Pacific Place Retail Center
Seattle, Washington
IIDA Award of Merit
*photography. Steven Keating*

This retail project used ceramic arc tube metal halide sources extensively, in conjunction with spectacular daylighting.

NBBJ Architects
Shaun Patrick Darragh, LC
Jeffrey I.L. Miller, IALD

## in this issue.



# News

## the fundamental importance of lighting quality.

In recent years there has been a renewed interest in the role of office environments on worker satisfaction, performance and comfort. The past decade marks a shift from thinking of facilities as a way to house the workforce to thinking about the entire building portfolio of a company in strategic terms. Buildings may potentially add value, reduce costs, and improve corporate image. Lighting plays a crucial role in the quality of the built environment, and represents a largely untapped opportunity for executives, owners and facility managers.

This year's keynote speaker at the LDL Open House was Carol Jones LC of the Light Right Consortium, and a member of the IESNA Committee on the Quality of the Visual Environment. She presented the leading edge of our understanding of the impact of lighting quality on our workplaces and buildings:

**• Competitive advantage**

A recent study by BOMA International found that if interior environmental quality is appreciably better, it enhances the ability to rent or sell space.

**• Vertical brightness is critical**

The distribution of light in a space, particularly luminances on room surfaces appears to be a major determinant of room satisfaction. Dissatisfaction with dark walls may result from a perception of gloominess, associated with reduced peripheral vision.

**• Make daylight your partner**

Most people prefer daylighting and desire access to a view in most types of work settings. Quality daylighting is a major element of lighting satisfaction, according to a report published by the National Bureau of Standards.

**• Give users control**

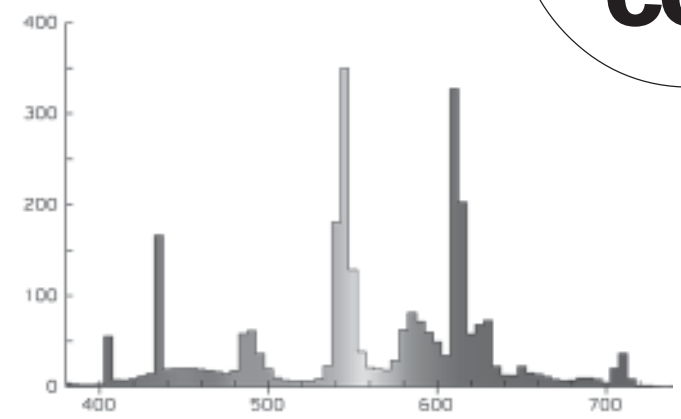
Research published in the Journal of the IESNA shows that when users were given dimming control of ceiling lighting a 35% - 42% decrease in electrical consumption resulted.

The Light Right Consortium uses a multidisciplinary approach to the growing movement for improving our lighting quality. By combining research, education, and collaboration, they are working to transform the lighted environment. The Consortium is a project managed by Pacific Northwest National Laboratory, operated by Battelle for the US Department of Energy.

If you would like a copy of the speaker's handout on "Lighting Values" visit *www.lightright.org*.

# light & color.

by Craig DiLouie & Eric Strandberg




*Above: every light source has a unique blend of frequencies of light at various wavelengths. Above is a spectral distribution curve of a 3500K lamp. Units are in nanometers*
Courtesy Philips Lighting

**correlated color temperature (CCT).**

Describes the color appearance of the light that is produced, in terms of its warmth or coolness. The CCT relates the color appearance of the lamp to the color appearance of a reference source when the reference source is heated to a particular temperature, measured on the Kelvin (K) temperature scale. A low color temperature (3000 K or lower) describes a warm source, such as a typical incandescent lamp and a warm fluorescent lamp. A high color temperature (4000 K and higher) describes a cool source, such as a 'cool white' lamp.

