



Lighting Design Lab's Future Looks Bright

The Lighting Design Lab (LDL) is pleased to announce that it has secured funding from the Northwest Energy Efficiency Alliance (a key funder since 1998) to continue offering technical consultations and training in the new and existing buildings market throughout the Pacific Northwest in 2006. In addition, the LDL, under contract to

NEEA, will provide electric lighting support to the newly created Integrated Energy Design Lab (IDL).

Two key staffing changes have resulted from the Alliance funding. First, Eric Strandberg, an LDL electric lighting consultant will provide the support to the IDL. Second, Edward Bartholomew has been hired as an LDL electric lighting consultant. Both Edward and Michael Lane will continue to offer training and consultation to the Pacific Northwest with a strong emphasis on the Puget Sound.

Congratulations to Eric and Welcome Aboard to Edward!

As in the past, Seattle City Light will continue to operate the Lab and provide funding. This financial support enables the LDL to continue offering its high quality technical assistance, consultations, training and library services as well as provide state-of-the-art lighting demonstrations and mock-up services. In addition to City Light, the Lab is also financially supported by BC Hydro, the State of Alaska and Tacoma Power.

Still, the LDL is looking to expand its financial supporter base to help offset a reduction in funding from the Alliance beginning in 2007 and help support a wider range of services. In early 2006, the Lighting Design Lab will begin a fundraising campaign to secure additional sponsors. We hope to broaden our list of sponsors to maintain the state-of-the-art technology demonstration center, mock-up services and technical assistance and to be able to provide services beyond the Puget Sound area after 2006.

If you are interested in sponsoring the Lab, contact Diana Grant, Project Manager, at 206-325-9711x24.

Edward Bartholomew

joins the Lighting Design Lab after working as a lighting designer at the Seattle design firm Studio Lux. He brings over ten years of architectural lighting design experience including retail, hospitality, residential, office, and civic projects. Edward is also a lecturer of Electric Lighting Design at the UW School of Architecture. He is excited at the opportunity to cultivate quality lighting within the Northwest design community. Edward has a Master of Fine Arts degree in Lighting Design from Parsons School of Design in New York City.



Above: Edward Bartholomew IALD MIES is the most recent addition to the LDL Lighting Specialists.

Idl: year of transition.

News

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standards for LEDs.

by Randal Smith



LEDs Magazine Available Online

The state of the art in light emitting diode technology changes faster than the speed of print. What was true at the beginning of a month may have completely changed in the space of a couple of weeks. It can be hard to keep up. Luckily, there is an online resource available for no more than the cost of registration.

LEDs Magazine is located on the Web at www.ledsmagazine.com. Physically located in the United Kingdom, it keeps abreast of developments in LED development in Europe, North America and Asia.

The magazine is published about once a month in PDF format. The registration is short, simple and quick, and it gets you a "key code" that allows you to download the PDF issues. When new issues come out, you receive an email notice. Go to the website and you download the latest issue.

Topics covered in a recent issue included high power LEDs, OLED (organic led) developments, an initiative to bring LED systems to poor villages in India, and developments with residential luminaires.

If you are an LED junkie, do yourself a favor and sign up for Leds Magazine.

When it comes to understanding Solid State Lighting (SSL) could you use a bit of an ASSIST? Then you might want to check out the latest program from the Lighting Research Center called Alliance for Solid-State Illuminations Systems and Technologies (ASSIST) for rock-solid advice on Solid State Lighting. Oh, in case you were wondering, "solid state lighting" is the latest moniker for lighting using light emitting diodes (LED) or organic light emitting diodes (OLED).

The LRC/ASSIST program has a free guide to standards for LEDs and tools for evaluation of SSL products. You can find this guide on the web at <http://www.lrc.rpi.edu/programs/solidstate/assist/pdf/ASSIST-LEDLifeForGeneralLighting.pdf>. Here are some highlights from the guide:

LED Life Definition

LEDs have very long operational life characteristics, 50,000 hours or longer. Like all light sources, the output of LEDs slowly decrease over time. The reported life of an LED component should be defined as the operating time for the component or system to reach the time to reach 70% lumen maintenance, and then to reach 50% lumen maintenance. This will enable the specifier to determine at what point the system should be relamped or replaced.

