

# Inter-Society Color Council *News*



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## Season's Greetings

Wishing each and everyone a very Merry Christmas and a Happy and Healthy New Year!

Gultekin Celikiz-ISCC News Editor

Number 371 January/February 1998

## 21ST CENTURY TECHNOLOGY AND CREATIVITY 1998 WILLIAMSBURG CONFERENCE (FEBRUARY 22-24)

The Inter-Society Color Council will be presenting an outstanding roster of professionals within design, the fine arts and industry who will address issues related to color as we approach the new millennium. These are individuals who have made major contributions to their disciplines on a national and international level. The two and one-half day program will include opportunities for speakers and attendees to interact within open scheduled discussions and social events. Time has been allotted within the conference schedule for participants to enjoy Colonial Williamsburg. This conference offers a special opportunity for meaningful interaction between the creative practitioner and the technical and scientific community. Registrations received after December 21st will be accepted on a space available basis. Registration forms and information may be obtained by contacting Ms. Cynthia Sturke, Administrative Assistant, at Tel: 703-318-0263, fax: 703-318-0514 or email: [iscc@compuserve.com](mailto:iscc@compuserve.com). More information concerning the conference program and speakers are available on the ISCC World Wide Web site at: <http://www.iscc.org>.

Prof. Wade Thomson

## COLOR CLEAVER: SLICING AND DICING THE WORLD OF COLOR

One of the poster papers at the ISCC Williamsburg Conference, February 22-24, 1998, will be a demonstration of the computer application *Color Cleaver: Slicing and Dicing the World of Color*. This beta version of the software is being shown by Joy Luke, Linda Taylor and Sylvia Weiss in the hope that ISCC members will try it and

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have suggestions for improving its usefulness before the final version is completed.

There are many computer applications that allow the user to create individual colors and a number that contain libraries of color palettes. *Color Cleaver* differs by enabling anyone looking for colors to use in a specific project, or looking for fresh color ideas, to search through color space for the right group of colors. The user indicates a pair of colors that must be used in a project, or ones the user would like to include in a color palette, and *Color Cleaver* returns between 40 and 200 unique groups of colors. Each of these groups contains the original pair of colors and a different set of interrelated colors. This is accomplished by slicing two-dimensional color planes at various angles within a three-dimensional color solid developed by the Optical Society of America. Since the planes contain transitional colors the viewer senses an underlying unity among the colors, making the palettes harmonious.

In 1947, shortly after the end of World War II, a committee was established by the Optical Society of America (OSA) to work on a new color order system. The goal was to develop a three dimensional color solid in which all color samples would be placed at perceptually equal color differences from one another in all directions. For this reason the color system is termed the Uniform Color Scales. Most of the individuals who served on the OSA committee were also major figures in the ISCC. Deane B. Judd, Dorothy Nickerson, Kasson S. Gibson and Sidney M. Newhall had been responsible in 1943 for the renovation of the Munsell color system and their work with that system convinced them that there was a need for a color order system in which perceptually uniform spacing was the primary criteria.

Dr. Judd served as chairman of the OSA committee until his final illness when David MacAdam became chairman and completed the committee's work. C. D. Reilly, who was largely responsible for the CIELAB formulas, fitted formulas to the

experimental data collected by the committee. Carl E. Foss suggested the system's form, which is important to its usefulness. Instead of being based on polar coordinates like the Munsell system, or on a cubic grid as CIELAB is, he proposed that colors be placed at the nodes of cuboctahedral units. These units are repeated to fill the achievable gamut of colors. This places each color equi-distant from seven other colors, a stringent test of uniformity, and fills space with the densest possible array of colors. Considered from a different viewpoint, this arrangement of points in space is the face centered cubic version of closest packing.

The Uniform Color Scales were completed and the OSA made available a notebook of colored samples representing the system in 1976, twenty-nine years after the project began. These OSA-UCS color samples have been used in numerous visual studies since then, but this computer application is the first way for people in other fields to take advantage of this uniquely beautiful color space.

Joy Turner Luke

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## 1998 ISCC ANNUAL MEETING WITH THE OPTICAL SOCIETY OF AMERICA

**M**ark your calendar and plan to participate in the 67th Inter-Society Color Council Annual Meeting which will be held in conjunction with the Optical Society of America Annual Meeting on October 1-4, 1998 at the Marriott Inner Harbor Hotel in Baltimore. As usual the meeting will include sessions organized by each of the

three interest groups, the education committee and any active project committees. In addition, there will be an ISCC/OSA Joint Symposium on color differences and color discrimination. We are expecting significant international contributions to this symposium from researchers in colorimetry, vision science, and industry. A draft of the planned meeting schedule along with a description of the joint symposium is given below.

A call for papers for the joint symposium will be included with the OSA Annual Meeting call for papers. Calls for the interest group and poster sessions will be circulated by the various group chairs through ISCC News. Please keep your eyes open for these calls and plan on participating in the meeting.

### Preliminary Meeting Schedule

Thursday, Oct. 1

8:00-4:00 ISCC Board of Directors Meeting

Friday, Oct. 2

9:00-11:30 Education Committee

11:30-1:00 ISCC Member-Bodies Lunch

1:00-2:00 Project Committee #51; Guide to Material Standards

2:00-4:30 Interest Group III; Art, Design & Psychology

4:30-5:00 Newcomers Meeting

5:00-7:00 Wine & Cheese Reception / Contributed Posters Session

Saturday, Oct. 3

9:00-11:30 Interest Group II; Industrial Applications of Color

11:30-1:00 Awards Luncheon / Business Meeting

1:00- 2:00 Individual Members Group Meeting

2:00-4:30 Interest Group I; Fundamental & Applied Color Research

6:00- ?? "Crab Bake" Outing

Sunday, Oct. 4

9:00-5:30 ISCC/OSA Joint Symposium "Color Discrimination and Color Differences: Perception and

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### Prediction"

The perception of color differences and color discrimination judgments, along with their prediction by mathematical formulas, are important both in industrial applications and basic color science. This symposium aims to bring together researchers from both domains to share their problems and solutions and create linkages to advance the field.

Please mark your calendars, plan to attend, and watch for upcoming calls for participation, program details, registration information, etc.

*Mark D. Fairchild*  
1998 ISCC Annual Meeting Chair

## ISCC 1998 ANNUAL MEETING OCTOBER 2-4 INTEREST GROUP I

### Basic and Applied Color Research CALL FOR PAPERS

ISCC Interest Group I, Basic and Applied Color Research, serves to bring together researchers in the fields of color science, color measurement, color technology, vision, education and psychology, to discuss topics of mutual interest. For the Annual Meeting to be held in Baltimore, MD, October 2-4, 1998, the topic of discussion is "Color Difference and Color Appearance". The session will comprise contributed papers (each approximately 20-30 minutes in length).

Color appearance models are particularly timely now, because of the need for a universal color-management standard on the Internet and in digital television. The CIE has a very active technical committee dealing with this topic. A CIE model called CIECAM97s is a candidate for a universal color-appearance space to be recommended

as a substrate for color-management systems. CIE Division I will hold a meeting in Baltimore, MD just prior to the Inter-Society Color Council Annual Meeting, and we anticipate that some of the participants will share their research and views with us at the Interest Group I session.