**color rendering index (CRI).**

A measurement of the amount of color shift that objects undergo when lighted by a light source as compared with the color of those same objects when seen under a reference light source of comparable color temperature. CRI values generally range from 0 to 100. Older-style 'warm-white' lamps were 52 CRI. and 'cool-white' lamps were 62. Today's T8, T5 and CFL lamps range from 75 CRI to 95 CRI.

The design goals always determine the characteristics of the lighting system. However, there are general guidelines for specifying lamp color characteristics. A broad variety of options are available to produce lighting effects from the simple to the theatrical, with some applications presenting extraordinary opportunities for the lighting designer to be artistic. However, greater complexity requires greater time, budget and attention to detail; in these applications, it may be desirable to mock up the installation to test the system.

• **Establish Desired Color Temperature**: One of the most important factors to consider is the psychological impact of various light sources. Warm light sources are generally preferred for the home, restaurants, hospitality and high-end retail applications to create a sense of warmth and comfort, while neutral and cool light sources are generally preferred for high-activity areas such as offices, schools, supermarkets and similar applications to create a sense of alertness.

A good example is to compare two restaurants—one a fast-food restaurant and one a high-end restaurant. In the fast-food place, where the food is relatively cheap, the lighting is typically cool fluorescent, providing an environment for the function of eating, enticing us to eat our meal quickly, get up and make way for the next customer. In the high-end restaurant, where the food is more expensive and we are purchasing the experience as much as the food, the lighting will most often be warmer incandescent and/or even simple candles, creating pools of intimacy, warmth and comfort, inviting us to stay as long as we like to enjoy the experience.

Another consideration regarding color temperature is research that suggests that cooler light sources, saturated in blue wavelengths, appear to enhance visual clarity and brightness perception at lower light levels.

• **Decide Importance of Color Rendering**: Once color temperature is established, we must decide the importance of rendering the colors of objects across the spectrum accurately. In general, in spaces that are occupied for long periods, whether it be for work or recreation, highest-color-rendering sources would be practical. The costs associated with worker productivity far outstrip the incremental costs of upgraded lighting.

• **Consider Daylight in your Color Scheme:** One of the first environmental questions is whether daylight is available. Daylight offers dynamic color characteristics that change during the cycle of the day and season. For most of the day, daylight is a very cool light source with excellent color rendering. Daylighting's dynamic qualities, while difficult to control, are actually part of its great appeal to office workers, who generally desire a connection to the outdoors and patterned variability in an otherwise monotonous, uniform environment. Therefore, it may be advantageous to optimize daylighting in the space depending on its design goals.

The color scheme of the space also determines selection of the light source. In a room with heavy red accents, a warmer source will reveal these reds as richly as possible. Conversely, cooler sources work well with blues, greens and other cool colors. And again, specifying a high-color-rendering light source (above 80) may be desirable to enhance the predominant color scheme but also properly render other colors in the space.

(This is an excerpt from a longer article that is available for download for free from our website - *www.lightingdesignlab.com*)

*Lower Costs, Improve Performance*

# lighting maintenance.

by Craig DiLouie & Randal Smith

*Above: Shaun Darragh shows the light emitting diodes from Tivoli Lighting that are being used on a pedestrian bridge on the Immunex project in Seattle. LEDs can dramatically cut maintenance costs.* Photo by LDL

All lighting systems experience deterioration of performance during operation and therefore require ongoing maintenance conducted either by properly trained in-house staff or an outsourced lighting management company. As the useful light distributed by the lighting system decreases, wattage remains the same, resulting in waste.

In many buildings, lighting systems are maintained in a reactive rather than proactive manner. As lamps fail, a service request is registered and the maintenance department can schedule the replacement with its other priorities. Defective components such as failed ballasts and broken lampholders are only replaced when they cause the fixture to malfunction. And fixtures are rarely cleaned, although dirt and dust buildup is absorbing useful light rather than distributing it.

