



# Inter-Society Color Council News

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Happy Holidays  
from the  
ISCC News Staff!

November/December

2000

## President's Report

We successfully completed a Board of Directors meeting on September 30, 2000 in Detroit, Michigan. **Hugh Fairman**, Treasurer, **Danny Rich**, President-Elect and acting Secretary for **Rich Riffel**, and **Michael Brill**, Past President completed the Executive Board in attendance. **Charla Haley**, **Dan Phillips**, **Ralph Stanziola**, **Robert Buckley**, **Alan Kravetz**, and **Mary McKnight** were the attending directors, along with **Cynthia Sturke**, Office Manager. **Romesh Kumar**, arrangements chair, handled the details and everything went smoothly as usual.

The developments recorded here are the results of many who selflessly give their time and resources to advance our color organization. To all of you who did so, I offer my congratulations and heartfelt thanks.

### AIC 2001

The Board of Directors and Paula Alessi, AIC Color 01 Chair, reviewed via teleconference, the logistics, responsibilities and organization of the upcoming June 2001 Quadrennial AIC Meeting. It is apparent that the AIC organizing committee has spent countless hours in preparation and is examining every detail associated with this conference. I continue to be impressed with the quality of the program. You should have received the AIC circular which was recently mailed. The quality and professionalism of the circular speaks well for the entire program. This quadrennial meeting is one you won't want to miss.

### Growth

We are pleased to welcome our new individual members, and our new sustaining member to our premier organization. Our organization continues to grow! Seventeen new individual members and one new sustaining member, **GretagMacbeth** have officially joined our society since our last board meeting in April. **GretagMacbeth** joins our ranks as newest sustaining member. We now have 13 sustaining members. **Jim Keiser** continues his excellent work as our evangelist. As you can see, the organization is alive and growing.

### ISCC Executive Officers

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### New Project Committee

The Board of Directors unanimously approved a new project committee, *Colors of Maximum Contrast* (PC 54). Fairman and Stanziola bring their expertise to this effort. The scope of PC 54 is to revise and republish the work of Project Committee #26, originally completed in 1964 and first published in *Color Engineering* (the precursor to *Color Research and Application*). PC 54 will select colors of maximum contrast to be published considering surface color and electronic media.

### Policy Issues

Michael Brill created an excellent document entitled "Guidelines for the President's Office." It is designed to be an appendix to our Standing Rules. The appendix is designated AA, indicating its importance and significance. The Board of Directors unanimously approved this appendix. It will be published in the Newsletter so that everyone will understand the position and responsibilities of the ISCC president. Hopefully, it will encourage you to become an active, contributing member; and perhaps one day, consider the election process for president.

Cynthia Brewer submitted an outstanding revision to the "Guide for Organizing Williamsburg and Panchromatic Conferences." The Board of Directors has 60 days to provide Cynthia Sturke with any corrections or modifications. This is a major revision based on a landmark conference orchestrated by Brewer, who has raised the bar for future Williamsburg conferences.

### ISCC Website

Our website, [www.iscc.org](http://www.iscc.org) has been updated to include the recipients of the prestigious Macbeth, Godlove, and Nickerson awards for the ISCC. Dave Wyble, our webmaster, is doing an outstanding job. Take a minute to visit the site. Our website contains the latest color community updates.

### Honorary Member

The Board of Directors unanimously confirmed the nomination of and bestowed the privilege of honorary membership to **Hugh Davidson**. (See the article on the next page. Hugh will receive the award at the ISCC Awards Banquet on June 23 prior to the opening of the AIC meeting on June 24, 2001. For those of you who know Hugh, he would be delighted to see you there. This is just one of the many reasons why you should attend.

### Project 51

The "Guide to Material Standards and Their Color Measurement" is currently under revision by Springsteen

and Ladson. The report has been divided into two sections. Part A comprises the following Tables:

- 1: Reflectance—Transmittance Measurement Capabilities of National Laboratories.
- 2: Reflectance—Transmittance Measurement Capabilities of Private Laboratories.
- 3: Laboratories with capabilities for measuring ISO Brightness.
- 4: Sources for Opaque Calibrated Gray and Color Standards.
- 5: Sources of Fluorescent, Brightness and Whiteness Standards.
- 6: Sources of Wavelength Calibration Standards.
- 7: Sources of Calibrated Durable White Reflectance Standards.
- 8: Laboratory Identification and Coordinate Data.