Interest Group I is now soliciting contributed papers on any aspect of basic and applied research in the field of color appearance and color difference. Please submit by June 1, 1998 a title and an abstract of no more than 200 words to either the Chair or Vice-Chair:

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## COLOR RESEARCH AND APPLICATION

### IN THIS ISSUE, February 1998

There is probably no circumstance where the visual evaluation of color is more critical than in certain medical applications. Our first article in this issue deals with one such situation. The rapid onset of cyanosis, a blue coloration of the skin and mucous membranes usually associated with a decrease amount of oxygen in the blood, may be a medical emergency. The accurate assessment of a patient's color can lead to the early detection of cyanosis. In the past, illuminant require-

ments that specified color temperature and color rendering index were sufficient to ensure appropriate lighting for the detection of cyanosis. However, with the replacement of many traditional fluorescent lamps with triphosphor technology, there is a need for reevaluation of the acceptance criteria. In "A Method for Evaluating the Acceptability of Light Sources for Clinical Visual Evaluation of Cyanosis," Stephen Dain, John W. Hood, Steward Montano, and Con Arali describe a method of evaluation with a single value criterion for acceptance of lighting.

In "Colour Matching for Ink-Jet Prints on Paper" C. de M. Bezerra, C.J. Hawkyard, H.M. Kulube, and S. Reyner describe a study that used partitive color mixing theory to predict colors produced by an ink-jet printer, and also the reverse process, whereby the area of each color was calculated for a given target color, which was specified by its tristimulus values. Ink-jet printers produce colored areas by spraying an array of tiny dots of a select number of colored inks. While most printers use 3 colors, possibly with the addition of black, there has been recent interest in increasing the color gamut by increasing the number of ink colors to seven or eight. Generally the color of a patch results from the additive mixture of colored dots. However, the situation is further complicated because of overlap of the dots also produces colors by subtractive mixing. Two, three and eight color mixtures, as well as the overlap considerations are included in this study.

A topic of historical concern in color science is assessing the legitimacy of summarizing color-difference data using a two-dimensional uniform chromaticity space. Although the CIE 1960 space is such a summary, the CIE 1976 spaces involve three dimensions and also implicit chromatic-adaptation laws. However, there is still a desire for a two-dimensional metric [see P. Alessi's "CIE guidelines for coordinated research evaluation of colour appearance models for reflection print and self-luminous displays image comparisons" in volume 19 of this

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journal, pages 48-58 (1994)]. As if in response to this perceived need, Claudio Oleari presents an article entitled "Uniform-scale chromaticity diagrams: opponent-chromatic responses as logarithms of cone-activation ratios." This article returns to the MacAdam-ellipse data that supported the 1960 space, and shows near uniformity of the color-difference thresholds in a 2D space whose coordinates are the logarithms of two cone-activation ratios. He finds that other published data also support the primacy of these coordinates, and suggests that chromatic adaptation of the cone-activation stage may be enough to render the model predictive of color-difference thresholds under different states of chromatic adaptation.

In the field of machine vision acquiring lighting information from the various reflections from objects is essential to the analysis of the scene leading to object recognition, etc. When we look at objects, we form many judgments subconsciously including recognition of the object, its color, the type of material that it is made out of (i.e., metal, plastic, stone, etc.). These judgments are linked to our experimental knowledge of how light interacts with the object and our subconscious analysis of the lighting conditions. In general, the specular reflection from a light source does not confuse us when we determine the shape or color of the object. This may not be true for machines. While we do not consciously ask the question, "Is this white area a new and different object, or merely a light source reflection?", a machine does. To answer this question, it is necessary for the computer to gain information about the light sources illuminating the objects. This information must come from the analysis of the radiant energy reflected from the objects. Thus it is vital to know the expected reflectances from objects. In "Linear Bases for Spectral Reflectance Functions of Acrylic Paints," Antonio Garcia-Beltrán, Juan L. Nieves, Javier Hernández-Andrés, and Javier Romero developed

a linear model for representing reflectances from a group of 5574 samples of acrylic paint on paper. Having the basis functions allowed the reflectance curves of objects to be recovered from the effects of the illumination falling on the object.

The final article in this issue follows a topic from last year, the preservation of monumental buildings. The earlier article examined the preservation of granite buildings, and the current article is concerned with the preservation of sandstone buildings. In "Assessment of Chromatic Changes Due to Artificial Aging and/or Conservation Treatments of Sandstones," the authors, J. Garcia-Talegon, M.A. Vicente, S. Vicente-Tavera, and E. Molina-Ballesteros report on the chromatic changes observed when weathering sandstone.

The Color Forum question this month is how many colors can people distinguish? This age-old question has been brought to mind recently by claims in the computer display field. It has been suggested that an advanced display system can produce 16.7 million different colors ( $2^8 \times 2^8 \times 2^8 = 16,777,216$ ), but can we perceive the difference between each of them? Pointer and Attridge discuss this question in "The Number of Discernible Colours."

In our Communications and Comments column this month, we have several letters in regard to recent articles and the authors' responses. One pair concerns the rigorous testing of the CIE Standard Observers by Kuehni and Thornton responding. Another letter, from Stephen Dain, is about traffic signals and Q factors for sunglasses. A third set includes a comment on a potential misunderstanding regarding the Allen Algorithm by Eugene Allen, and a response by Robert Marcus and Percy Pierce. Let me close by saying this issue contains an unusual number of book reviews, six of them. They report on the books: *Color: an Introduction to Practice and Principles* by Kuehni (two reviews), *Color Technology for Electronic Imaging Devices* by H. Kang, *The Reproduction*

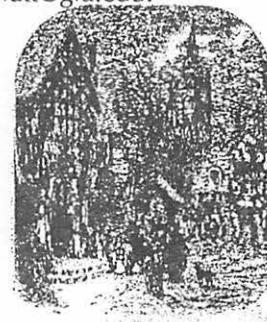
*of Colour* by Hunt, *Fifteenth Biennial Workshop on Videography and Color Photography in Resource Assessment* ed. by Paul W. Mausel, and *Indirect Perception* by Rock.

Ellen C. Carter  
President, ISCC

## CALL FOR POSTERS

The Gemological Institute of America will host the 1999 International Gemological Symposium in San Diego, CA on June 21-24. More than 2000 people are expected to attend this pivotal event. The symposium program - with the theme "Meeting the Millennium" - will feature technical sessions and panel discussions on a variety of topics of vital interest to all members of the gem and jewelry industry. In addition, there will be an open Poster Session featuring original presentations on such topics as new gem materials, synthetic gem materials, treatments, gem identification and grading instrumentation and techniques, gem localities, gem exploration, jewelry manufacturing, and jewelry design.

Contributions are being solicited for this Poster Session. To be considered for this important event (space is limited), please submit a preliminary abstract (no more than 250 words) to one of the Poster Session organizers by October 1, 1998. For further information on the Poster Session, contact Dr. James Shigley at 760-603-4019; fax: 760-603-4021; email: jshigley@gia.edu or Ms. Donna Dirlam at 760-603-4154; fax: 760-603-4256 or email: ddirlam@gia.edu. For information on the Symposium, contact Carol Moffatt at 760-603-4406 or email: cmoffatt@gia.edu.



## FIFTH COLOR IMAGING CONFERENCE BIGGER THAN EVER

The Fifth Color Imaging Conference was held in Scottsdale, AZ from November 18 to 20, 1997. The conference is co-sponsored by the Society for Imaging Science and Technology (IS&T) and the Society for Information Display (SID). The conference continues to grow, with 335 participants this year. This is a single track 3-day conference plus one day for tutorials, with sessions this year on: Color Vision & Appearance; Gamut Mapping & Display; Color Printing; Color Transforms & Algorithms; Digital Photography; Color Graphics & Simulation; Color Management and Color Standards & Measurements. There was also a poster session, an evening panel on Color Integrity vs. Color Fidelity on the Internet, and a talk by Rich Gold of Xerox PARC on Documents and Genres. The proceedings are available as hardcopy and on a CD-ROM.