Considering the waste in labor and energy costs involved, it's generally advisable to consider a planned lighting maintenance program during the planning of the lighting system. Planned lighting maintenance is the practice of organizing labor and resources to ensure consistent recommended light levels and the most economical use of the lighting system. It tunes the lighting system and optimizes performance. In a planned maintenance program, three actions are taken on a periodic basis:

- Group relamping: Replacing all lamps en masse at predetermined basis, usually at 60% - 80% of rated lamp life.
- Fixture cleaning
- Inspection and troubleshooting

Planned maintenance can:

- Reduce nominal labor costs related to fixture relamping and cleaning by up to 70%
- Reduce cost by concentrating lamp purchases into fewer, high-volume buys
- Produce higher light levels over the life of the lighting system
- Generate lighting upgrade opportunities such as reduced-output energy-saving lamps that take advantage of higher light levels to reduce energy costs
- Ensure proper inspection and upkeep of the lighting system, such as ensuring batteries are charged for emergency lighting in compliance with regulations

All lighting systems experience light loss. When designing a lighting system, this light loss must be predicted to the best possible extent and built into the system as a "depreciation cushion." By doing so, the lighting designer ensures that the lighting system, over a period of time, provides a minimum light level despite the anticipated erosion of output.

Light loss is broken down into recoverable and nonrecoverable light loss factors, which in turn are expressed as light loss factors in lighting design calculations. Light loss factors are values that express the percentage of light reaching the workplane after various characteristics and environmental factors depreciate that amount. A sample light loss factor might be 0.9. During the design process, therefore, if we have a lighting system that produces 100,000 lumens, then only 90,000 lumens will be provided over an established period of time as the causes of light loss take their toll.

Lumens are a measure of the light output of a lamp or lighting system, and footcandles are used to measure light levels at the workplane, or where the light is used. Mean lumens express the amount of light output after deterioration due to light loss factors. Maintained lumens express light levels after deterioration due to light loss factors.

If the light loss factor is "nonrecoverable," then preventative maintenance generally cannot reduce the extent of the light loss. If the factor is "recoverable," then preventative maintenance plays a strong role in the extent of the light loss. Recoverable light loss factors include lamp burnouts, lamp lumen depreciation, fixture dirt depreciation and room surface dirt depreciation.

(This is an excerpt from a longer article that is available for download from our website - *www.lightingdesignlab.com*)

# spring 2002 events.

Registration Form on Page 7

**All Registration MUST BE IN ADVANCE. All fees MUST BE PAID IN ADVANCE. No registrations or fees will be accepted at the door.**

**Classes designated as 'a', 'b', 'c', and 'd' are intended to be taken together. They are presented in sequence, some at the same location on the same day.**

## 1 • light sources. by Eric Strandberg

| | | |
|---|---|---|
| Boise: | Wednesday 2/20 | • 3:30pm - 5:30pm • $20 |
| Portland: | Wednesday 2/27 | • 3:30pm - 5:30pm • $20 |
| Eugene: | Thursday 2/28 | • 3:30pm - 5:30pm • $20 |
| Spokane: | Tuesday 3/5 | • 3:30pm - 5:30pm • $20 |
| Bozeman: | Thursday 3/7 | • 1:00pm - 3:00pm • $20 |
| Seattle: | Wednesday 3/13 | • 3:30pm - 5:30pm • $20 |

Once the needs of the occupants of various kinds of spaces is understood, light sources may be considered for illumination. This class begins with examination of the general performance characteristics of light sources. Issues such as efficacy, lamp life, lumen depreciation, color, and ambient temperature will be addressed. Daylight as a light source is integrated into the class. Source technologies such as the following will be covered: daylight; high performance incandescent; fluorescent; high intensity discharge; light emitting diodes; and photoluminescent materials. Students will leave with an understanding of the strengths and weaknesses of different light sources and the process of selecting the most suitable one for a lighting application.

