



Inter-Society Color Council *News*

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Nov/Dec 2007

President's Column

In this column, my last of 2007, I want to say a little about this past year but mostly look forward to the future.

In 2007, we had two successful meetings: a Special Topics meeting with the AATCC in Charlotte, NC in February, and our Annual Meeting in Kansas City in April, where Bob Hunt received the Godlove Award for lifetime achievement in color and Dave Wyble received the Nickerson Award as the Council's webmaster. With sadness, we also noted the passing of several friends of the Council, Ralph Stanzola and Therese Commerford among them.

Let me use the rest of the column to tell you about our 2008 meetings. Meetings remain key to the Council and to the expression of its unique identity. Since my last column, one meeting went away and another has been added. We had originally planned a joint meeting with CMG (Color Marketing Group) in place of the Education Saturday program at their Spring Conference in Montreal. It would have been a very different program than they are used to—perhaps too different after the initial enthusiasm had subsided. Even as we decided to cancel the joint program, interest in doing something together remains high and we have agreed to start discussions about a partnership that will place joint activities on a surer footing.

We have three meetings planned for next year. First is the Annual Meeting in Baltimore, September 14 and 15. It will follow our usual meeting format: a single-track meeting with sessions organized around the three Interest Groups. It will be followed by a one-day Safety Color Expert Symposium on Tuesday September 16. This meeting will cover the perception, measurement, and standardization of regular, fluorescent and photoluminescent materials, and safety light signaling. Cameron Miller of NIST

**The Editors of the ISCC
Newsletter wish you
Happy Holidays!**



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and Carl Andersen of the Federal Highway Administration will chair the Baltimore meetings. A Call for Papers for the Annual Meeting appears later in this issue of the newsletter.

What's new and has been added to our meeting calendar is a Special Topics meeting on the measurement of black and white, following the IS&T/SID Color Imaging Conference in Portland, Oregon next November. It will cap a week of color-related meetings, beginning with ICC DevCon (International Color Consortium Developers Conference) on Monday, followed by the Color Imaging Conference and on Friday the Hunt Symposium, honoring Bob Hunt, before concluding with the ISCC/IS&T Special Topics Meeting on Saturday, November 15. The meetings will be held at the historic Benson Hotel in downtown Portland: "historic" since it was built in 1912.

The idea for another special topics meeting to build on the success of the one we had following CIC in 2005 had been on my mind for a while. Five of us met and discussed it over breakfast at the CIC in Albuquerque last month. The discussions that started then led eventually to a suggestion by Danny Rich to do something around the print characteristics of paper, which affect whiteness in color reproduction. Ann Laidlaw suggested we consider blackness as well.

Choosing "Black and White" as the special topic for the meeting recognizes them as two of the most important properties of any colored image. Recently there has been renewed interest in these concepts, witness the IDEAlliance Print Properties subcommittee on paper characterization, the SIS Workshop on Paper on optical properties of paper, CIE Publication 163 on the Effect of Fluorescence in the Characterization of Imaging Media, and papers at the Color Imaging Conference. Key topics at the meeting will include the measurement of white papers, three-color overprints versus true black, and the impact of novel light sources on the rendition of colored images.

With all this planned, I am looking forward to 2008, and on behalf of the ISCC, I want to wish all of you the very best in the New Year.

Robert Buckley, Xerox Corporation

HUE ANGLES

(Send contributions to Michael H. Brill, mbrill@datacolor.com)

What Color is Your PET?

Last September I was an “accompanying person” at a conference on molecular imaging. It might seem close to my area of expertise, but it is not. Accordingly, my color-scientist thinking led to a strange take on concepts in that field. Ostranenie (from the Russian Остранение) is the literary device of forcing an audience to see something in an unfamiliar way, to enhance perception of the familiar. An example is to refer to driving a car as sitting on top of repeated gasoline explosions, or to refer to the human brain as electrified meat. For lots of ostranenie, read any book by Kurt Vonnegut—or be an accompanying person.