A common claim by some manufacturers is that LED systems can be counted on to have a rated life of 100,000 hours or more. These claims clearly do not take lumen depreciation into account.

LED Life Measurement

For the purpose of measurement of useful life, the LED component should first be operated continuously for 1,000 hours at the proper rated current and voltage. Then the component should be monitored for an additional 5,000 hours while monitoring temperatures on the component. The 70% and 50% lumen depreciation levels may be reached within this time frame. If not, the data may be extrapolated to estimate when these point may be reached. The chromaticity (color) may shift in this time period, and should be noted.

The performance of both the LEDs and the driver should be monitored and the temperatures, as well. Heat is the great enemy of lighting system performance, and LED systems are no exception. A popular misconception is that LED systems do not produce any heat. This is not true, especially with the newer, high-output LED systems.

The ambient temperature for LED systems can be crucial to system life and performance. The constancy of voltage supplied by the driver

is critical, as well. Too much heat, and inconsistent voltage can prematurely end the life of an LED system. The heat sinks required by some high-output LED systems can be impressively large.

The LRC/ASSIST publication provides sample data collection sheets for three situations: general LED system data collection; low-power LED system data collection; and high-power LED system data collection.

LRC and SSL

The Lighting Research Center is at the forefront of research and application development. The LRC regularly conducts the LED Lighting Institute, providing 3-day, hands-on workshops for lighting specifiers, fixture designers and manufacturers on the rapidly evolving LED lighting technology.

Additionally, the LRC researches LED lighting applications. Among others, they have evaluated LEDs in retail display windows, low-profile LEDs in elevators, innovative LED lighting in senior care facilities, LEDs in refrigerator cases, outdoor lighting signage, using color in display lighting, and using LEDs for aircraft passenger reading lights.

They are currently conducting technology research into improving white LED performance through scattered photo extraction, and using nanocrystal quantum dots. Application research is ongoing with developing electronic walls and ceiling for use with SSL.

The LRC SSL is available online at <http://www.lrc.rpi.edu/programs/solidstate/>

The Lighting Research Center is a partner with the Northwest Energy Efficiency Alliance, currently one of the prime sponsors of the Lighting Design Lab. Other partners of the LRC include lighting manufacturers, the New York State Energy Research and Development Authority (NYSERDA), the United States Department of Energy, the United States Environmental Protection Agency, and Boeing.

Right: the LRC provides free information for downloading on standards and testing of LEDs as part of the ASSIST program.



environmental impact of efficient lighting.

by Diana Grant



Saving lighting energy means more than just a reduction in your building's operating costs. It also means reducing your impact on the planet. Here are some of the ways lighting improvements reduce the load on the environment.

Air pollution reductions: Seattle City Light estimates 1200 pounds of CO² are saved for every megawatt hour of lighting savings. One megawatt hour is 1,000 kilowatt hours.

Above: Ross Lake in the North Cascades. Environmental stewardship is taken seriously by Seattle City Light. Photo courtesy Seattle City Light/City of Seattle.

- Estimated achievable savings regionwide in 20 years in commercial lighting = 3,066,000 megawatt hours. Potential CO² savings is 1,839,000 tons.
- Estimated achievable savings regionwide in 20 years in residential lighting = 4,642,800 megawatt hours. Potential CO² savings is 2,785,680 tons.

"Would it be great if the concept of waste was obsolete 100 years from now?"

— Denise Fong, principal of Candela Lighting Design in LD+A Magazine

Mercury:

It only takes 24 broken fluorescent lamps to pollute the fish in a 20 acre lake. This makes proper lamp disposal and using low-mercury lighting products very important. Average mer-

cury content has been reduced in lamps from 45 milligrams in 1988 to less than 3 milligrams today. EPA regulations make it illegal to improperly dispose of mercury-containing products. Do you recycle your spent fluorescent lamps? If not, check the laws in your community.