## 2a • luminaires. by Michael Lane

| | | |
|---|---|---|
| Boise: | Wednesday 3/20 | • 1:00pm - 3:00pm • $20 |
| Portland: | Wednesday 3/27 | • 1:00pm - 3:00pm • $20 |
| Eugene: | Thursday 3/28 | • 1:00pm - 3:00pm • $20 |
| Spokane: | Tuesday 4/2 | • 1:00pm - 3:00pm • $20 |
| Bozeman: | Thursday 4/4 | • 10:00am - 12:00pm • $20 |
| Seattle: | Wednesday 4/10 | • 1:00pm - 3:00pm • $20 |

Effective lighting design means putting light where it is wanted and needed, and eliminating light where it's not wanted or needed. Understanding how light is distributed by a luminaire is key to the process of effective and efficient lighting of a space. This class reviews the differences in performance of indoor and outdoor luminaires, and examines windows and skylights as luminaires. The student will leave with an understanding of how luminaire performance is classified, how system performance is evaluated, and how luminaires can be specified.

= basic = intermediate = expert

### 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 2 hour class would be worth 2 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**
***iida.com***

**NCQLP**
***ncqlp.org***

Northwest Energy Efficiency Alliance
www.nwalliance.org

## 2b • lighting application — retail. by Shaun Darragh

Boise: Wednesday 3/20 • 3:30pm - 5:30pm • $20
Portland: Wednesday 3/27 • 3:30pm - 5:30pm • $20
Eugene: Thursday 3/28 • 3:30pm - 5:30pm • $20
Spokane: Tuesday 4/2 • 3:30pm - 5:30pm • $20
Bozeman: Thursday 4/4 • 1:00pm - 3:00pm • $20
Seattle: Wednesday 4/10 • 3:30pm - 5:30pm • $20

Retail Lighting will be the first in our current series of lighting design application classes. This session will cover design issues and methods for lighting a variety of typical retail spaces. A particular focus of the class will be emerging design trends and research. Concepts and options will be examined through pertinent examples, case studies, and group discussion. The student will develop a working understanding of issues specific to retail lighting and methods for approaching the design of these complex spaces. It is recommended that the student be familiar with topics covered in *The Advanced Lighting Guidelines* Chapter 6 - Light Sources and Ballast Systems, and Chapter 7 - Luminaires and Light Distribution, prior to taking this class.

## 3a • controls. by Shaun Darragh

Boise: Wednesday 4/17 • 1:00pm - 3:00pm • $20
Portland: Wednesday 4/24 • 1:00pm - 3:00pm • $20
Eugene: Thursday 4/25 • 1:00pm - 3:00pm • $20
Spokane: Tuesday 4/30 • 1:00pm - 3:00pm • $20
Bozeman: Thursday 5/2 • 10:00am - 12:00pm • $20
Seattle: Wednesday 5/8 • 1:00pm - 3:00pm • $20

Lighting controls can be among the most critical elements of any successful lighting design project, yet they are to frequently overlooked during the design and commissioning of our buildings. This session will discuss a variety of lighting control systems that are generally in use today and the effective application of these controls in typical lighting projects. The student will develop a working knowledge of the controls options that are generally available, how to effectively apply them, and supporting information regarding their effectiveness in the workplace. It is recommended that the student be familiar with topics covered in *The Advanced Lighting Guidelines* Chapter 8 - Controls.

## 3b • lighting application — schools. by Eric Strandberg

Boise: Wednesday 4/17 • 3:30pm - 5:30pm • $20
Portland: Wednesday 4/24 • 3:30pm - 5:30pm • $20
Eugene: Thursday 4/25 • 3:30pm - 5:30pm • $20
Spokane: Tuesday 4/30 • 3:30pm - 5:30pm • $20
Bozeman: Thursday 5/2 • 1:00pm - 3:00pm • $20
Seattle: Wednesday 5/8 • 3:30pm - 5:30pm • $20

As educational approaches change and classroom tasks change, so too must our approach to lighting change. New products can aid lighting specifiers to achieve better lighting results in a more energy efficient and sustainable way than ever before. This class looks at new tools available for classrooms and common areas of education facilities. We will look at application strategies, fixture types, lamp types and literature available today.