At the conference, I heard about positron-emission tomography¹ (PET). The PET scan is a diagnostic tool whose cuddly name hides the fact, salient at the conference, that the imaging events are positron-electron (matter-antimatter) annihilations that are made to happen inside your body. Now, an electron is a sizeable particle whose complete annihilation (and also that of an injected positron with the same mass) produces a lot of energy. “Is it safe?” I asked, with none of the menace of Szell in *Mara-thon Man*. “It’s been known to be safe for three decades,” was the reply, replete with the condescension I’ve come to associate fondly with the medical profession.

Seeking confirmation from my own meager knowledge, I tried to cast this problem in a framework familiar to color science: Find the wavelength associated with the energy of a positron-electron annihilation. Does it convey warmth by the mechanism of a heat lamp, sunburn you, incur the dose-calibrated ionization damage of a dental X-ray, or more generally rock your world? (In the title to this column, I loosely call “PET color” the PET-induced-photon spectrum.)

Everyone I asked at the conference knew that a positron-electron annihilation liberates two photons, each with 511 KeV of energy, in opposite di-

rections (to conserve momentum). But nobody had turned that number into wavelength, so I did a back-of-the-envelope calculation: PET photon energy 511 KeV converts to energy $E = 8.186 \times 10^{-14}$ Joules (J), via 1.602×10^{-19} J/eV, Planck’s constant is $h = 6.626 \times 10^{-34}$ J-sec, and $c = 2.998 \times 10^8$ m/sec. Hence the PET photon wavelength is $h c/E = 0.002427$ nm. At this wavelength, a photon from PET has far more energy than one from a dental X-ray (~0.06 nm) or chest X-Ray (~0.03 nm), and in fact is near the shortest wavelength attributed to X-Rays (0.001 nm).

Given that PET positrons produce hard X-rays in our fragile bodies, how can this be safe? Presumably, the total dosage of radiation in a PET scan is low, even though the energy per photon is high. Let’s check the plausibility of this assumption. One application of PET is to see brain metabolism through uptake of a radioactive glucose analogue that emits (you guessed it) positrons. The pseudocolors that are used to encode the metabolism level in the PET image¹ are, of course, correlated with radiation emitted from the affected brain cells when the positrons annihilate with local electrons. One would think the radiation dosage to those brilliantly metabolizing brain cells would be quite high, even for relatively low average dosages in the whole brain.

Ultimately, the dose depends on how many photons are needed for a PET scan. Although tomography implies a volume scan and hence a lot of photons needed to light up the right pixels, a PET scan has a spatial resolution of 5-6 mm (much coarser than most other diagnostic images). Relative to diagnostic X-rays, PET scans need fewer photons per pixel to combat shot noise. But a lot of photons are wasted, because the image is captured only in a short cylinder around the affected area. And surprisingly, the photons do less damage to the local tissue than ionization due to the original positron.

Continued on page 4

Continued from page 3

As I found out, the computation of radiation dose is serious business in radiochemistry. Empirical studies (mostly on mice) make model fits to vulnerability as a function of such variables as organ type, metabolic rate, uptake rate, and geometry. The complication quickly exceeded the envelope I was writing on.

Back to color science, then. Can we tweak those PET pseudocolors so they're more informative to doctors? Don't even try: doctors are used to the present colors. Okay, back to literary devices then, such as ostranenie. That seems safe enough.

Michael H. Brill, Datacolor

1. http://en.wikipedia.org/wiki/Positron_emission_tomography
2. <http://www.pbs.org/wnet/brain/scanning/pet.html>

In Memoriam: Sandy Austin

Just as the newsletter was about to go to press, we received the sad news of Sandy Austin's passing. Sandy had been a member of the Board since 2006. That's where I got to know her and how we started working together on a couple of projects. She had wondered about her ability to contribute when she found out about her cancer, but she did continue to contribute, and we have all benefited from it: When she found out last week that her illness was not responding to treatment, it was her decision to let go. She passed away Monday afternoon, Dec. 17. I will miss her sensible advice, delivered in a thoughtful manner at our meetings. Her husband Ken mentioned that their trips to Kansas City had been bright spots for him and Sandy over the last year. Having them both there were bright spots for us as well. She was a wonderful person and I am happy that I got to know her and work with her.