This year's conference began with a keynote address from Dr. Robert Hunt, his third keynote address at this annual conference. Dr. Hunt derived how many bits per color are needed in today's digital systems, in a presentation entitled, "Bits, Bytes, and Square Meals in Digital Imaging." By considering the limited reproduction gamut of these systems, visual sensitivity to luminance versus chrominance, the modulation transfer function in the eye, and a visually linear quantization of available levels, the audience was shown that about 1 bit/pixel is sufficient. Further compression is available for motion pictures, necessitating only 0.3 bits/pixel.

Lindsay MacDonald, Conference committee CO-chairman, presented Dr. Hunt with an award for recognition of outstanding contribution to the field of color science and to the Color Imaging Conference.

Thus began the Color Vision and Color Appearance session, chaired by Ronnier Luo (U. Derby). Graham Finlayson (U. Derby) and Paul Hubel (Hewlett-Packard) presented a method for white balance correction which correlates the gamut of colors in the image with reference samples under various illuminants. The illuminant which gives the best correlation is chosen as the probable illuminant of the scene, and the image can then be corrected for this illuminant.

Cathleen Daniels (Eastman Kodak Co.) conducted experiments which showed that the effect of surround on the illuminance contrast in pictorial images is less than what was previously found. S. Lee Guth (Indiana U) proposed that our contrast sensitivity to color variations (yellow/blue and red/green) may have the same band-pass characteristics that the luminance contrast sensitivity function (CSF) exhibits. The luminance CSF becomes a low-pass function for low lightness values, and most chromatic CSF experiments are done at low chroma values. Therefore when the threshold experiment is performed at high chromatic stimulation levels, perhaps the CSF becomes band-pass.

An invited talk by Maureen Stone began the Gamut Mapping and Display session. Stone discussed the work of the VRML Color Fidelity Working Group. VRML, or Virtual Reality Modeling Language, is used for 3D graphics on the world wide web. One issue the group struggles with is gamma. Their experiments showed that a gamma of 2.2 was preferred over 1.3, and they are considering using that as their standard. Two papers discussed gamut mapping. Jan Morovic and M. Ronnier Luo (U. Derby) developed several gamut-mapping algorithms which they compared to several standard techniques. They compared printed reproductions to originals displayed on a CRT at D50 and found that their new techniques outperformed more traditional gamut mapping methods. Hideto Motomura (Matsushita Research Institute) used

color categories and tolerance ellipses to perform color appearance and gamut mapping transformations.

The Color Printing session chaired by R. Buckley (Xerox Corp.) began with an invited paper by Gary Field (Cal. Poly.) Field reminded the audience that there is more to obtaining color approval in the graphic arts industry than  $\Delta E$ 's. Other factors include reproduction objectives, gamut considerations, and differences in color vision. He was followed by three papers on printer modeling, specifically as a way of characterizing color output. J.P. Van deCapelle (Barco Graphics) described a substrate-independent technique for printer modeling by making spectral measurements of single-colorant step wedges on different backgrounds, and estimating various parameters that are independent of the background. A simple model is then used to predict the color of arbitrary ink mixtures. Patrick Emmel (Ecole Polytechnique Federale de Lausanne) discussed an extension to Beer's Law that allows for the characterization of fluorescent inks. Jonathan Arney (Rochester Inst. Tech.) showed good results with a CMY halftone model that is an extension of the Neugebauer model.

Mike Brill (Sarnoff Corp.) described his efforts to add color and time components to the Lubin vision model. He described a correlation of 0.9 between the model's JNDs and subjective ratings across several visual tasks. The model has been proposed as a draft standard in the ITU and IEEE, and he expects an executable version of the model to be available on the web soon. Raja Balasubramanian (Xerox Corp.) discussed a computationally efficient method of color correction which utilizes a PEG-encoded image.

In the Digital Photography session, Kimiyoshi Miyata and other researchers at Chiba University found that correlation between an objective error measure and subjective ratings of degraded images increased when the error was computed using the blocks in the image most often gazed at by

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subjects. Xuemei Zhang (Stanford U) described the correlation between detection probabilities and the distortion maps laboriously constructed by paid subjects who compared original and halftone images. The detection probabilities were computed using RGB, CIELAB and sCIELAB and sCIELAB 94; sCIELAB made the most consistent predictions, and was improved through the use of CIE94.

The Color Imaging Conference is increasing its focus on the accurate use of color in computer graphics. In a session on Color Graphics and Color Simulation, chaired by Donald Greenburg (Cornell U), several presentations looked at the relationship between knowledge of the illumination and the quality of the graphics simulation.

The Color Management session concluded with a thorough discussion by the president of the International Color Consortium (ICC), Todd Newman. Newman (Silicon Graphics, Inc.) discussed some of the problems which continue to plague the color management world. The use of private tags by color management modules, ambiguity in the specification, particularly concerning white point, definition of rendering intents, gamut stretching, and appearance modeling are all areas that need further definition in order to achieve consistent and high-quality color management. Twenty-three posters were presented in a separate-track poster session. Gustav Braun (RIT) won this year's "Cactus Award" for the best poster presentation. He presented a method for visualizing gamut surfaces by plotting maximum  $C^*$  as a function of  $L^*$  and hue. This results in a 2-D "mountain range" surface, with potential use for operations such as efficiently determining out-of-gamut pixels, smoothing of noisy gamut surface data, and gamut mapping. In a related poster, Patrick Herzog (Aachen U. of Tech.) used a similar gamut representation to perform printer calibration on "nested shells" of the printer gamut.

Parker Plaisted (Torrey Pines) and Robert Chung (RIT) presented a paper

on the ICC profile construction process, discussing the trade-off between providing control for the expert and ease-of-use for the novice. A set of features was identified for profile construction. Three levels of user expertise were identified, along with the feature subsets available at each level. Phil Green (London College of Printing) compared the quality of ICC profiles created by several vendors. Outputs were significantly different, with Color Synergy profiles generally preferred for their high chroma renditions.

*Karen Braun  
Robert Buckley  
Raja Balasubramanian  
Xerox Corporation*

## THE UNITED STATES NATIONAL COMMITTEE OF THE INTERNATIONAL COMMISSION ON ILLUMINATION (USNC/CIE)

The USNC/CIE held its Annual Meeting Friday, Oct. 30 through Sunday, November 2 at the Holiday Inn NE in Wickliffe, Ohio, northeast of Cleveland. The meeting was held jointly with the Canadian National Committee.

Friday morning was devoted to US meetings of the Technical Council and of the Executive Committee. At the latter meeting, the nominations of the two new Members for Life was approved, namely William Thornton and James Jewell. Thornton is well known to many ISCC members. Jewell is a former President of the Illuminating Engineering Society of North America (IESNA). The afternoon was devoted to Activity Report of CIE Divisions and to

a report on CIE Standards, after which USNC and CNC held separate business meetings.

On Saturday, November 1, The Technical Program titled New Developments in Lighting included five papers for the morning session, as follows:

Jennifer Vetch, NRC Canada, Research at NRC on Lighting Quality and its Effects on Performance and Satisfaction.

