sports where players must follow the overhead trajectory of the ball, such as in volleyball and tennis. (Another drawback of direct-only lighting systems is that the low illumination of a ceiling surface can create a darker atmosphere.)

Indirect lighting, or uplighting, involving the installation of fixtures aimed at a highly reflective ceiling, provides the least amount of glare and produces very uniform illumination. However, the shadowless illumination produced by an indirect lighting system provides very little modeling, which can make it difficult for the player to detect spin and/or the direction of travel of the ball or to separate the ball from its background.

The best combination of performance characteristics is supplied via a direct/indirect system;

as a result, this trend is being seen increasingly in everything from fieldhouses to indoor tennis centers. At least 30% of the total light distribution should be provided as the indirect component; 40% is preferred. The indirect component of the lighting system makes the facility appear spacious and open by adding luminance to the ceiling and upper walls and enhances the uniform distribution of light. The direct component improves modeling.

Contractors are moving away from placing ceiling-mounted luminaires directly over playing areas in indoor facilities. For example, in facilities with multiple basketball, tennis, or volleyball courts, this means placing lighting between the courts and

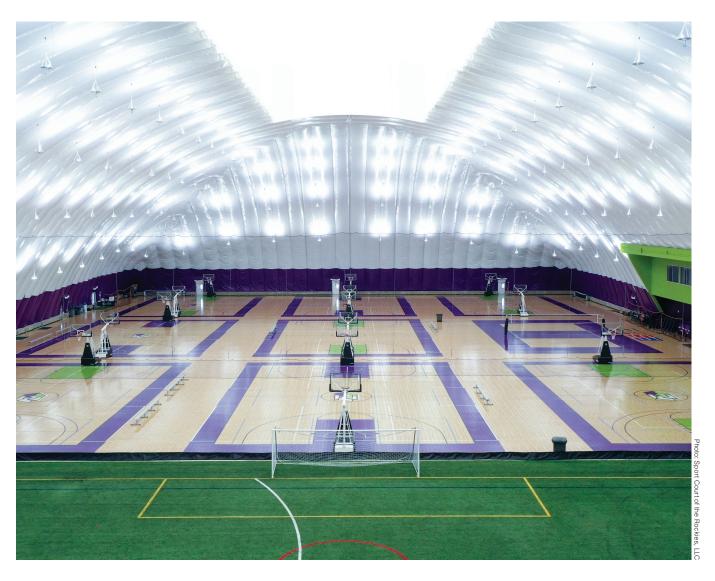


The Courts at Gibson Park, a pickleball complex in Roseville, CA, features eight 580-W fixtures per court with an average of 45 fc. away from the corners to maintain proper uniformity of the primary playing area.

There is also a growing understanding that luminaires must be built to withstand damage from balls that fly too high. With sports such as racquetball, squash, padel, and tennis, facility owners and managers should utilize luminaires that are constructed so that balls do not lodge in or on top of them. An additional development is the need for non-breakable or impact-resistant lenses.

Lighting levels for sports are generally dictated by the governing body for each sport; the required amount of lighting may also vary depending upon the competitive level of the sport being played. For example, a professional volleyball game requires a higher lighting level than a high school game. ANSI/IES RP-6-22, *Lighting Sports and Recreational Areas*, provides full information on recommended lighting levels for all sports.

Other considerations include the need for additional lighting if events will be televised and/or livestreamed. In these cases, higher levels of



lighting affect not only the visibility of the players and the overall view of the playing field but also the overall quality of the broadcast. Higher levels of lighting allow cameras to capture clear, sharp images without shadows or glare, which can detract from the viewing experience.

Overcoming Adversity

An unfortunate trend noted by many lighting manufacturers is the propensity of facility owners to purchase lighting inexpensively from pop-up ads online—only to discover the equipment does not include domestic customer support, something that can be invaluable if things go wrong. "Consumers are generally looking for technical expertise," said Frasure.

However, it's not the only challenge facing the sports lighting industry, according to Lucy Lee, CEO and vice president of Sales for Shinetoo Lighting USA LLC. Lee cited "improper fixtures,

For the Future Legends Complex in Windsor, CO, designers developed LED lighting specifically for the air structure industry. lighting footcandle levels and a lack of uniformity regulation, no glare control, and fixtures that are not compatible with smart controls."