Robert Buckley, President ISCC

New EU Masters Program in Color

Four European universities have been approved by the EU to offer a new two-year master's program entitled "Color in Informatics and Media Technology" (CIMET), within the Erasmus Mundus program.

The Erasmus Mundus program is a co-operative and mobility program at the master or doctorate level. Universities and university colleges unite in a consortium to offer a joint degree. The University of Saint-Etienne (France, coordinator) will offer the master's program, Color in Informatics and Media Technology (CIMET), together with Gjøvik University College (Norway), the University of Granada (Spain) and the University of Joensuu (Finland).

The consortium is inviting applications in two areas, a visiting scholar program and the master's degree program. Visiting scholars will conduct research during three months in the summer at one of the four universities related to one of the following fields: Color image capture, devices and processing; Spectral color science; Technologies and models for multi-media systems. Four grants of 13,000 Euros are proposed per year. Invited Scholars will also contribute to the teaching of one compulsory course or one optional specialization course among the set of courses proposed (See www.master-erasmusmundus-color.eu).

For the master's degree program, applicants must have a bachelor's degree or equivalent in computer science, physics or mathematics, or a related field. Admission will be based on academic excellence. 12 students from EU countries will be admitted and 18 students from outside EU. Scholarships (21,000 Euros pre year for non EU students) are provided for students from both groups. The study program starts autumn, 2008. The master program is broadly interdisciplinary, encompassing photonics, computer vision and imaging science, computer science and media technology as a mix of relevant theoretical and practical knowledge. All courses will be given in English. The program requests high mobility, but it is possible to mainly study in one host university and attend only one semester in another university.

For more information contact: cimet@ligiv.org or see www.master-erasmusmundus-color.eu.

Updated ISCC Logo

In this issue of the ISCC News, we are debuting the updated ISCC logo. In our publications, we have been using a scanned version of the logo. While this gave adequate quality at some sizes, at others the combination of the printed original and the scan of it made artifacts noticeable. What was desired was an outline version of the logo, created in a graphics program, with cleaner lines and scalable to arbitrary sizes.

This is where Scot Fernandez and Denise Maire stepped in. Scot, who is on the ISCC board of directors, arranged for Denise to generate an updated version of the logo. Denise is a Senior Production Artist at Hallmark Cards, Inc. in Kansas City. She took the highest resolution version of the scanned logo we had, imported it into Adobe Illustrator and in effect traced it, although tracing doesn't adequately describe what she did. The concentric

circle, triangles and vertical lines are all artwork, with their thickness and end and join styles chosen to match the scanned version as closely as possible.

For the text, she used a selection of fonts, selecting the kerning and horizontal scaling to adjust the space between letters and stretch the text string to approximate what is in the scanned version. "INTER-SOCIETY COLOR COUNCIL, INC." uses Optima Black; with some kerning spread and horizontal scaling. "FOUNDED 1931" uses Optima Demi, with no kerning but some horizontal scaling. "SCIENCE · ART · INDUSTRY" also uses Optima Demi with a lot of kerning but hardly any horizontal scaling. In the resulting EPS file, the fonts were converted to outlines to avoid missing font issues in the future. A detailed description of her updated design has been archived in the ISCC Office.



Scanned ISCC Logo



Updated ISCC Logo

CORM 2008 Technical Conference on Visual Optics: Call for Papers

The CORM 2008 Annual Technical Conference will be held at Rensselaer Polytechnic Institute and the Lighting Research Center in Troy, NY. Technical paper sessions are scheduled for Tuesday, June 10, 2008 and Wednesday, June 11, 2008. CORM Committee meetings are planned for Monday, June 9, 2008. A tour of the Lighting Research Center is

planned for Thursday AM, June 12, 2008.

Presentations on measurement of light or optical properties of materials related to vision are invited. Abstracts should be submitted to a Program Coordinator by February 1, 2008. A written paper is not required. PowerPoint presentations should be submitted by May 1, 2008.

See the CORM website, www.corm.org/documents/CORM2008ConferenceCallforPapers.pdf for more information.