The tables are greatly expanded and are now current. Part B is the text that accompanies the tables. Part A of this document will be submitted to our Member Bodies, seeking approval for publication. Part B is scheduled for completion in early 2001.

#### ISCC Publications

The Board of Directors authorized the office manager to obtain 500 copies of the very popular article "*Color and Light*," written by **Billmeyer** and **Hammond**; an excellent review or primer. Contact the ISCC office for further information. Order a copy for yourself and copies for your colleagues, as well. These will be available for purchase in early December.

#### Newsletter

Congratulations to our Editor, **Tek Celikiz**, and our compositor **Cynthia Sturke**. The newsletter continues to improve with every issue. Substantial improvements in layout and reporting make the newsletter more informative, easier to read, and more interesting. Our printer, Norris has tweaked his operation and printing process. The result is what you see today: an excellent job. Congratulations to all who make our primary communication vehicle a success.

#### Coming Soon . . .

**Roland Connelly, Sr.** and **Richard Harold** have put together an exciting conference entitled "*Color Basics for Industry*." This educational conference is designed for those who work in industries that control or evaluate color and product appearance. The presenters are first-class and will do an excellent job. This conference is scheduled for March 19-20, 2001 in Cleveland, OH. A

registration form is included with this newsletter. Visit our website, [www.iscc.org](http://www.iscc.org) for additional information. Are there people that you know who should attend? I believe this conference will be sold out, so register early.

#### A Reminder

The ISCC is hosting the Quadrennial Meeting of the AIC in Rochester, NY in June of 2001. You will hear from world class scientists, artists, and industrial technologists, many speaking on the same subject from different perspectives. It promises to be the best ever. Remember, mark your calendars, and set aside time for this landmark conference. Visit our website for a wealth of additional information.

**In Closing . . .** Without each one of you, the success, the growth, and the opportunities for the ISCC would not be realized. All these things are a result of your efforts and resources. I am proud to be a member of the ISCC and honored to be your president. I appreciate your trust in me and I will continue to work diligently for you and our organization. I can be reached at (646) 282-1037 or at [jladson@estee.com](mailto:jladson@estee.com).

Remember: "**Become involved, make a difference and have the time of your life. Let's enjoy the journey.**"

*Jack Ladson*  
ISCC President

## CALL FOR PAPERS

### International Conference on

### Information Visualization -IV2001

25 July 2001 to 27 July 2001, London, England,

[http:// www.graphicslink.demon.co.uk/IV2001/](http://www.graphicslink.demon.co.uk/IV2001/)

Information Visualization Theory & Practice, Design Visualization, Digital Libraries, Mobile Communications, Environments, Symposium and Gallery of Digital Art, Augmented and Virtual Reality, Web Graphics and Visualization, Visualization in Built Environment, Visualization in Medical & Biological Sciences, Computer Aided Geometrical Design, Cooperative Design and Visualization, Education and Industry Partnerships in Visualization, Multimedia, Computer Visualization & Graphics Rendering, Real-time Visualization of Simulation Data, Computer Animation. Contact: Ebad Banissi, Visualization & Graphics Research Unit, South Bank University, 103 Borough Rd, London SE1 0AA. UK.(+44) 171.815.7476, Fax: (+44) 171.815.7499, [banisse@sbu.ac.uk](mailto:banisse@sbu.ac.uk)



## AIC Color 01

From June 24-29, 2001 the 9th Congress of the International Colour Association will be held in Rochester, NY, The World's Image Centre. This Congress promises to be stimulating and innovative as state-of-the-art color science, technology, art and design are shared. We are preparing a dynamic program for the Congress, including symposia, invited talks, contributed and poster papers, and an entertaining excursion and delectable banquet. This is a great opportunity to share your knowledge on any color related topic.

## AIC Deadlines

Nov. 15, 2000	Abstracts Submissions Due
Dec. 1, 2000	Exhibitor's Adv. Registration
Mar. 1, 2000	Author's Notification of Presentation Details
April 15, 2001	Congress Program Available on Website
May 15, 2001	Advance Registration Due
May 15, 2001	Manuscripts for Proceedings Due
May 18, 2001	Hotel Reservations Due
June 24, 2001	AIC Color 01 Begins

## STUDENT TRAVEL GRANTS



Student Travel Grants applications are now being accepted for student travel to attend the 9th AIC Congress in Rochester, NY. Two \$500 Travel Grants are available. A preference will be given to those who are giving presentations or posters. For further information, please contact:

**Dr. Geoffrey Rogers,**  
**Education Committee Chair**  
**Fashion Institute of Technology**  
**227 W27th Street**  
**Dept. of Science and Math**  
**New York, NY 10001 USA**  
***geof@matrixcolor.com***

**Application Deadline: April 1, 2001**

## Added Pre-Conference Tour!

There has been a pre-conference tour added to the previously announced program. An additional Corning Museum of Glass and Finger Lakes Winery Tour will be offered on Saturday, June 23rd at 9:00 a.m. An updated registration form has been inserted in this issue to reflect this additional social event.