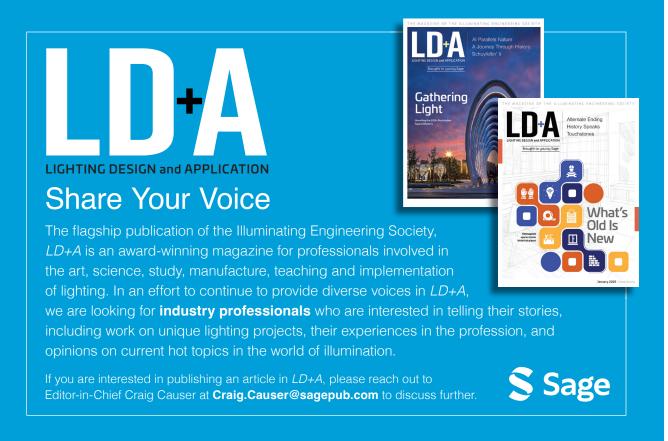
The sports lighting industry will continue to evolve. High-visibility events like the 2026 World Cup in Canada, Mexico, and the U.S. as well as the 2028 Olympics in Los Angeles will drive public awareness of modern sports facilities and the amenities—including lighting—that make them great.

Output

Description:

THE AUTHOR | Mary Helen Sprecher has been a technical writer for more than 35 years with the American Sports Builders Association, the national association of designers, builders, and suppliers of materials for athletic facilities. She is also the managing editor of *Sports Destination Management*.





PROJECT IN PICTURES

Cool Enough for School

Agnew K-12 Campus in Santa Clara, CA, as well as cross-grade mentorship and social development. While bright tones like yellow signify **LPA**, **Inc.** selected high-CRI fixtures to provide the shapes of which progress with the students' space, while linear and more complex geometric



Ceiling-mounted round luminaires enhance the bright yellow colorpop and architectural "floating" ceil-





Recessed chevrons enhance a social gathering



A cozy seating niche exemplifies the **multi- layered, flexible lighting scheme**, including individually controllable fixtures, glare-free pendants, adjustable wallwashers, and recessed linear luminaires.

 \ll

Playful curved fixtures decorate the hall that **bridges the elementary school to the middle school**, signaling a transition in age and academics.

IES INSIDER

IESNYC Announces 2024 Richard Kelly Grant Recipients

Katie Czub (pictured left) and Anushka Jain (pictured right) have been presented with the 2024 Richard Kelly Grant, which honors the legacy





of pioneering architectural lighting designer Richard Kelly. The Richard Kelly Grant is a program designed to encourage young people who are passionate about light and demonstrate an innovative approach to light as art and/or science. Administered by the IES New York City Section, it is open to individuals 35 and under who are studying or working in the art and/or science of illumination in the U.S., Canada, or Mexico.

Czub, senior associate at Fisher Marantz Stone, began her architectural lighting design journey with the discovery of the iconic Glass House, igniting her mission to transform the architectural landscape through the nuanced interplay of light and shadow. Holding a Bachelor of Architecture and a Master of Science in Architectural Sciences with a Concentration in Lighting from Rensselaer, her technical expertise and attention to detail have significantly enriched the built environment, introducing innovative lighting solutions that elevate and define spaces.

Jain, a lighting designer at LOOP Lighting's New York office, is recognized for her research into the use of colored lighting in art galleries to enhance the perceived vibrancy of artworks. Her lighting model proposes immersive viewing environments that expand art beyond the canvas, incorporating color theory, the physiological effects of visible light, and simultaneous contrast to challenge traditional gallery lighting design. She graduated with honors from Parsons School of Design's M.F.A. in Lighting Design program.

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MEMBER MENTIONS



Ashley Mikels
has been
promoted
to senior
associate with
IA Interior

Architects.



Bob Workman has been promoted to general manger, specification, at

Convergence.



Nino De La Rosa has been promoted to principal at **CAL Lighting**.



Emily Lai has been appointed commercial Midwest regional sales manager with

ETC.



Grace Wirtz has been appointed national ESCO sales leader with **Lutron**

Electronics.

Bold = Individual or Sustaining Member



THE LIGHTING CONFERENCE

Anaheim Marriott | Anaheim, CA | August 21-23, 2025

Join us August 21-23, 2025 in sunny Anaheim, CA for IES' annual conference, IES25: The Lighting Conference, the preeminent conference for all things lighting, from research to design to technology and more—a true state of the industry event.

Our three day event includes a day of hands-on workshops, two days of educational sessions and technical papers & presentations, exhibits by leading manufacturers, Emerging Professionals Day, the Leadership Forum, and the industry benchmarking Illumination Awards Gala.

Visit **ies.org/ac** for more information. Registration opens March 2025!





