

## How Can Integrating Spheres and Spectrometers Add Value to Your Measurement Efforts?

# Find out at the Optical Sensing Workshop 2009

Choose From  
These  
Great Locations!

**Tucson, AZ**  
Monday  
May 11, 2009  
Marriott Tucson  
University Park

**Albuquerque, NM**  
Tuesday  
May 12, 2009  
Sandia Courtyard

**Denver/Boulder, CO**  
Thursday  
May 14, 2009  
Courtyard by Marriott-  
Louisville/Boulder

**Registration**  
Advanced: \$50  
before April 17th  
\$75.00  
after April 17th  
Lunch Provided  
Payable by Check,  
Visa, AMEX or MC

Learn design fundamentals and application methods, plus **HANDS-ON** workshops to discuss your optical sensing issues.

### WHAT YOU WILL LEARN

**SphereOptics presents -  
Radiometry and Photometry**  
*The integrating sphere – a versatile  
solution in light measurement*

This seminar provides information on the basic science of radiometry and photometry, including theory and design, how to specify and use an integrating sphere for measuring light sources and electronic imaging sensors and assessing measurement performance. SphereOptics will have a number of measurement instruments available for hands-on measurement including: LED & Lamp measurements, Uniform Light Sources and General Purpose Integrating Spheres.

**Avantes presents – The Micro  
spectrometer – providing affordable  
solutions in Spectroscopy**

Attendees will gain a general understanding of the fundamentals of spectrometer design, and explore specific applications in radiometry, chemistry, reflection and thin film measurement. Experts will discuss current applications and help determine how spectroscopy and optical sensing techniques may be applied to solve specific issues for customers in industry and research.

### PRACTICAL & HANDS-ON DEMONSTRATIONS

Practical demonstrations for a variety of integrating sphere measurements and spectroscopy applications will be shown. Attendees will also have the opportunity for hands-on use of instruments. Ample time is allotted in a separate demonstration room to discuss your application with the workshop presenters.

### Join Industry Experts and Learn:

- Basics of Light Radiometry and Photometry
- Techniques for Spectroscopic Analysis

### Plus How To:

- Specify an Integrating Sphere
- Select and Configure the Right Spectrometer

**for YOUR SPECIFIC APPLICATION!**

### WHO SHOULD ATTEND?

The lectures and seminars are intended for scientists and engineers working in the field of optical sensing including light measurement, fluorescence detection, testing of optical properties of materials, color measurement and spectroscopic measurement.

**Sponsored by:**





# WORKSHOP PROGRAM

FOR WORKSHOP  
SPECIFIC INQUIRIES,  
PLEASE CONTACT  
ONE OF THE  
SPONSORS BELOW:

**Avantes USA**

Broomfield, CO 80021  
Tel: 303-410-8668  
Toll free: 866-678-4248  
infoUSA@avantes.com  
www.avantes.com

**SphereOptics USA**

Concord, NH 03301  
Tel: 603-715-3000  
Tel: 858-695-2896  
sales@sphereoptics.com  
www.sphereoptics.com

**TIME**

7:30 - 8:15 AM

8:15 - 8:30 AM

**8:30 - 9:30 AM**

9:30 - 9:45 AM

9:45- 10:45 AM

10:45 - 12:00

12:00 - 1:00 PM

**1:00 - 2:00 PM**

2:00 - 2:15 PM

**2:15- 4:15 PM**

4:15 - 4:30 PM

**EVENT**

Registration

Welcome & Introductions

**Radiometry & Photometry**

- Radiometry/Photometry Terminology & Units
- Integrating Sphere Theory & Applications
- Diffuse Reflectance Materials & Coatings
- Lamp & LED Measurement
- Reflectance/Transmittance Measurement
- Uniform Calibration Sources
- Laser Power Measurement

Break

**Radiometry and Photometry**  
*(continued)*

**Solutions in Spectroscopy**

- Spectrometer Design and Tradeoffs
- Detector Selection
- Spectroscopy Applications from  
Core Research to Process Control
- Fiber Design Considerations

Lunch Break *(Lunch provided)*

**Solutions in Spectroscopy**  
*(continued)*

Break

**Demonstrations and Hands-on Workshops**

- LED / Source measurements
- Uniform light sources
- Reflectance
- Colorimetry / Irradiance

Wrap-up and Surveys

**SPONSOR**

**SphereOptics**

Chris Durell  
Justin Jacobs

**Avantes**

Greg Neece  
Damon Lenski

## Practical & Hands-on Demonstrations from 2:15 to 4:15 PM

*Don't miss this opportunity for hands-on use of instruments  
and to discuss your application with the workshop presenters.*

# REGISTRATION FORM

## *Optical Sensing Workshop 2009*

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone: ( \_\_\_ ) \_\_\_\_\_ Fax: ( \_\_\_ ) \_\_\_\_\_

Email: \_\_\_\_\_

*Please indicate which Workshop you will be attending:*

Tucson, Arizona  
Monday - May 11

Albuquerque, New Mexico  
Tuesday - May 12

Denver/Boulder, Colorado  
Thursday - May 14

*Please describe your area of interest:*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Seminar Cost: \$75.00 - *Advanced Registration by April 17th, 2009 - \$50.00*

### **PAYMENT OPTIONS:**

CHECK: Make Checks Payable to: SphereOptics, LLC

MASTERCARD  VISA  AMERICAN EXPRESS

Cardholder Name: \_\_\_\_\_

Billing Address: \_\_\_\_\_

Card Number: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_

Exp Date: \_\_\_\_\_

Signature: \_\_\_\_\_

**PLEASE FAX to: 603-225-3089 OR MAIL THIS FORM TO:** SphereOptics  
One Horseshoe Pond Lane  
Concord, NH 03301

**PLEASE NOTE:** Deadline for pre-registration is May 1, 2009

Please call one of the Workshop Sponsors in advance if you plan to register on site.

Seminar fees are non-refundable. If you are unable to attend, with 72 hours advance notice, seminar fees may be applied to future seminars.