## Attention All AIC Exhibitors!!

There is still time to book an exhibition booth for the AIC 2001 Congress. The rate will go up after December 1st, 2000.

**\$750 (paid in full *before* Dec. 1, 2000)**

**\$1,000 (paid in full *after* Dec. 1, 2000)**

Booth Rental Fee Includes: 10'x10' (3m x 3m) show booth with 8' (2.4m) high burgundy and beige background drape and 32" (0.8m) high burgundy side drape; 6'x 2' x 30" (1.8m x 0.6m x 0.8m) skirted table, two folding chairs, and a 7"x44" (17cm x 111cm) booth identification sign.

Service desk maintained by experienced personnel with a supply of extra equipment and furnishings for exhibitors during move in and move out.

Rochester Riverside Convention Ctr will provide the following services at additional cost: Electrical, Audio Visual, Telephone, Floral, and Cleaning.

After payment is received, a complete Exhibitor's Service Kit will be sent out with the necessary information and requisition forms. To exhibit, please fill out the Exhibitor Registration Form (inserted in this issue). Completed forms may be sent to:

Kevin McGuire, Exhibitions Chair  
 Tailored Lighting  
 1350 Buffalo Road., Suite 12  
 Rochester, NY 14624

Visa, MasterCard, American Express, money orders or checks accepted. Checks should be made payable to AIC Color 01. Credit card charges will be passed through Tailored Lighting.

## HUGH R. DAVIDSON ELECTED AS AN HONORARY MEMBER



Mr. Hugh R. Davidson has been elected as an Honorary Member of the ISCC. Honorary Membership is reserved for those ISCC members who have rendered signal service to the ISCC or to those fields served by the individual Member-Bodies of the ISCC, in such manner as to aid in accomplishing the objectives of the ISCC. Mr. Davidson's achievement will be formally recognized on Sunday, June 24, 2001 at the Awards Luncheon of the ISCC's Annual Meeting being held at the "The World's Image Centre" in Rochester, New York.

Davidson is most well-known for his work in computer color matching and for his educational seminars, but he also has many accomplishments in the areas of instrumental developments for industrial color control, color differences and color-order spacings.

After earning a B.S. degree in Engineering Physics from Lehigh University in 1941, Davidson worked for the National Research Council and for the Operations Research Group of the Navy. For six years after World War II, he worked as a physicist for General Aniline and Film Corporation. Davidson co-founded the firm Davidson and Hemmendinger with Henry Hemmendinger in 1952 to do color consulting and color measurement.

In 1954, Davidson developed (jointly with the Librascope Corporation) the first automatic tristimulus integrator and attached it to the GE-Hardy spectrophotometer. For the first time in the history of the color measurement, tristimulus integration could be carried out automatically at the same time that the spectrophotometric curve of a colored sample was being recorded. Davidson and Hemmendinger painted the first glossy edition of the Munsell Book of Color for the Munsell Color Company. They developed the analog Colorant Mixture Computer (COMIC), the first computer dedicated to making computer assisted color-matches. They also developed a color rule — a series of painted panels used to evaluate observer and illuminant metamerism.

When Davidson and Hemmendinger merged with Kollmorgen Corporation in late 1967, Davidson became the vice-president of the Color Systems Division. In 1973, Davidson left Kollmorgen to form Davidson Colleagues with Thelma Roesch, where he has been developing digital software for computer color matching and continuing to teach color seminars. Since he started teaching about color and computer color matching in the 1950's, approximately 2500 students have attended his seminars. Davidson developed the pigment plan, and painted the samples, for Optical Society of America's Committee on Uniform Color Scales.

In 1996, Davidson Colleagues became affiliated with Resource III, a company formed to develop color-matching and color-control software.