Member Item:**Yoshi Ohno Received de Boer Award**

The CIE honored Dr. Yoshi Ohno with the de Boer Award during the opening session of its July 2007 meeting in Beijing, China. The de Boer Award is the CIE's distinguished Services Award for Organization and Administration. CIE has initiated a special award system that permits the Board to give Distinguished Services Awards at each Session to a maximum of three expert volunteers for outstanding contributions to CIE. The other Distinguished Services Awards are for fundamentals and application.

Ohno's involvement with CIE started in 1991 at the Melbourne session, and he has been Secretary of CIE Division 2 since 1996. While being the chair of two technical committees, he is active in many other technical committees in Division 2 and Division 1. He co-chaired CIE Expert Symposia in 2001 and in 2002 and he played leading roles in other recent Division 2 symposia. Yoshi Ohno also invested much effort in developing the Division 2 Internet website and contributed to the development of the CIE Website. There are also ten email reflectors for CIE TCs that he maintains, some of which are actively used. Many other volunteers in CIE often take the systems and ways of working he developed as an example for their own work.

Yoshi is currently a Group Leader of the Optical Sensors Group in the Optical Technology Division of the National Institute of Standards and Technology (NIST). Before going to NIST, he was a senior researcher at the Lighting Research Laboratory of Matsushita in Japan. His research work spans a wide range of subjects, from fundamental realization of units to applications in photometry and colorimetry. For several years Yoshi Ohno has been involved in Solid State Lighting. His recent work on color rendering simulation and analysis of white LEDs is well known and widely used in the LED industry. He is also a leading person for standardization of measurements of Solid State Lighting products in the USA. He has published several book chapters. One of his most recent contributions is the chapter, "Spectral Color measurement," for the CIE book on Colorimetry that will be published next month.

**FIRST CALL FOR INTEREST-GROUP PAPERS!!**

**ISCC 2008 Annual Meeting,
Baltimore, MD
September 14-15, 2008**

The co-located topical meeting is on Perception and Measurement of Safety Colors, but topics for the Annual meeting are wide open! **May 31, 2008** is the deadline to submit abstracts and brief author bios to one of the three Interest-Group chairs:

- I. Basic and Applied Research: Jim Roberts, jim.roberts@altana.com
- II. Industrial Applications of Color: Jaime Gomez, jaimeagomez@comcast.net
- III. Art, Design, & Psychology: Marcia Cohen (mr.cohen@mindspring.com)

Each abstract should be 2-4 pages long, including figures, and preferably submitted in pdf format to facilitate printing of the Proceedings.

For further information about the meeting, contact

Carl Andersen
(carl.Andersen@fhwa.dot.gov) or
Cameron Miller
(c.miller@nist.gov)

The Inter-Society Color Council

and

The Society for Imaging Science and Technology

Announcement and Call for Papers for a Special Topics Meeting

on

BLACK and WHITE

Two of the most important colors in any imaging application are white and black. White is normally supplied by the media and black or “key” is supplied by a traditional pigmented ink. These two visual concepts hold critical roles in the processes that constitute the graphic arts workflow.

Recently there has been a renewed interest in these concepts as exhibited by activities within the IDEAlliance Print Properties subcommittee on paper characterization, the SIS Workshop on Paper on optical properties of paper, CIE Publication 163 on the Effect of Fluorescence in the Characterization of Imaging Media, and in papers at the Color Imaging Conference.

This has resulted in a number of research committees and standardization committees being formed to try to better understand the scope of this problem – especially as it related to international standards on the measurement and communication of color in image reproduction, such as ISO 2469, 3664, 13655, 12647, GRACoL 7 and the G7 press/proofer calibration methodology.

We invite you to join the ISCC and the IS&T in a special 1-day meeting after the 2008 Color Imaging Conference highlighting the recent achievements in the measurement of white and black. Invited, session keynote, papers will come from the research & standards areas described above and contributed papers will certainly fill in the practical understanding between the requirements of the documentary standards. Topics will include, measuring and predicting the media white point when it contain fluorescent brightening agents, predicting the visual impact of the media white on gray balance of an image, correlating instrumental readings to visual judgments under various D50 simulations, the effect of geometry on the measurement of white, is there an objective assessment and quantification of the percept known as whiteness, the relationship between whiteness and brightness in perceived color gamut, relating the standard optical properties of paper (ISO 2469) to the end use properties of the media (ISO 12647).