## 4a • retrofits. by Michael Lane

Spokane: Tuesday 5/14 • 1:00pm - 3:00pm • $20
Bozeman: Thursday 5/16 • 10:00am - 12:00pm • $20
Portland: Tuesday 5/21 • 1:00pm - 3:00pm • $20
Eugene: Wednesday 5/22 • 1:00pm - 3:00pm • $20
Boise: Wednesday 6/12 • 1:00pm - 3:00pm • $20
Seattle: Wednesday 6/19 • 1:00pm - 3:00pm • $20

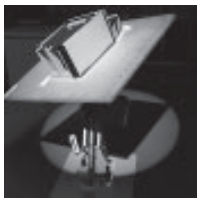
Although new construction activity is huge, the bulk of lighting resides in our existing buildings. This class examines the process of identifying, cataloguing, and evaluating the lighting found in a building. The process of identifying opportunities for improvements in energy efficiency, lighting quality, and lighting maintenance is reviewed. The process of determining the appropriateness of simply changing a lamp, retrofitting a ballast, replacing a luminaire, or performing a complete redesign will be examined. The student will leave with an understanding of evaluating the lighting in a building, identifying opportunities, and estimating payback periods for different measures.

## 4b • lighting application — office. by Shaun Darragh

Spokane: Tuesday 5/14 • 3:30pm - 5:30pm • $20
Bozeman: Thursday 5/16 • 1:00pm - 3:00pm • $20
Portland: Tuesday 5/21 • 3:30pm - 5:30pm • $20
Eugene: Wednesday 5/22 • 3:30pm - 5:30pm • $20
Boise: Wednesday 6/12 • 3:30pm - 5:30pm • $20
Seattle: Wednesday 6/19 • 3:30pm - 5:30pm • $20

Office Lighting will be the third in this series of lighting design application classes. This session will cover design issues and methods for lighting typical spaces to be found in office environments. Emerging design trends and research into visibility and productivity will be examined in depth. Concepts and options will be presented through pertinent examples, case studies, and group discussion. The student will develop a working understanding of issues specific to office project lighting and methods for approaching the design of these spaces. It is recommended that the student be familiar with topics covered in *The Advanced Lighting Guidelines* Chapter 6 - Light Sources and Ballast Systems, Chapter 7 - Luminaires and Light Distribution, and Chapter 8 Lighting Controls prior to taking this class.

## 5 • daylighting fundamentals series. by Joel Loveland



### 5a. 100 Introduction to Daylighting Design

Seattle: Monday 2/25 • 4:30pm - 6:30pm • $20
Portland: Wednesday 2/27 • 4:30pm - 6:30pm • $20

Daylighting 100 introduces WHY daylight in a preferable architectural light source, WHAT daylight is as a light source and HOW to conceptualize daylighting as an integrated building design element.

### 5b. 101 Schematic Design — Simple Ideas for Making It Happen!

Seattle: Monday 3/11 • 4:30pm - 6:30pm • $20
Portland: Wednesday 3/13 • 4:30pm - 6:30pm • $20

Daylighting 101 introduces the idea of using daylight as a primary source of illumination, and rules of thumb for quick and easy use in sizing windows and skylights.

### 5c. 102 Physical Modeling for Daylighting Design

Seattle: Monday 3/25 • 4:30pm - 6:30pm • $20
Portland: Wednesday 3/27 • 4:30pm - 6:30pm • $20

Daylighting 102 introduces the various way of using physical models for understanding how an architectural project attains its daylighting design goals.

### 5d. 103 Amazing Glazing (instructor Barbara Erwine)

Seattle: Monday 4/8 • 4:30pm - 6:30pm • $20

Hands-on demonstrations and explanations of the latest innovations in window technology help you understand the performance of new coatings and tints and choose the best combination for your building.