Luke Cui, Macbeth Co., Error Sensitivity in Measuring Chromaticity.

Justin Rennilson, ARTI, Revision of CIE Publication 54 on Retroreflection.

John Bullough, Lighting Research Center, Rennselaer Polytechnic Institute, Mesopic Photometry: Issues and implications.

William Thornton, Prime Color Inc., The One Remaining Step to Reach Excellent Lamplight.

The Afternoon session included the following five papers.

Ivan Pasini, PW&GS, Canada, Integrated Personnel Environmental Controls

Clay Belcher, University of Kansas, Electronic Lighting Textbook

David Crawford, International Dark-Sky Association, Astronomy and Light Pollution: Where Have the Stars Gone?

Steve Martel, Remote Source Lighting, Remote Illumination Systems

Gary Allen, GE Lighting, Remote Illumination Systems

This reporter would like to have time to make brief reports on each presentation, but he will include a brief report on just one, namely that of Bill Thornton because of its profound implications. Thornton reminded the conference that the luminous efficiency curve was disqualified by MacAdam in 1950 when he showed that perceived brightness is strongly non-additive. Judd reported in 1955 that the CIE had come to regard the luminous efficiency function, as a matter of convenience and utility rather than because luminance so evaluated correlates with

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what the eye sees. Yet trichromacy of vision demands three independent visual-system spectral sensitivities. Thornton cited 14 sets of visual data, including both CIE observers and MacAdam's 1967 landmark paper "Color Science and Color Photography," which by consensus indicate narrow peak sensitivities at three nanometer wavelength regions, namely  $446\pm 7$ ,  $533\pm 5$ , and  $610\pm 6$ . Recognition of this fact together with the concomitant minima in the blue-green and yellow regions of the spectrum, recommends lamplight with minimized power in these regions. The gain is higher brightness per watt of lighting in an illuminated space as well as more preferred coloration of well known object colors. He demonstrated the latter point by illuminating colored fruit and vegetables with a conventional cool-white fluorescent lamp and with a tri-band lamp.

Saturday evening all attendees and accompanying persons were transported by bus to Nela Park to tour the General Electric Lighting Institute followed by a social hour and a gourmet dinner as guests of the Institute.

Report submitted by Harry K. Hammond III

## AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC Research Committee on Color Measurement Test Method (RA36) met November 20, 1997 in Research Triangle Park. The committee reviewed the following items:

- *Color Technology in the Textile Industry, 2<sup>nd</sup> edition* is recently published and available for sale by AATCC. More on this book elsewhere

in the News.

- Video will be produced next year demonstrating the proper use of color evaluation procedures.

- Lighting Communications subcommittee plans to meet with retailers and producers of apparel, textiles, and dyes to recommend standard procedures for viewing color. Representatives of this subcommittee will participate in meetings regarding color and lighting. Effects of color rendition from sources having similar CRI and CCT (but different SPD) were demonstrated visually for the subcommittee.

- Letter Ballots:

Proposed method for general procedure for the determination of relative dye strength by spectrophotometric transmittance measurement.

Revision of the Test Method 173, *CMC: Calculation for Small Color Differences* for letter ballot before the next meeting.

Evaluation Procedure 6: *Instrumental Color Measurement* requiring editorial revision.

Evaluation Procedure 8: *9-Step Chromatic Transference Scale* has been resolved, and filed with AATCC.

- Color Technology Workshop was held October 28-29, and continues to attract participants as a successful training course for color technicians.

- Next meeting of the Committee will be February 24-26, 1998, in Charlotte, NC.

Ann Laidlaw



## CORM 98 COUNCIL FOR OPTICAL RADIATION MEASUREMENTS

CORM announces annual conference and business meeting with joint CIE Division 2 meeting. The CIE Division II meeting will be Monday and Tuesday, May 18th and 19th, and the CORM conference will follow on May 20th and 21st, 1998 in Boulder Colorado at NIST Optoelectronics Division.

CORM '98 events include the traditional Franc Grum Memorial Lecture and banquet, the annual business meeting, sub-committee meetings, and of course, the main conference. The conference will include a technical session to address progress with *International Radiometry and Photometry* standards, and appropriate to NIST Boulder expertise, there will be a double session dedicated to the topic of *Optoelectronics*.

A special social event is planned for Sunday, May 17th, and an inter-meeting social hour will be held on Tuesday evening. A tour of some NIST Optoelectronics facilities will be on the 21st.

Preliminary CORM 98 Schedule and Call for Participation

**Sunday May 17th:** A special social outing is planned which will include a tour of the magnificent natural surroundings. More details can be expected in the Spring 98 ORN and on our website, on-line about December 1st.

**Monday May 18th:** CIE Division II-Technical Committee Meetings: Three conference rooms at NIST will be available for these committee meetings.

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**Tuesday May 19th:** CIE Division II—Main Meeting: Room 1107 at NIST will be available for this meeting. The Division II main meeting typically includes: reports from the Associate Directors and the technical committees under the jurisdiction, the Editor's report, reports on activities regarding CIE standards, discussion on new technical committees and/or reporters, and administrative matters.

An inter-meeting social hour will be held on Tuesday evening at the Regal Harvest House.

**Wednesday May 20th, AM:** CORM AM Conference Session—*International Radiometry and Photometry Standards*

This session is a forum for national laboratories involved in radiometry and photometry, to present new measurement techniques or instruments, new reference materials, or advances in measurement and calibration services. The conference sessions are being held in the NIST auditorium.

**Wednesday, PM:** CORM PM Conference Session—*Optoelectronics (Part 1)*

This is the beginning of a double session where technical papers will be presented regarding recent advances in topics that may include: Laser measurement, Fiber-optic metrology, Integrated Optics, Optical Emitters & Detectors, and Optoelectronic Components. Held in the NIST auditorium.

The Franc Grum Memorial Lecture and banquet will be Wednesday evening at the Regal Harvest House.

**Thursday May 21st, AM:** CORM AM Conference Session—*Optoelectronics (Part 2)*

The technical session will continue from the previous afternoon.

**Thursday, PM:** CORM PM sessions—Committee and Sub-committee Meetings, Tour

A block of discounted rooms will be

available at the Regal Harvest House for May 16th through May 23rd, located at 1345 28th Street, Boulder CO 80302-6899. For more details and updates, visit our new website ([www.corm.org](http://www.corm.org)) available after December 1st, 1997.

**Conference Coordinators:**

(CORM Directors)  
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## FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY (FSCT)

Celebrating its 75th Anniversary, the Federation convened in Atlanta, GA, on November 3-5, 1997. Offered in conjunction with the 75th Annual Meeting was the International Coatings Expo (ICE) and Technology Conference. The FSCT-sponsored event attracted 8,233 attendees to Atlanta's Georgia World Congress Center.

The record-setting number of supplier companies—332—filled 96,800 square feet of exhibit space with state-of-the-art raw materials, equipment, and services for the coatings industry. Of these, 49 companies were first time exhibitors. The previous record was set in 1996 when 320 supplier companies were represented in Chicago, IL.

Returning for its second year was the popular International Coatings

Technology Conference. The Conference, which drew 495 registrants to its four two-day and ten one-day programs, featured sold-out attendance at two of its offerings: "Executive Forum I: Strategically Effective New Product Development: An Enterprise-Wide Approach from Concept Through Commercialization" and "Surfactant Chemistry."