This is going to be a timely and focused look at the issues plaguing the passage of graphic reproduction from a pure art form to an engineering discipline. Please consider staying a day or two after the Color Imaging Conference for this meeting – especially if you are a developer of ICC profiles or software tools for an ICC-based workflow. You will find these topics very relevant and you will want to share your experiences in this area.

For additional information or to send an abstract, contact Ann Laidlaw, ALaidlaw@xrite.com.

Color Research and Application

In This Issue, December 2007

We open this issue with two articles in the field of vision. Cyanosis is a blue coloration of the skin and mucous membranes associated with a decrease of oxygen in the blood. It can be an indication of a medical emergency, and thus its detection is extremely important. The selection of light sources has been the topic of several articles [including in this journal "A Method for Evaluating the Acceptability of Light Sources for the Clinical Visual Evaluation of Cyanosis," by Dain, Hood, Montano and Arali 23:4-7, 1998]. Also there have been anecdotal reports of people with color vision deficiencies having difficulty in recognizing cyanosis. In "Colour Changes in Cyanosis and the Significance of Congenital Dichromasy and Light," Stephen Dain, using the previously established databases, examines the likelihood for color vision deficient observers to make mistakes about cyanosis and also whether it is possible to select light sources that would help remedy the problem.

Do men and women experience the appearance of color differently? In our next article Pedro J. Pardo, A. L. Pérez, and M. I. Suero report on experiments that examine the possibility that men and women have different color appearance interpretations. Are the differences physiologically based or cognitive, or the combination of the two? Some researchers have hypothesized that it is genetic. There are two subtypes of the long-wavelength (or L-) cones whose peak response differ by about 4-7 nanometers. The x chromosome carries this data. Since men have only one x-chromosome, they have roughly a 50-50 chance of receiving the L_A or L_S cone. However, women with two x chromosomes present a more varied distribution. They can have two of either L_A or L_S , or one of each. Is this the cause of the variation in color appearance responses? Thus far the psychophysical variations are still disputed, but several hypotheses have been presented. Therefore, Pardo, Pérez, and Suero designed an experiment to determine the average radiance ratio for men and for women. In their article, "An example of sex-linked color vision differences," they show that at least at the point in color space that they conducted experiments, men and women can not be considered as forming one homogeneous population.

As early as the 1920s experts recognized a need for establishing an international photometric system

that both provided an estimation of the psychophysical attributes of photometry, and provides a psychological correlate of the photometric attribute. The CIE1924 V(l) photometric system became standard in response to urgent requests from the lamp industries. This system met the first requirement, but did not address the second. In our next article, a "Proposal for an Integrated Photometric System and its Application to Luminous Colors," Drs. Yoshinobu Nayatani and Hideki Sakai give the whole concept of the newly proposed system, and include the formulas and examples for luminous colors. Future work is planned to give the formulas and examples for object colors.

Earlier this year, in the June Issue (#3) of this journal, Kenji Imura introduced a virtual fluorescent standard method for measuring the optical properties of a sample treated with fluorescent whitening agent. In this issue, Mr. Imura examines the application of this method to the case where an ink sample is printed on optically brightened paper. Since both the paper and the ink are fluorescent, this case creates a complication. In "Method for Measuring Optical properties of a Printed Sample On FWA-Treated Paper," Mr. Imura compares two approaches to this problem: one identified as the orthodox approach, the other identified as an abridged approach. Twenty-eight samples were used to examine the performance of the virtual fluorescent sample method by each approach. The results show that the performances of both approaches are remarkable at least for those samples, and the abridged approach has a performance close to that of the orthodox approach for most of the samples.

Over 50 years ago, at the Budapest Technical University, a study of color harmony was begun. While certain results of these studies have been published, our next article is the first part of a series in which Antal Nemcsics presents those parts yet to be published. "Experimental Determination of the Laws of Color Harmony Part I – Harmony content of different scales with similar hue" deals with the group of experiments testing how much the harmony content of scales found in various locations of the axial sections of the Coloroid system differ from each other. Nemcsics reports that the extent of the harmony contents of color scales of planes containing the same hue depends on: 1) the angle between the line supporting the scale and the horizontal neutral axis, 2) the hue, saturation, and luminosity of the colors supporting the scale, and 3) the number of harmony intervals between members of the scale.