## • regional class locations.

**Spokane:** Avista, Rooms A & B, 1411 E Mission, Spokane, WA

**Bozeman:** Montana Power Division Office, Bull Room, 121 E Griffin Drive, Bozeman, MT

**Portland:** University of Oregon, Portland Center Administration, 722 SW 2nd Ave, Room 100 (Lecture Hall)Portland, OR

**Eugene:** EWEB Training Center, North Building Training Room, 500 E 4th Ave, Eugene, OR (Note 2/28 class to be held in the Community Room)

**Boise:** University of Idaho - Idaho Urban Research and Design Center, 775 W Fulton St, Boise ID

**Seattle:** Lighting Design Lab, 400 E Pine St, Ste 100, Seattle, WA

## contact LDL.


**Toll-Free**
800.354.3864

**Fax**
206.329.9532

**Mail**
400
East Pine Street
#100
Seattle WA
98122

**Mail**
info
@lightingdesignlab.com


**Payment**

If you are paying by check simply enclose payment made out to Lighting Design Lab and mail with this registration form.

If you wish to pay by credit card, you may fax in the registration form.

You may register online using our new secure server, and receive immediate written receipt of your registration and payment.

If you need to use a P.O., you may attend class before we receive the P.O., as long as we receive notice that you are using the P.O. method of payment.

NORTHWEST ENERGY EFFICIENCY ALLIANCE
www.nwalliance.org

# registration form.

Spring 02 Classes

**PAYMENT POLICY**: **Fees MUST BE PAID IN ADVANCE before attending class.** Purchase Orders, checks, and credit cards are accepted. A credit toward future LDL classes will be issued for unused registration fees.
**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 • credit from previous LDL event •

**registration information.**

Name • _____

Company • _____

Profession • _____

I Pay My Electric Bill To • _____

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

Phone • _____

E-Mail • _____ Fax • _____

Address • _____

City, State, Zip • _____

Credit Card Number (Visa / MC ) • _____

Expiration Date • _____

**please check the circles of the class(es) and event(s) you wish to attend. all classes are $20**

**1 • light sources.**
❍ Boise: Wed 2/20 • 3:30pm - 5:30pm
❍ Portland: Wed 2/27 • 3:30pm - 5:30pm
❍ Eugene: Thurs 2/28 • 3:30pm - 5:30pm
❍ Spokane: Tues 3/5 • 3:30pm - 5:30pm
❍ Bozeman: Thurs 3/7 • 1:00pm - 3:00pm
❍ Seattle: Wed 3/13 • 3:30pm - 5:30pm

**2a • luminaires.**
❍ Boise: Wed 3/20 • 1:00pm - 3:00pm
❍ Portland: Wed 3/27 • 1:00pm - 3:00pm
❍ Eugene: Thurs 3/28 • 1:00pm - 3:00pm
❍ Spokane: Tues 4/2 • 1:00pm - 3:00pm
❍ Bozeman: Thurs 4/4 • 10:00am - 12:00pm
❍ Seattle: Wed 4/10 • 1:00pm - 3:00pm

**2b • lighting application — retail.**
❍ Boise: Wed 3/20 • 3:30pm - 5:30pm
❍ Portland: Wed 3/27 • 3:30pm - 5:30pm
❍ Eugene: Thurs 3/28 • 3:30pm - 5:30pm
❍ Spokane: Tues 4/2 • 3:30pm - 5:30pm
❍ Bozeman: Thurs 4/4 • 1:00pm - 3:00pm
❍ Seattle: Wed 4/10 • 3:30pm - 5:30pm

**3a • controls.**
❍ Boise: Wed 4/17 • 1:00pm - 3:00pm
❍ Portland: Wed 4/24 • 1:00pm - 3:00pm
❍ Eugene: Thurs 4/25 • 1:00pm - 3:00pm
❍ Spokane: Tues 4/30 • 1:00pm - 3:00pm
❍ Bozeman: Thurs 5/2 • 10:00am - 12:00pm
❍ Seattle: Wed 5/8 • 1:00pm - 3:00pm