Technical presentations were also an important part of the FSCT Annual Meeting. From the Keynote Address given by one of the nation's leading science and technology forecasters Daniel Burrus to the Mattiello Memorial Lecture presented by F. Louis Floyd, the Annual Meeting offered attendees many opportunities to learn of the latest innovations in the world of coatings technology.

James A. McCormick, Managing Director of Enhansco, Ponte Vedra Beach, FL, was the recipient of the Federation's highest honor, the George Baugh Heckel Award, for 1997.

Mr. McCormick, a Past-President of FSCT, received the award during the Opening Session of the Federation's Annual Meeting, in Atlanta, on November 3.

The FSCT is proud to announce the additional winners of awards presented at its 75th Annual Meeting:

**DISTINGUISHED SERVICE AWARD**—M. Jay Austin, of Halox Pigments, Hammond, IN.

**ARMIN J. BRUNING AWARD**—Calvin McCamy, retired from Macbeth, Division of Kollmorgen, New Windsor, NY

**ROON FOUNDATION AWARD**—"Oxidative Crosslinking of Alkyd Resins Studied with Mass Spectrometry and NMR Using Model Compounds"—W.J. Muizebelt, J.J. Donkerbroek, M.W.F. Nielen, J.B. Hussem, M.E.F. Biemond, R.P. Klaasen, K.H. Zabel, of Akzo Nobel

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**ALFRED L. HENDRY AWARD**—Kip Sharp, University of Southern Mississippi, Hattiesburg, MS.

**SOCIETY SPEAKERS AWARD**—First Prize—Amir Niromand (Rhone-Poulenc, Inc.) New York Society.

Second Prize—Ben Calozzo (DCA Coatings) Cleveland Section.

**SOCIETY SECRETARIES AWARD**—

First Prize—Joseph C. Reilly, JCR Enterprise, Secretary of the Los Angeles Society.

Second Prize—Chris Lockhart, Reynolds Metal Co. Secretary of Louisville Society.

**CORROSION COMMITTEE PUBLICATION AWARD**—"Rapid Electrochemical Assessment of Paint"—M. Kendig, S. Jeanjaquet, R. Brown and F. Thomas of Rockwell. Published in the December 1996 issue of the Journal of Coatings Technology.

**A.F. VOSS/AMERICAN PAINT & COATINGS JOURNAL AWARDS**—

First Prize—"Correlation of Accelerated Exposure Testing and Exterior Exposure Site, Part IV-Three-Year-Results," Cleveland Society.

Second Prize—"Reactive Diluents for Two-Component Polyurethane Coatings," New York Society.

**ANNUAL MEETING POSTER SESSION**—

First Prize—"Linseed and Sunflower Oil Alkyd Ceramers"—Rob Sailer, North Dakota State U.

Second Prize—"Stratification Processes During Urethane Crosslinking Spectroscopic Studies"—

C.L. Allison and M.W. Urban, North Dakota State University.

Third Prize—"Corrosion Protection of Aluminum: Correlation of Salt Fog Testing with Electrochemical Evaluation"—J.O. Stoffer, T.J. O'Keefe, E. Morris, X. Lin, P. Yu, University of Missouri-Rolla.

ICE '98

Plans are underway for the 1998 International Coatings Expo and Technology Conference to be held October 14-16, 1998, at the Ernest N. Morial Convention Center, in New

Orleans, LA. For exhibiting information, contact Steve Kettlekamp at 314-994-9640.

## RIT'S MUNSELL COLOR SCIENCE

### LABORATORY

#### 1998 SUMMER INDUSTRIAL SHORT COURSE ANNOUNCEMENT

Rochester Institute of Technology's Munsell Color Science Laboratory will present its annual courses in Color Science in June 1998. "Principle of Color Technology for Material Systems," will be offered in two segments: "Colorimetry and Color Measurement," June 1-3, 1998 and "Industrial Color Matching" June 4, 1998.

"Colorimetry and Color Measurement," will focus on the applications of colorimetry for industrial color control of materials. Key topics include spectrophotometry: principles, geometry selection, and methods of characterizing precision and accuracy; CIE colorimetry, derivation of colorimetry from XYZ through CIELAB; and tolerancing: CMC and CIE94 equations, deriving visual tolerances from historical pass/fail data, and optimizing L:c ratios. Additional topics include: terminology, color vision, color order systems, illuminant and observer metamerism, and color TQM concepts. This course is taught by Dr. Roy S. Berns, R.S. Hunter Professor of Color Science, Appearance and Technology, and Dr. Mark Fairchild, Director, Munsell Color Science Laboratory.

"Industrial Color Matching" will present techniques to successfully use computer colorant formulation systems in an industrial environment. This course will be taught by Ralph Stanziola, co-founder of Applied Color Systems and current President of Industrial Color Technology. Topics include: colorant identification via

spectral analyses, additive functions of reflectance (Kubelka-Munk) and transmittance (Beer-Lambert), semi-quantitative production batch adjustments, principles of computer colorant formulation, methods to get the most out of your system, and a problem solving session. This is a great opportunity to benefit from Mr. Stanziola's extensive industrial experience.

These courses are highly beneficial to persons involved in the coloration of natural and synthetic materials such as paints, textiles, and plastics.

#### INDUSTRIAL SHORT COURSES IN COLOR IMAGING

Rochester Institute of Technology's Munsell Color Science Laboratory will present a one week industrial course for the color imaging community.

"Foundations of Color Management Systems," will be held on June 8-12, 1998. This is a five-day intensive short course designed to teach the underlying principles for implementing color management. The course is divided into three sections: colorimetry, modeling imaging peripherals for device profiles, and color appearance models. Participants can participate in any or all of the sections. These foundations are incorporated into color management systems such as Postscript Level II, ICC and KPCMS providing "plug and play" capabilities.

Section One: Colorimetry for Imaging, offered on June 8, will be taught by Dr. Roy S. Berns, and will include an overview of color vision and appearance, photometry, colorimetry mathematics, color measurement instrumentation, color space transformations, and color quality metrics.

Section Two: Colorimetric Device Characterization, offered on June 9-10, will also be taught by Dr. Roy S. Berns. Topics include scanner colorimetry using multiple-linear regression and spectral estimation techniques; CRT colorimetry using the CIE technique; binary printer colorimetry for cluster dot, FM

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screening, and conventional rotated screen and halftoning devices; continuous tone printer colorimetry using Kubelka-Munk theory; and the basics of building device profiles.

Section Three: Color Appearance Models, offered on June 11-12 will be taught by Dr. Mark D. Fairchild. Color-appearance models extend basic colorimetry, as typified by CIE tristimulus values, to the prediction of color matches and color appearance across widely varying viewing conditions. Topics include important aspects of human vision, color appearance terminology, color-appearance phenomena, derivation of color-appearance models including Nayatani, Hunt, RLAB, LLAB, CIELAB, and ATD, testing of color-appearance models, applications and implementation.

The courses will consist of classroom lectures, demonstrations, laboratory sessions, and social times for informal interaction with other students and staff. Early registration is recommended.

For further information, contact: Colleen M. Desimone, Munsell Color Science Laboratory, Rochester Institute of Technology, Chester F. Carlson Center for Imaging Science, 54 Lomb Memorial Drive, Rochester, NY 14623-5604; telephone: 716-475-7189; fax: 716-475-5988

email: cmd9553@rit.edu or see our website at "<http://www.cis.rit.edu/research/mcsl/courses.html>.