From the earliest recorded color in art and communication, color has been used to convey certain images and feelings, and thus has played an important role in general life. However, the systematic study of color has concentrated for the most part on the physics, perception, design, and production areas. More recently there is an increased interest in integrating the humanities and sciences, thus in terms of color, looking at color and the color sense conveyed. It is important for artists and designers who are trying to convey their own image meanings in their work, to relate to the images of the general audience. Wen-Guey Kuo undertook a study to attempt to establish a new color image scale to evaluate the color image meanings of works matching those of the average person. In "The Feasibility of Establishing New Colour Image Scales Using Magnitude Estimation," he shows the relationships between the latest color image scales and the color attributes such as lightness, hue and chroma.

Next Ralph W. Pridmore discusses "Chromatic Luminance, Colorimetric Purity & Optimal Aperture-Color Stimuli." In this article Pridmore points out that colorimetric purity, a luminance metric, is different from excitation purity, a chromaticity-diagram metric. He reminds the reader that the measurement of colorimetric purity has always been problematic for non-spectral hues. Then he goes on to discuss these terms and their meanings in detail and to propose a solution for the problems.

For our last article we look at a "Color Study of Mudejar Paintings of the Pond at the Palace of "Reales Alcazares" which are located in Seville in Southern Spain. The analysis of the paintings has shown that there were two reconstructions or renovations of the pool. It also makes it possible to date these renovations. But more importantly to the color science studies, Adrián Durán-Benito, Liz. Karen Herrera-Quintero, María Dolores Robador-González, and José Luis Pérez-Rodríguez worked together to characterize the pigments. This then facilitated the choice of materials and colors used to carry out the renovation of this historic building.

We also include in this issue, one book review and brief announcements about three CIE publications: CIE Publication 127:2007 Measurement of LEDs; CIE 177:2007 Colour Rendering of White LED Light Sources; and CIE 179:2007 Methods for characterizing tristimulus colorimeters for measuring the colour of light. Rolf Kuehni reviews the two volume series *Progress in Colour Studies, Vols. I and II*. Martin Bide gives a report on the AATCC/ISCC

Industrial Color Challenges Symposium held earlier this year. And finally since this is the last issue of the year, the annual index is included.

Ellen Carter, Editor
Color Research and Application

In Memoriam

Thomas F. Milham

(November 12, 1942 – July 9, 2007)

Thomas F. Milham, 64, died unexpectedly on Monday, July 9, 2007 after suffering a heart attack while sailing near his home.



Tom attended Massachusetts College of Art in Boston and resided in Gloucester, MA. His career started with Soep Painting, the largest union paint contractor in Boston. Tom restored old buildings including the Colonial Theatre in Boston, and a large five star hotel in Providence. For 27 years he was Executive Vice President of Surface Protection Industries, manufacturer of Zolatone and other specialty architectural coatings.

Always an innovator, Tom introduced pearlescent and metallic pigments into multicolor and specialty finishes in the mid 1980s. He was the principal driver in creating and launching water-based multicolor in the early 90's and Airless by Zolatone, a high-production, labor-saving and water-based version of multicolor in 2004. He developed a new manufacturing method called blending (CCM) that reduced production costs and lead times. Along the way, he successfully developed Luminations, a highly popular light-reflectance coating that incorporates pearl and mica-like glitter in a water-based multicolor formula.

As an active member of Color Marketing Group (CMG), an international Association of 1000 Color Designers, Tom served as a Chairholder and held a variety of other leadership roles and positions over the past 23 years. He was an engaged and engaging member particularly to new CMG members. His insights and willingness to contribute were extremely valued by the membership.