**3b • lighting application — schools.**
❍ Boise: Wed 4/17 • 3:30pm - 5:30pm
❍ Portland: Wed 4/24 • 3:30pm - 5:30pm
❍ Eugene: Thurs 4/25 • 3:30pm - 5:30pm
❍ Spokane: Tues 4/30 • 3:30pm - 5:30pm
❍ Bozeman: Thurs 5/2 • 1:00pm - 3:00pm
❍ Seattle: Wed 5/8 • 3:30pm - 5:30pm

**4a • retrofits.**
❍ Spokane: Tues 5/14 • 1:00pm - 3:00pm
❍ Bozeman: Thurs 5/16 • 10:00am - 12:00pm
❍ Portland: Tues 5/21 • 1:00pm - 3:00pm
❍ Eugene: Wed 5/22 • 1:00pm - 3:00pm
❍ Boise: Wed 6/12 • 1:00pm - 3:00pm
❍ Seattle: Wed 6/19 • 1:00pm - 3:00pm

**4b • lighting application — offices.**
❍ Spokane: Tues 5/14 • 3:30pm - 5:30pm
❍ Bozeman: Thurs 5/16 • 1:00pm - 3:00pm
❍ Portland: Tues 5/21 • 3:30pm - 5:30pm
❍ Eugene: Wed 5/22 • 3:30pm - 5:30pm
❍ Boise: Wed 6/12 • 3:30pm - 5:30pm
❍ Seattle: Wed 6/19 • 3:30pm - 5:30pm

**5a • daylighting 100: introduction.**
❍ Seattle: Mon 2/25 • 4:30pm - 6:30pm
❍ Portland: Wed 2/27 • 4:30pm - 6:30pm

**5b • daylighting 101: schematic design.**
❍ Seattle: Mon 3/11 • 4:30pm - 6:30pm
❍ Portland: Wed 3/13 • 4:30pm - 6:30pm

**5c • daylighting 102: physical modeling.**
❍ Seattle: Mon 3/25 • 4:30pm - 6:30pm
❍ Portland: Wed 3/27 • 4:30pm - 6:30pm

**5d • daylighting 103: amazing glazing.**
❍ Seattle: Mon 4//8 • 4:30pm - 6:30pm

lighting design lab

400 East Pine Street #100, Seattle WA 98122
www.lightingdesignlab.com

FIRST CLASS
U.S. POSTAGE
**PAID**
SEATTLE, WA
PERMIT #5130

*lighting design lab news*
*is published by the lighting design lab*
*400 E. Pine Street #100 Seattle WA 98122*

## to contact us.


| | |
|---|---|
| General Phones | **206.325.9711**<br>**800.354.3864** |
| Fax | **206.329.9532** |
| Project Manager | **Diana Grant** - ext 24<br>diana@lightingdesignlab.com |
| Schedule Coordinator | **Front Desk** - ext 0<br>info@lightingdesignlab.com |
| Lighting Specialists | **Michael Lane** - ext 26<br>michael@lightingdesignlab.com |
| | **Shaun Darragh** - ext 27<br>shaun@lightingdesignlab.com |
| Mockup Coordinator | **Eric Strandberg** - ext 28<br>eric@lightingdesignlab.com |
| Daylighting Specialist | **Joel Loveland** - ext 32<br>joel@lightingdesignlab.com |
| Librarian & Editor | **Randy Smith** - ext 29<br>randy@lightingdesignlab.com |
| Stage Technicians | **Adam Griffen** - ext 37<br>adam@lightingdesignlab.com |
| | **Nacho Bravo** - ext 31<br>nacho@lightingdesignlab.com |


## our sponsors.

Northwest Energy Efficiency Alliance
Seattle City Light
Puget Sound Energy
Snohomish PUD
Tacoma Power
British Columbia Hydro
University of Washington
State of Alaska

The Northwest Energy Efficiency Alliance is a nonprofit group of electric utilities, state governments, public interest groups, and industry representatives committed to bringing affordable, energy-efficient products to the marketplace.

NORTHWEST ENERGY EFFICIENCY ALLIANCE
www.nwalliance.org