**ANSWERS to the PUZZLE from the last issue #370:**

**How to Paint the Digital World**

*Submitted by Michael H. Brill*

(a) If B is a sphere, the area surplus is  $3/2$ . To see this, imagine looking at the voxel approximation, B' along the voxel coordinate directions, positive and negative. Each of these views reveals a separate set of voxel faces, which collectively comprise all the visible voxel faces—i.e., the surface of B'. But these six views are circles, each with area  $\pi r^2$  (where r is the radius of

the sphere). The ratio of the sum of these areas ( $6\pi r^2$ ) to the area of the sphere ( $4\pi r^2$ ) is  $3/2$ . You can apply the "six-views" trick to compute the area surplus of any convex object from its three projections (each seen from two sides).

(b) The minimum area surplus is 1, obtained by a cube whose edges are aligned with the voxel coordinate axes. The maximum area surplus is  $\sqrt{3}$ , obtained either by a cube voxel-aligned along its body diagonals or by an octahedron with its opposite vertices so aligned. To see why  $\sqrt{3}$  is maximum, consider any almost-planar "facet" of B with area A and unit normal n in voxel coordinates. The area of the corresponding "facet" of B' is the sum of the projected areas along the three voxel-axis viewing directions from outside the object B'. This sum is A times the sum of the direction cosines  $n_i$  in the voxel coordinate directions. The sum is maximized when the direction cosines are all equal (and hence equal to  $1/\sqrt{3}$ ). Hence the maximum area surplus of the facet is  $3/\sqrt{3}$ , or  $\sqrt{3}$ . By the way, this argument extends to N dimensions, for which the minimum area surplus (in N-1 dimensions) is 1, and the maximum is  $\sqrt{N}$ .

## NEWS FROM MEMBERS

About 20 years ago a group of individuals who were both members of Problem Committee 24D of ISCC and Color Measurement Research Committee RA36 of AATCC, had decided to publish as a book a collection of previously published important papers supplemented by some original papers. Rolf G. Kuehni and a few other members prepared a table of contents and solicited some original papers. Due to the expense of producing a camera-ready copy, the idea of printing this book was only a pipe dream, until Gultekin Celikiz offered to prepare a camera-ready copy and edit the manuscript. The 1st edition finally became a

reality in 1983 and AATCC published a limited number of copies.

In the early nineties as the copies of the first edition dwindled, an editorial committee started to prepare the manuscript for the second edition. The committee had even reached across the ocean to England for three of the articles. Some of the chapters were revised and few of the articles that were timeless were printed without any change. In 1997 the American Association of Textile Chemists and Colorists published the 2nd edition of "Color Technology in the Textile Industry." A number of ISCC members were responsible for both editions. We should recognize these individuals who have spent long hours to make both editions a reality. Those responsible for both editions are:

- \*Eugene Allen,
- \*J. Richard Aspland
- #A. Brokes
- \*Gultekin Celikiz
- \*Theresa R. Commerford
- \*Roland L. Connelly, Sr
- \*Roland E. Derby, Jr. ‡
- \*Charles E. Garland
- \*Louis A. Graham
- \*Franc Grum ‡
- \*Richard W. Harold
- \*Henry Hemmendinger
- \*Robert F. Hoban ‡
- Ann Holland
- Sam J. Huey
- \*Richard S. Hunter
- \*Ruth M. Johnston-Feller
- \*Michael Keating
- \*Rolf G. Kuehni
- \*Ann C. Laidlaw
- Anne Liebeknecht Ellery
- @Roderick McDonald
- @S. Oglesby
- William B. Prescott
- \*Daniel L. Randall
- @Bryan Rigg
- \*Frederick T. Simon
- @Kenneth J. Smith
- Edwin I. Stearns ‡
- \*Charles D. Sweeny
- \*Robert F. Willis
- Christine Wilson
- \*Günter Wyszecski ‡
- \*Joanne C. Zwinkels

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(\*member of ISCC; @living in Great Britain; #living in Germany; ‡ deceased)

The book is on sale from AATCC for \$45 for AATCC members and \$70 for nonmembers. AATCC, P. O. Box 12215, One Davis Drive, Research Triangle Park, NC 27709-2215

**Calvin C. McCamy** has received the Armin J. Bruning Award of the Federation of Societies for Coatings Technology

**William Thornton** has recently been made a lifetime member of the United States National Committee of the International Commission on Illumination (USNC/CIE). I would like to report at this time **Fred W. Billmeyer, Jr.** and **Harry Hammond III** have been life members for some time.

**Mary C. Miller** has just published a book, *Color for Interior Architecture*. It is published by John Wiley & Sons (ISBN 0-471-12736-1). The book examines the major considerations involved in color choice for interior spaces. This unique reference enables readers to gain a fundamental understanding and awareness of color that can be applied to virtually any design situation. The book brings together theory and practice in an

## NOTE ON FIRST WILLIAMSBURG CONFERENCE

The First Williamsburg Conference was organized and run by Max Saltzman in 1966 on Instrumental Approaches to Colorant Formulation.

Ellen Carter  
President

accessible, user-friendly format—providing interior designers, architects, and students with the straightforward help they need to create color settings that satisfy the eye, the mind and the spirit.

Mary C. Miller taught for 20 years at the University of North Carolina at Greensboro where she established and chaired the five-year professional interior design program. She is an active member of the Interior Design Educators Council.

My apologies to **Jean Bourges**. When her book, "Color Bytes" was mentioned in the last issue of *ISCC News*, additional details were inadvertently omitted. "Color Bytes" is published by Chromatics Press, Inc. 110-64 Queens Blvd, Suite #268, Forest Hills, NY 11375. The individual list price is \$34.95, ISCC members less 10% discount—add postage and NY resident sales tax. Corporate discounts are available—for more information contact Robert Silver;  
tel: 718-793-1464  
fax: 718-793-2857.

## MEMBERSHIP DUES

The ISCC Membership Dues Invoices have been mailed for 1998. In an effort to keep our database current, please fill out any changes or additions to your contact information on the invoice. If you did not receive one, please let the office know (Tel: 703-318-0263). Remember, in order to continue receiving the *ISCC News* and Directory update in 1998, it is hoped that you will return your invoice before the next *ISCC News* goes to press. An added benefit to continuing your membership is, of course, the greatly reduced subscription rate to the *Color Research and Application Journal*, available upon your paid membership dues. If you have any questions, please contact Ms. Cynthia Sturke at the ISCC office.

Cynthia Sturke

## RICHARD S. HUNTER COLOR INSTITUTE'S FIRST SEMINAR.

The Richard S. Hunter Color Institute (RSHCI), in partnership with the National Coil Coaters Association (NCCA) provided the first Color and Appearance Seminar on November 20, 1997 for coil coaters and their vendors. A full house of 50 attendees gathered at the O'Hare Westin in Rosemont, IL to hear Glen Anderson, Executive Director of NCCA and Jane Hersey, Executive Director of RSHCI, initiate the seminar and thank the attendees for making the seminar vision a reality.

Gordon Leggett, a color and appearance staff specialist with the Institute, presented the informative, interactive educational program. Anderson praised the quality of the Seminar, color course notes and the accompanying handouts and said attendees received information to help manage their color management programs from prepaint to postpaint. Hersey commented, "There was a broad spectrum of attendees from color technicians to quality managers to vice presidents. The attendees represented a wide variety of coil coating companies who came from as far away as Mexico and Canada.