- 1. Moderns Forms introduces the Pisces smart ceiling fan with an integrated, dimmable CCT LED module. Compatible with the Modern Forms app, which allows for integration with voice control devices, the three-blade fixture is available in matte black or matte white finishes and is ideal for residential projects. www.modernforms.com
- **2. Juno Trac** announces TSLOT1 and TCSS Series Linear Ambient Trac Fixtures for combining accent lighting and ambient lighting into one system. The TSLOT1 (pictured) for architectural applications is 1.5 in. wide and approximately 2.3 in. tall and provides up to 1,000 lumens

per ft at 115 lumens per watt; it offers five color temperatures with 90 CRI minimum and various beam distributions such as asymmetric, batwing, and others. The TCSS Series for commercial applications has a 2-in. by 2-in. profile, delivers 1,000 lumens per ft, and offers dimmability as well as three color temperatures. www.junolighting.com

3. Luxxbox introduces Stalik with sound absorption for open floorplan workplace applications and hospitality environments. Available in three sizes (300, 600, and 900 millimeters) and 77 wool colors, the cylindrical fixtures can be clustered together in various heights to form eye-catching

centerpieces. For areas in need of sound control but no illumination, unlit Stalik Baffles are also available. www.luxxbox.com

4. Acclaim Lighting unveils Flex
Graze HO SC for low-profile linear
wall washing and grazing. The flexible
strip with a horizontal bend of 31.5
in. and a vertical bend of 15.7 in. is
IP67-rated for wet locations and can
be temporarily submerged for up to 1
hour. Made with flame-, solvent-, and
UV-resistant silicone bodies, strips are
available in five color temperatures
ranging from 2700K to 5700K and
deliver up to 733 lumens per ft, while
consuming 7.3 watts.
www.acclaimlighting.com



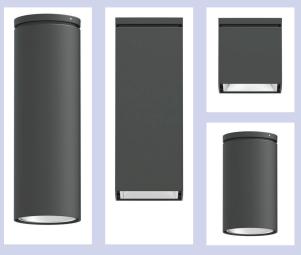
5.

5. Gaspare Asaro debuts the Cloud Collection featuring Tuscany, Italy-sourced Alabaster. The collection includes three fixtures: the Cloud N1, a ceiling light that can be a semi-flush mount or pendant fixture with a brass band; Cloud N.4, a sculptural luminaire with overlapping diffusers that provides uplighting; and the Cloud N.5 (pictured) with intersecting semi-circles. All styles provide soft illumination through which natural veining in the Alabaster can be seen. www.gaspareasaro.com

6. Cooper Lighting Solutions unveils HALO ML Flex, a series of canless LED downlights and wall washers that mount directly to the ceiling without the need for housing. With interchangeable and precision-engineered round or square trims, larger and smaller fixtures share light engines, allowing for easy changes to shape and size as well as switching from downlight to wall-wash effects. www.cooperlighting.com

SPOTLIGHT Gotham Lighting





Gotham Lighting introduces the IVO Deep Regressed Downlights and Cylinder to the IVO family of products. Downlights feature lumen packages ranging from 500 to 8,000, a 45-deg cutoff light source with either 4- or 8-in. aperture sizes, as well as a tool-free plug-in module and driver unit. Cylinders with field-cuttable cords are available in 20 colors and nine trim finishes and offer 4- or 6-in. apertures, each with three height options, in addition to the same lumen packages as the downlights.

http://www.gothamlighting.acuitybrands.com

PRODUCTS

7. Cyclone Lighting introduces a contemporary bracket and base cover for outdoor poles. The minimalist, modular bracket is a curved decorative element that is made of aluminum and can be used to create more than seven mounting arm styles to suit a project's aesthetic. The curved base cover, also made of aluminum, compliments the mounted bracket for a seamless appearance. www.cyclonelighting.com

8. Resident unveils the Bloom collection designed by Tim Rundle. Ideal for commercial and residential projects, the collection takes inspiration from paper lanterns, with each luminaire featuring a perforated mesh core encased within a frosted glass shade. Bloom provides soft illumination with an "out-of-focus dappled effect" and is offered as a pendant in two sizes as well as a floor light and table light (pictured). https://resident.co.nz

9. LightArt debuts Acoustic Dial. Declare-label compliant and designed with LEED, WELL, and LBC projects in mind, luminaires are available in 30 colors and made with Red List Free Sola Felt. Dial is offered in three sizes and two styles: Closed—a drum pendant with acoustic fins, or Open—a pendant with a "zero-like" silhouette (pictured). Fin options include angled, curved, and straight shapes. https://lightart.com



7.



8.



9.



The following companies have elected to support the Society as Sustaining Members, which allows the IES to fund programs that benefit all segments of membership and pursue new endeavors, including education projects, lighting research, and recommended practices.*

CHAMPION









AMBASSADOR

Current

BENEFACTOR

HLB Lighting Design
LUMA Lighting Design/

PAE Engineers

Lutron Electronics

Musco Lighting

P2S, Inc.

Rosendin Electric, Inc.

SOSEN USA, Inc.

USAI, LLC

SUPPORTER

Affiniti Studios

A.L.P.