Cradle to Cradle:

What is the environmental impact of your lighting choices? Do your manufacturer choices make environmentally responsible choices when manufacturing and shipping? What are the pollution costs of shipping your luminaires, lamps and ballasts—do they come from 250 miles away or 12,000? Fuel and air pollution costs for shipping half a world away can be enormous. T5HO systems use much less material and weigh less, reducing shipping impacts, and the future impact on landfills.

new tech: small ceramic metal halide.

by Randal Smith



Above: small ceramic metal halide lamps offer new ways to think about reflector lamps. Photo courtesy GE Lighting

Traditionally, reflector lamps, specifically PAR lamps have involved a sort of sealed-beam system where the lens, socket, filament and reflector have all been considered disposal. A new generation of small, low-wattage ceramic metal halide calls some of that thinking into question.

Two lamp manufacturers, GE and Philips, have developed small bi-pin CMH lamps that can be changed when needed, but keeping the reflector, lens and all the rest of the lighting system. Besides being more environmentally responsible (see article

above) it has the potential to result in lower costs, too.

GE and Philips offer these in wattages ranging from 20W to 70W sizes. Unfortunately, not all of these pin-based lamps are compatible between manufacturers. (Come on, guys!)

Potentially, having a replacement light source means that reflectors can be more greatly optimized to the light source and more choices in beam spreads and optical performance would result.

winter 2006

events.

Registration on Page 6

did you know?

Members of professional design organizations (AIA, NCQLP/LC, ALA, BOC, and others) may be able to receive continuing education credits for attending events offered by the LDL.

To self-certify your credits (sometimes called learning units) make sure you keep the Certificate of Completion that we distribute at each event.

Learning unit credits are almost always issued at a rate equal to the contact hours. So a 3 hour class would be worth 3 credits.

For information about how your organization works with continuing education credits visit their website at:

AIA

aia.org

ALA

americanlightingassoc.com

ASID

asid.org

BOC

neec.net/boc.htm

BOMA

boma.org

IFMA

ifma.org

IIDA

ida.com

NCQLP

ncqlp.org



BETTERBRICKS

All Registration **must be in advance**. All fees must be **paid in advance**. No registrations or fees will be accepted at the door. On-line registration is available at <http://www.lightingdesignlab.com/classes>

1 • Fixture Selection — Pros and Cons. \$20

Portland:	Wednesday, February 22	10:00 am - 12:00 pm
Seattle:	Wednesday, March 1	10:00 am - 12:00 pm
Boise:	Thursday, March 9	10:00 am - 12:00 pm
Spokane:	Tuesday, March 14	10:00 am - 12:00 pm
Bozeman:	Thursday, April 6	10:00 am - 12:00 pm

Light fixtures are constantly improving, but which one is the right one for your space? The recessed "troffer" has evolved from the lensed fixture to the parabolic fixture to the recessed indirect fixture and now back to an "advanced" lensed fixture. Pendant fixtures have kept pace with the incorporation of T5HO technology and smaller size fixtures. But, which one will be the most cost effective at providing the best quality lighting and the best energy efficiency?



What can we learn from the catalog data, computer simulations, and some of the actual fixtures when we compare these various products? Attendees will learn the impacts of fixture choices regarding; energy consumption, light levels, and lighting quality.
(2 CEU contact hours)

2 • Electric Lighting Controls in Daylit Spaces. \$20.


Portland:	Wednesday, February 22	1:30 pm - 3:30 pm
Seattle:	Wednesday, March 1	1:30 pm - 3:30 pm
Boise:	Thursday, March 9	1:30 pm - 3:30 pm
Spokane:	Tuesday, March 14	1:30 pm - 3:30 pm
Bozeman:	Thursday, April 6	1:30 pm - 3:30 pm

Is it time to control your electric lights in response to daylight (many codes require it already)? How do you specify lighting controls correctly? Is it better to use occupancy sensors or photocell switching/dimming equipment? Which is more cost effective? What are the advantages for each choice?



This class will examine the lessons we can learn from recent research on electric lighting controls in daylit spaces. Attendees will learn the impacts of control choices regarding; energy consumption, light levels, and responsive controls.
(2 CEU contact hours)



 = basic

  = intermediate

   = expert

3 • Improving Indoor Air Quality in Buildings. by Dan Morris. \$20.