Tom is survived by his wife, Donna M. (Merlino) Milham, and by several children and grandchildren. Contributions may be made in his memory to the Eagle & Dove Ministries, P.O. Box 7094, Gloucester, MA 01930.
Jack Ladson

CALENDAR

Please send any information on Member-Body and other organization meetings involving color and appearance functions to:

Ms. Cynthia Sturke
ISCC Office
11491 Sunset Hills Road, Reston, VA 20190
703-318-0263 tel 703-318-0514 fax
isccoffice@cs.com website: www.iscc.org

2008

- Jan 23-25** **ASTM E12 Color and Appearance**, Embassy Suites Hotel; Ft. Lauderdale, FL, www.astm.org
- Jan 26-31** **19th Annual Electronic Imaging Symposium**, IS&T and SPIE, San Jose, CA, 703-642-9090, electronicimaging.org
- Mar 16-10** **Biomedical Optics (BIOMED)**, Collocated with: Digital Holography and Three-Dimensional Imaging (DH) and Laser Applications to Chemical, Security and Environmental Analysis (LACSEA), Hilton St. Petersburg Bayfront, St. Petersburg, Florida, USA, 202-416-1907, www.osa.org/meetings/topicalmeetings/biomed/
- Mar 16-19** **TAGA 2008**, Technical Association of Graphic Arts, Sheraton Fisherman's Wharf Hotel, San Francisco, California, www.gain.net/eweb/
- Apr 27-May 2** **2008 ASPRS Annual Conference**, The Imaging and Geospatial Information Society, Oregon Convention Center, Doubletree Hotel Lloyd Center, Portland, Oregon, 301-493-0290, www.asprs.org/
- May 4-6** **SPE ANTEC 2008**, Society of Plastic Engineers, Color and Appearance Division, Milwaukee, WI, www.4spe.org/conf/antec08/
- May 12-15** **CPMA's 2008 International Color Pigments Conference**, Lincolnshire Marriott Resort, Lincolnshire, IL, www.pigments.org/
- May 18-23** **SID 2008**, Los Angeles, CA, www.sid.org/conf/sid2008/sid2008.html
- Jun 9-Jun 13** **CGIV 2008: IS&T's Fourth European Conference on Color in Graphics, Imaging and Vision**, Terassa, Spain, 703-642-9090, www.imaging.org/conferences/
- Jun 10-13** **CGIV 2008: IS&T's Fourth European Conference on Color in Graphics, Imaging and Vision** Terassa, Spain, 703-642-9090, www.imaging.org/conferences
- Jun 15-18** **AIC Interim Meeting, Colour – Effects and Affect**, in Stockholm, Sweden, Swedish Colour Centre Foundation, Contact: Berit Bergström, berit.bergstrom@ncscolour.com, www.aic2008.org
- Jun 24-27** **Archiving 2008**, Society for Imaging Science and Technology, Bern, Switzerland 703-642-9090, www.imaging.org/conferences/
- Jun 25-27** **ASTM E12 Color and Appearance Meeting**, Adams Mark; Denver, CO www.astm.org
- Sep 14-16** **Inter-Society Color Council 2008 Annual Meeting**, Baltimore, Maryland, 703-318-0263, www.iscc.org

- Oct 15-17** **International Coatings Expo, ICE 2008**, Federation of Societies for Coatings Technology, Lakeside Center, McCormick Place, Chicago, IL, 610-940-0777, www.coatingstech.org/Programs/index.cfm?event=ICEAttendeeInfo
- Nov 10-14** **Sixteenth Color Imaging Conference**, Society for Imaging Science and Technology, and Society for Information Display, The Benson Hotel, Portland, Oregon, www.imaging.org
- Nov 15** **ISCC/IS&T Special Topics Meeting**, Intersociety Color Council and Society for Imaging Science and Technology, The Benson Hotel, Portland, Oregon, 703-318-0263, isccoffice@cs.com

2009

- Sept 27-Oct 2** **AIC 11th Congress**, Sydney, Australia, Organizer: Colour Society of Australia, Contact: Nick Harkness, www.aic2009.org
- Jun 23-25** **ASTM E12, Color and Appearance**, American Society for Testing and Materials, National Institute of Standards and Technology, Gaithersburg, MD, www.astm.org

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All submissions must be in English. Please submit materials by the first of each even numbered month. Materials submitted later may be printed in the following issue.

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