The NCCA is an industry trade organization representing the coil coating industry. (Coil coating is a continuous and highly automated process for coating metal before fabrication. Coil coated products can be found in a variety of markets including appliance, automotive, building products, containers and packaging, furniture, transportation and more.) The NCCA provides an atmosphere of education and networking to help promote the coil coating industry.

The RSHCI, is named in memory of Richard S. Hunter. The three member Board of Advisors of the Institute was

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announced at the NCCA/RSHCI seminar. All well known in the color community, Dr. Fred W. Billmeyer, Jr. brings a scientific and technical background to the Board, while William V. Longley and Ralph Stanziola provide industrial experiences and strong applications orientation. The NCCA partnering with the RSHCI provides the knowledge of how to provide consistent color and appearance for coil coated products is essential in today's competitive marketplace.

To find out more about NCCA or RSHCI, visit our web site at: [www.coilcoaters.org](http://www.coilcoaters.org) and [www.color-edu.com](http://www.color-edu.com).

*Jane Hersey*  
Richard S. Hunter Color Institute  
703-834-2212

## GENTLE REMINDER!

All appropriate information submitted to this *NEWS* publication is the full and complete responsibility of the sender.

This publication and the ISCC assumes no responsibility for information changes and inaccuracies.

Thanks,  
The Editor

## CALENDAR

Please send information on Member Body and other organization meetings involving color and appearance functions with dates, places, and information source to:

Cynthia Sturke  
ISCC Office Manager  
11491 Sunset Hills Rd.  
Reston, VA 20190  
tel: 703-318-0263  
fax: 703-318-0514  
email: [isc@compuserve.com](mailto:isc@compuserve.com)

## 1998

**ASTM COMMITTEE D-1**, Jan. 11-14, Paint, and Related Coatings, Materials and Applications, Sheraton San Diego Hotel and Marina, San Diego, CA info: Scott Orthey, tel: 610-832-9717; fax: 610-832-9666.

**ASTM COMMITTEE E-12 ON APPEARANCE**, Jan. 14-16, Sheraton San Diego Hotel and Marina, San Diego, CA info: Bode Buckley; tel: 610-832-9740; fax: 610-832-1547.

**ISCC WILLIAMSBURG CONFERENCE** (FEB. 22-24), Color and Design: 21st Century Technology and Creativity, *Inter-Society Color Council*, info: Wade Thompson, tel: 417-882-2553 or ISCC Office

**COLOUR and IMAGING WEEK at DERBY**, March 23-27, University of Derby, United Kingdom, info: Linda Marshall; tel: +44(0)115-9376070; email: [lmarshall@compuserve.com](mailto:lmarshall@compuserve.com)

**COLOR MARKETING GROUP (CMG)**, Spring International Conf., Apr. 19-21, The Broadmoor, Colorado Spring, CO. Info: 5904 Richmond Hwy., Suite 408, Alexandria, VA tel: 703-329-8500, fax: 703-329-0155; email: [colorcmg@erols.com](mailto:colorcmg@erols.com)

**TAGA 98, 50TH ANNIVERSARY CELEBRATION**, Apr. 26-29, *Technical Association of the Graphic Arts*, Marriott Lincolnshire Resort, Chicago, IL, info: Karen Lawrence, tel: 716-475-7470

**CORM 98**, May 17-21, *Council for Optical Radiation Measurements*, Annual Conference and Business Meeting with Joint CIE Division II, at NIST Optoelectronics Division, Boulder CO info: N.L Johnson, tel: 612-733-5939, email: [nljohnson@mmm.com](mailto:nljohnson@mmm.com).

**CIE Division II**, May 18-19, *Commission internationale de l'Éclairage*, Boulder, CO, see CORM 98 meeting, Info: CIE email: [ciecb@ping.at](mailto:ciecb@ping.at)

**SID 98**, *Society for Information Display*, May 17-22, Anaheim Convention Center, Anaheim, CA info: Lauren Kinsey, SID, 1526 Brookhollow Drive, Suite 82, Santa Ana, CA 92705, tel: 714-545-1526; fax: 714-545-1547; email: [socforinfodisplay@mcimail.com](mailto:socforinfodisplay@mcimail.com)

**ASTM, COMMITTEE D-1**, Paint, and Related Coatings, Materials and Applications, Omni Inner Harbor, Baltimore, MD, Info: Scott Orthey, tel 610-832-9717; fax: 610-832-9666

**ASTM, Committee E-12 ON APPEARANCE**, June 17-19, Atlanta Hilton, Atlanta, GA, info: Bode Buckley, tel: 610-832-9740; fax: 610-832-1547.

**Argencolor 1998 - The 4th Argentine Congress on Color**, August 3-6, School of Fine Arts, Misiones University, Misiones, Argentina, info: Prof. Mirta Rossetti, email: [rossetti@obernet.com.ag](mailto:rossetti@obernet.com.ag).

**AATCC International Conference and Exhibition**, Sept. 22-25, American Association of Textile Chemists and Colorists, Marriott, Philadelphia, PA info: Shirley Clifton, tel: 919-549-8141; fax: 919-549-8933.

(Continued→)

**ISCC ANNUAL MEETING**, (Oct. 2-4); Inter-Society Color Council, Marriott Inner Harbor Hotel, Baltimore, MD; info: ISCC office, tel: 703-318-0263

**OSA ANNUAL MEETING**, Oct. 4-8; Optical Society of America; Baltimore Convention Center, Baltimore, MD info: OSA, tel: 202-223-0920; fax: 202-416-6100.

**COLOR MARKETING GROUP (CMG)**, Fall International, Conference, Oct. 4-6, Le Centre Sheraton Hotel, Montreal, Canada, Info: CMG, 5904 Richmond Hwy, Suite 408, Alexandria, VA 22303

**AIC Interim Meeting**, Oslo, Norway, Oct. 10-11, Association Internationale de la Couleur, Info: Prof. Mitsuo Ikeda, Fax: +81-775-61 26 63, email: miked@bkc.ritsumei.ac.jp.

**TAPPI Conference**, Oct 18-23, Technical Association of the Pulp and Paper Industry, Milwaukee Hilton, Milwaukee, WI, Info: Lisa Archer; tel: 800-332-8686 ext. 225

**IS&T/SID**, Sixth Color Imaging Conference, Nov 16-19, Society for Imaging Science and Technology/Society for Information Display, Sunburst Hotel, Scottsdale, AZ, info: IS&T Conference Manager, 7003 Kilworth Lane, Springfield, VA 22151, tel: 703-642-9090; fax: 703-642-9094; email: info@imaging.org; internet: <http://www.imaging.org>.

## 1999

**ASTM COMMITTEE D-1**, Paint and Related Coatings, Materials and Applications, Jan. 24-27, The Peabody Memphis, Memphis, TN, info: Scott Orthey, tel: 610-832-9717; fax: 610-832-9666

**ASTM COMMITTEE E-12 ON APPEARANCE**, Jan 24-26, The Peabody Memphis, Memphis, TN, info: Bode Buckley; tel: 610-832-9740; fax: 610-832-1547

**ISCC WILLIAMSBURG CONFERENCE**, Feb 21-23, 2nd Panchromatic Conference, Color in it's Surround; info: Dr. Cynthia Brewer, tel: 814-865-5072 or ISCC Office

**ISCC & TAGA ANNUAL MEETINGS** May 5-7, Inter-Society Color Council and May 2-5, Technical Association of the Graphic Arts Tech. Conf. Westin Bayshore Hotel, Vancouver, British Columbia, Canada; info Prof. Bob Chung; tel: 716-475-2722

**SID 99**, May 16-21, Society for Information Display info: SID tel: 714-545-1526, email: socinfodisplay@mcimail.com.

**ASTM COMMITTEE D-1**, Paint and Related Coatings, Materials and Applications June 13-16, Omni Rosen Hotel, Orlando, FL; info: Scott Orthey, tel: 610-832-9717; fax: 610-832-9666.