Seattle: Tuesday, 2/21 • Noon - 1:30 pm



Dan Morris CIE, President of Healthy Buildings, Inc. presents our quarterly Sustainability presentation, this time on Indoor Air Quality. This class will cover the ecology of buildings, including reasons why newer buildings have more environmental issues than older buildings. The class covers designing, building, operating and maintaining buildings for good indoor air quality and natural ventilation pros and cons. Understand how unintended side effects and disadvantages of products and systems effect IAQ, sustainability and durability. Students will leave with an understanding how VOCs, fine dust, and moisture impact the Air Quality and sustainability of buildings . Dan teaches the IAQ unit in the Sustainability Building Advisor program at SCCC, and for EPA and ALA.

☆ Puget Sound IESNA—IIDA Awards Gala Banquet. Visit www.iespugetsound.org for registration.



Location To Be Announced: Thursday, April 20 • Time To Be Announced
The Puget Sound Section is hosting this annual celebration of the best in lighting design in our area. See www.iespugetsound.org for more information and registration details.

• Lighting Fundamentals Tour - Explore the Lighting Design Lab. no charge by appointment.

In addition to being a work and meeting place, the Lighting Design Lab is designed to be a large walking classroom for teaching the fundamentals of lighting. All the pieces of lighting are on display: light sources; luminaires, controls; and daylighting. Touring the LDL is the perfect way to attend this class and get hands-on exposure to new technology. A Fundamentals Tour lasts about an hour and a half—more if there are lots of questions. If your tour group has a particular interest such as glare, power quality issues, or controls, the tour can be tailored to your interests. A comprehensive tour of the LDL addresses energy effective lighting, integrating daylight and electric light using controls, color characteristics of light, lamps and ballasts, luminaires and more. In addition, the tour provides more details into LDL services.

To schedule a Lighting Fundamentals Tour you may:

- call 800-354-3864 (206-325-9711) ext 29 and set it up with Randy
- email at randy@lightingdesignlab.com or info@lightingdesignlab.com
- fax your request to 206-329-9532

We will need to know what date(s) you would like for the tour, and possible times. It would work best if the tours start no later than 2:00 PM. Please limit your tour group size to 20. Let us know if you have a specific area of interest.

• Project Design Reviews. no charge by appointment.

The lighting specialist is available to provide schematic design review of proposed lighting strategies on your commercial and industrial lighting projects. Please contact the specialist for your territory to directly set up an appointment in your office.

Idl class locations:

Boise:	Integrated Design Lab 108 N 6th St Boise ID	Seattle:	Lighting Design Lab 400 E Pine St Suite 100 Seattle WA
Bozeman:	Montana State University Strand Union Bldg Rm 276 7th & Grant Bozeman MT	Spokane:	WSU Spokane Spokane South Campus Facility 412 E Spokane Falls Blvd. Room to be announced Spokane WA
Portland:	PGE - 2 World Trade Center 121 SW Salmon Flags Room Portland OR		

registration form.

Winter 2006 Classes

PAYMENT POLICY: Fees Must Be Paid In Advance before attending class. Purchase Orders, checks, and credit cards are accepted. Complete and fax this form to 206-329-9532. Class fees are waived for university students and employees of sponsoring electric Utilities. **No Payment or Registration Will Be Accepted At The Door.**

Secure On-line registration is available at <http://www.lightingdesignlab.com/classes>

registration fee paid by. (circle one)

credit card • enclosed check • purchase order • Utility employee fee waiver • university student fee waiver • Oregon Energy Trust Scholarship

registration information.

Name • _____

Company • _____

Profession • _____

I Pay My Electric Bill To • _____

billing information. (must be complete to process card transactions)

Phone • _____

Fax • _____

E-Mail • _____

Address • _____

City, State, Zip • _____

Credit Card Number (VISA & MasterCard ONLY) • Please include your CVV Code - last 3 digits of the number on the back of your card near your signature

Expiration Date • _____

please check the circles of the class(es) and event(s) you wish to attend (on-line registration available).
event locations on page 5.