BK Lighting

Cannon Design

Cree Lighting

DLR Group

ETC, Inc. Evluma

GE Lighting, a Savant Company

Нарсо

H.E. Williams, Inc. HP Engineering

IMEG Corp

Integrated Design Solutions

Kenall Mfg. Co.
Kurtzon Lighting
L Design Studio, LLC
Landscape Forms

Legrand

Leotek Electronics, LLC Lighting Services, Inc.

LMPG

LSI Industries, Inc.

LumenWerx, Inc.

Ministère des Transports du

Québec

RAB Lighting, Inc.
Radiant Vision Systems
Reveal Design Group

Satco Products, Inc Spitzer Lighting Targetti USA, Inc.

Tresco Lighting
Visa Lighting

WSP USA, Inc.
Zumtobel Lighting

*Contributor Sustaining Members are listed at www.ies.org.

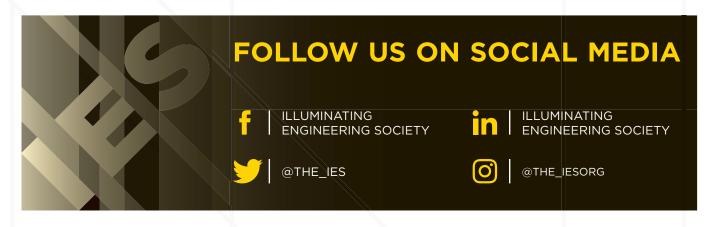
THE IES WELCOMES THESE NEW SUSTAINING AND UNIVERSITY MEMBERS

ALUZ

Sazan Group

Whether you are a manufacturer, utility company, distributor, sales agency, engineering firm, architectural firm, or any other professional or technical business that engages with lighting, each organization can pick and choose levels of benefits and discounts for their company employees directly—and in certain cases, non-employees' partners, as well—furthering the reach to a larger group of professionals. The complete new Sustaining Membership structure (including the tax deduction levels) is listed at: www.ies.org/membership/ies-sustaining-membership.

Education institutions that have dedicated lighting programs as well as those higher learning institutions that focus on "lighting" in their curriculums qualify for the University Membership. For more information on program benefits go to: www.ies.org/membership/ies-university-membership.



Q+A

(continued from p. 14)

of the job and the ability to work on cutting-edge lighting controls technology makes it one of the most dynamic and rewarding fields. Plus, seeing the final product come to life—knowing we helped make that happen—is always a great feeling.

Where do you see Control Force in 10 years? Do you have a dream project?

In 10 years, I see the company as a leader in the lighting controls industry, known for tackling complex projects and delivering seamless, high-quality solutions. I envision us working on globally recognized projects. A dream project would be something that pushes the boundaries of what's possible with lighting control; something

like Sphere in Las Vegas would be super cool!

Ultimately, I want Control Force to be known as the company that was always there when our clients needed us most-the team that tackled the tough challenges others avoided. I want us to be synonymous with reliability, the first name people think of when they need a solution fast. At the same time, I want to grow a team of the best talent in the industry, where everyone is just as passionate about delivering exceptional service. If, in 10 years, we're still solving problems, showing up when it matters most, and feeling just as excited about every project as we are today, then I'd say we're exactly where we should be.



Head of Field Services Nick Signorelli performing service maintenance on a job site.

Progressions

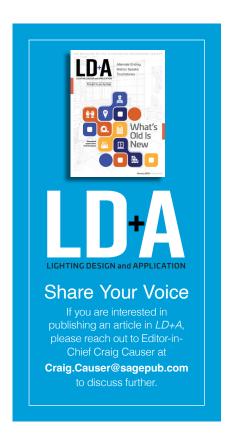
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Approximately 75% of all existing data was created in the last 20 years. We need to have the will to seek relevant information. Filtering extraneous information takes a conscious effort, and our new tools can help us, but we need to learn how to use them. Computers are learning to speak human language in a helpful and conversational manner, but I read recently that their maturity level in this regard is that of a 5-yearold dog. If we make the effort to speak computer, in terms of how to ask our questions in the form of prompts, we can filter out the noise and irrelevant content. Once again, we need to make a conscious effort and use our willpower to learn this skill now to fully enable these tools to assist

us. We are in uncharted territory with no historical precedent for the changes occurring in terms of technology and information accessibility.

Anything strong enough to help us is strong enough to hurt us. The key to avoiding the latter is knowledge and the understanding that comes from it. How we learn and much of what we need to learn is changing rapidly. If we have the will to embrace the inevitable changes then we differentiate ourselves with the potential for increased growth both personally and in our careers.

Mark Lien, LC, LEED AP, is industry relations consultant for the IES.





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LAST LOOK

Glazed Glass

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