**TAPPI**, Oct. 17-22, Technical Association of the Pulp and Paper Industry; Conference, Omni Durham Hotel, Durham, NC, info: Lisa Archer, tel: 800-332-8686, ext: 225

**OSA ANNUAL MEETING**, Optical Society of America, Santa Clara, CA, info: OSA, tel: 202-223-0920, fax: 202-416-6100

**AATCC, INTERNATIONAL CONFERENCE AND EXHIBITION**, Oct. 12-15, American Association of Textile Chemists and Colorists, Convention Center, Charlotte, NC, info: Shirley Clifton, tel: 919-549-8141; fax: 919-549-8933

## 2000

**ASTM COMMITTEE D-1**, Paint, and Related Coatings, Materials and Applications, Jan 23-26, Hyatt Regency, New Orleans, LA info: Scott Orthey; tel: 610-832-9717; fax: 610-832-9666.

**ASTM COMMITTEE E-12 ON APPEARANCE**, Jan 24-26, Hyatt Regency, New Orleans, LA, info: Bode Buckley; tel: 610-832-9740; fax: 610-832-1547.

**ISCC & CPMA ANNUAL MEETINGS**; April, Inter-Society Color Council and Color Pigments Manufacturers Association, Charlotte, NC., info: Romesh Kumar, tel: 401-823-2161

**SID 2000**, May 14-19, Society for Information Display. Long Beach CA, Info: SID, tel: 714-545-1526; fax: 714-545-1547; email: socforinfodisplay@mcimail.com Web Site: <http://www.sid.org>.

**AATCC INTERNATIONAL CONFERENCE AND EXHIBITION**, Oct. 15-18, American Association of Textile Chemists and Colorists, Benton Convention Center, Winston-Salem, SC, info: Shirley Clifton, tel: 919-549-8141; fax: 919-549-8141

## 2001

**ISCC / AIC MEETING**, June 24-29, Inter-Society Color Council and Association Internationale de la Couleur, Rochester Riverside Convention Center, Rochester, NY; info: Paula J. Alessi, tel: 716-477-7673; fax: 716-722-1116

# **SPECIAL SALE!!!**

**Reprints of “Color and Light” by Fred W. Billmeyer Jr., and Harry K. Hammond, III, Chapter 40 of ASTM Paint Manual, 23 pages  
\$5 each or 20 copies \$50 ...available only while current supply lasts.**

This is an authorized reprint from ASTM Manual 17, Copyright 1996. American Society for Testing and Materials, 100 Bar Harbor Drive, West Conshohocken, PA 19428-2959

## **Demystifying Color**

**Special Price - \$5 each or 20 copies for \$50. 11 pages color (will cost \$15 each when current supply runs out)**

This technical report, produced by Bob Chung of Rochester Institute of Technology when he was ISCC Education Committee Chair, discusses and explains ten myths about color.

Either of these publications can be obtained by contacting Cynthia Sturke at the ISCC Office, 11491 Sunset Hills Rd, Reston, VA 20190 tel: 703-318-0263, fax:703-318-0514, email: [iscc@compuserve.com](mailto:iscc@compuserve.com)

# J O B S W A N T E D !



This Section is intended to help ISCC members that are in need of, and are looking for employment. Here is an opportunity to use the resources at hand.

There is no charge for this service. However the restrictions are as follows:

1. This service is for ISCC members' use only.
2. No more than 50 words may be used to describe yourself.  
(Not including name address and/or telephone number).
3. If you are using a P.O. Box, you must supply a complete address.
4. No Agency representing member(s) is allowed.
5. Neither the ISCC News nor the editors are responsible for any errors.
6. You must advise us in writing when you have obtained employment.

We hope this new section will be of value to you, the ISCC member. If you have any suggestions/criticisms, please send them to the editor. Let's make this work!

## SEEKING EMPLOYMENT

### SALES/ MARKETING IN COLOR

BS in Chemistry/Math. 20 years experience in instrumentation, sales, sales management, marketing, key account development. Past eight (8) years devoted to the color industry. Member of: ACS, SIC, IFT, ITT, SPE, Paint/Coatings. Cannot relocate away from Northern New Jersey.

William Tuting

507 Shirleen Lane

Mine Hill, NJ 07803

Tel : 973-328-7689

fax: 973-328-8654

email: btuting@worldnet.att.net

## SEEKING EMPLOYMENT IN R&D POSITION IN COLOR

PhD (expected, 1997) Color Vision, MS Biophysics, BS Biomedical Engineering. Highly motivated, adaptable and dependable individual seeking R&D position. Interdisciplinary background and research experience in color, color vision, biomedical instrumentation, colorimetry, photometry and reflectometry. Working knowledge of computer graphics, image analysis/processing, mathematical modelling. Computer and statistics skills include Pascal, C C++, Matlab, Assembly, S, SAS, Steplt.

Jun Xu

The University of Chicago, Visual Science Center

939 E. 57th Street, Chicago IL 60637

Tel: 773-702-1987, Fax: 773-702-4442

email: junxu@midway.uchicago.edu

## SEEKING EMPLOYMENT RELATED TO COLORATION

Noted Bulgarian color and light expert, returning from visiting scholarship in Japan, seeks short or long term employment in the West. Thirty years' extensive and varied experience in visual and instrumental color measurement in many systems. Capable in research, teaching, program development, quality control. Multilingual.

Assoc. Prof. Dr. Todor Kehlbarov

BG-1000 Sofia, P.O. Box 1089

Bulgaria

Phone/Fax 011 359 2 88 05 97

US Contact: Dr. F. W. Billmeyer, Jr.

Phone/Fax 01 518 377 9511

## SUSTAINING MEMBERS

BYK-Gardner  
Tel: 301-483-6500

Chromatics Color Sciences International, Inc.  
Tel: 202-717-6544

Hunter Associates Laboratory, Inc.  
Tel: 703-471-6870

Labsphere  
Tel: 603-927-4266

Minolta Corp.  
Tel: 201-934-5291

## ISCC MEMBER-BODIES

<p>American Association of Textile Chemists and Colorists (AATCC) American Society of Interior Designers (ASID) American Society for Testing and Materials (ASTM) American Society for Photogrammetry and Remote Sensing (ASPRS) The Color Association of the United States, Inc. (CAUS) Color Marketing Group (CMG) Color Pigments Manufacturers Association (CPMA) Council on Optical Radiation Measurements (CORM) Detroit Colour Council (DCC) Federation of Societies for Coatings Technology (FSCT) Gemological Institute of America (GIA)</p>	<p>Graphic Arts Technical Foundation (GATF) Human Factors &amp; Ergonomics Society (HFES) Illuminating Engineering Society of North America (IESNA) National Association of Printing Ink Manufacturers (NAPIM) Optical Society of America (OSA) Society for Information Display (SID) Society of Plastics Engineers, Color &amp; Appearance Division Society for Imaging Science and Technology (IS&amp;T) Technical Association of the Graphic Arts (TAGA) Technical Association of the Pulp and Paper Industry (TAPPI)</p>
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## OFFICERS 1996-1998

Position	Name	Address	email	Telephone	Fax
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