1 • Fixture Selection - Pros & Cons. \$20

- Portland • Wed 2/22 • 10 - Noon
- Seattle • Wed 3/1 • 10 - Noon
- Boise • Thurs 3/9 • 10 - Noon
- Spokane • Tues 3/14 • 10 - Noon
- Bozeman • Thurs 4/6 • 10 - Noon

2 • Electric Lighting Controls in Daylit Spaces. \$20.

- Portland • Wed 2/22 • 1:30 - 3:30
- Seattle • Wed 3/1 • 1:30 - 3:30
- Boise • Thurs 3/9 • 1:30 - 3:30
- Spokane • Tues 3/14 • 1:30 - 3:30
- Bozeman • Thurs 4/6 • 1:30 - 3:30

3 • Improving Indoor Air Quality. \$20.

- Seattle: Tues 2/21 • Noon - 1:30pm

You can register instantly and securely on-line. Payment is accepted by credit card, check and purchase order.
www.lightingdesignlab.com/classes

light pollution by Randal Smith v. trespass.



Above: A terrific guide to light pollution and trespass is available at no cost from the Lighting Research Center's National Lighting Product Information Program's Lighting Answers website at <http://www.lrc.rpi.edu/programs/nlrp/lightinganswers/lightpollution>

An awareness of the consequences of night lighting is growing among lighting specifiers. Communities are drafting ordinances designed to control skyglow and unwanted light across property lines. The issues are called light pollution and light trespass, and they can be easily confused.

Light pollution is when the illumination from a property, or a community is directed upward into the sky. This has the effect of causing the night sky to literally glow over that area. The sky glow blocks out the view of the night sky for all of us. It makes the work of astronomers nearly impossible. It ruins the atmosphere of small towns and rural areas at night. Many communities feel that the darkness is an important reason why they moved to the small towns in the first place.

Light trespass is when a luminaire of the wrong distribution is used on a property,

and the light is being distributed in improper directions causing other property owners to experience glare on their property.

Dealing with these problems is gaining in importance partially due to several issues. The Leadership in Energy and Environmental Design (LEED) program offers a credit for controlling stray light on a project. Some communities are adopting the Model Lighting Ordinance. A greater environmental awareness is growing in the lighting community, prompted by the International Dark Sky Association and the Illuminating Engineering Society of North America.

The causes of light pollution and light trespass are not always the same things, and neither are the solutions. But using luminaires with optics designed for better cutoff of light distribution can be a good start toward helping solve both problems. A free publication is available from the Lighting Research Center—see caption at left.

ballast bullets.



Ballasts are not sexy. They are, however, crucial to the success of the luminaires and lighting systems that require them. We've written about ballasts in the past, but from the inquiries we get, it seems time to briefly revisit this topic.

Flexibility

- Even though this is changing a bit with new multi-lamp, multi-volt ballasts, most ballasts can only run one (or two) lamp types and wattages, on one voltage. Installing the wrong lamp in a ballast can result in bad lighting, ruin lamps, ruin ballasts and may even be dangerous.

Starting Method (Fluorescent Electronic Ballasts)

- Instant Start: the most common type found because they use 2-3W less than rapid start. But if you have frequently switched (i.e. motions sensors) your lamp life may suffer.
- Rapid Start: not as common, uses more watts, so almost never used in rebate job although you may get longer lamp life.
- Programmed Start: originally designed to guard against end-of-life problems, they also start the lamps correctly. Save more energy than rapid start, and offer potentially dramatically longer lamp life (over 30,000 hours, even with motion sensors. The **only** ballast to use with T5HO systems.

HID

- Until fairly recently electronic ballasts for HID were too expensive to use and did not

offer compelling energy savings for pay-back. But new systems for metal halide can make them competitive from an energy savings standpoint with T5HO in height-ceiling applications. Offers better lumen maintenance and lamp life.

New Generation

- Newer designs for ballasts (and lamps) have moved the energy consumption downward while raising ratings for lamp life upward without impacting lighting performance. These new lamp and ballast combinations mean that specifiers must begin to think about integrated lighting systems instead of just lamps and ballasts in order to get the best lighting performance and greatest energy savings. The new 'high-performance T-8' systems fall into this category.