Davidson joined the ISCC in 1951 and served on the ISCC Board of Directors from 1962 until 1964. He has published over 40 papers and has been granted several patents in the field of instrumental color match-

ing. In 1966 Davidson received from the Federation of Societies for Coating Technology, the Armin J. Bruning Award in recognition of his outstanding contribution to the science of color in the field of coatings technology. In 1977 he received the Godlove Award, the ISCC's highest honor, for his long term contributions in the field of color, and in 1988 Davidson received the Millson Award from the American Association of Textile Chemists and Colorists for inventing the COMIC. Davidson is a member of the American Association of Textile Chemists and Colorists (AATCC), the Federation of Societies for Coatings Technology (FSCT), and the Optical Society of America (OSA).

## **The Inter-Society Color Council Historical Records at the Hagley Museum and Library**

Two years ago the Hagley Museum and Library, an independent research library specializing in the history of business and technology, acquired the historical records of the Inter-Society Color Council. Hagley is one of the country's most important repositories for business records. Its library administers the records of more than 1,000 firms and trade associations: including those of E.I. du Pont de Nemours, Joseph E. Seagram & Sons, Avon Products, MCI, the Society for the Plastics Industry, the National Association of Manufacturers, The Chamber of Commerce of the United States, and The Conference Board.

Hagley is interested in maintaining an ongoing relationship with the Inter-Society Color Council, its members, and member organizations. The library would like to continue to receive records from the ISCC that fit into its collecting mission. Hagley's interest in documenting the history of color is part of an effort to document America's culture of consumption. Color with its connection to fashion is at the center of this relationship between, business, culture, and society. Hagley seeks collections that describe the role that color plays within business and industry particularly as it relates to business strategy, marketing, advertising, and fashion. The library is looking to identify collections that describe the relationship between the companies and trade

associations whose records it administers (DuPont, Seagram, Avon, the Society for the Plastics Industry) and the Inter Society Color Council's member organizations. Hagley's primary interest is in the business of color rather than in the technology and science. It is not a technical library. For the most part, its users are historians, rather than scientists or engineers. Hagley is interested in continuing to document the administrative history of the ISCC and would consider acquiring records that describe the development of the ISCC as an organization.

If you know of any historical materials that should be added to the ISCC Archive at Hagley, please contact Joy Luke, or Dr. Michael Nash, Chief Curator, Library Collections at the Hagley Museum and Library, P.O. Box 3630, Wilmington, DE, 302-658-2400, ext. 329; [mikenash@udel.edu](mailto:mikenash@udel.edu).

## **Detroit Colour Council October Meeting**

The DCC held their 22<sup>nd</sup> in a series of annual panel conferences at the Michigan State Management Education Center on October 3, 2000. The topic was "Automotive Color Harmony." The theme was Establishing Meaningful Color Tolerances. There were three Speakers/panelists: Ralph Stanziola; Industrial Color Technology, Dave Alston; GretagMacbeth, and Larry Depaoli; Uniform Color. Ellen Rayman; Ford Global Craftmanship, and Brad Hartley; Lear Corp. joined the panel discussion.

Ralph led off with a general overview of color tolerances and reviewed color space along with a visual display of lightness, hue and chroma. Dave followed with a presentation on how to select realistic tolerances. Larry reviewed the variables required in setting tolerances. He briefly discussed Light Source, Sample, & Observer. Tools to use in setting tolerances include Color History, a Controlled Environment and using Proper Target. These presentations were followed by a lively Question & Answer session that ran over an hour. It was obvious that this topic is very important and suggestions for a follow-up have already been made.

*James R. Keiser, DCC*

## Book Review



### **Billmeyer and Saltzman's Principles of Color Technology**

Third Edition, Roy S. Berns, John Wiley & Sons, New York, 2000, 247 pages

*Principles of Color Technology*, by Fred Billmeyer and Max Saltzman, has long been a classic reference for the practicing color technologist and an authoritative text for students studying applied color science. Originally published in 1966, the authors updated it with a second edition in 1981. Roy S. Berns, the Richard S. Hunter Professor of Color Science at the Munsell Color Science Laboratory, Rochester Institute of Technology, has written the third edition.

Like the original *Principles*, this edition covers the basics of color: from the physical and physiological basis of color perception, to the use of colorants and the techniques of industrial color engineering. This book, however, is really more than a third edition; it not only updates *Principles* to include recent developments in the technology and science of color, but also expands upon and reworks much of the original material. Berns has made important contributions in many different areas of color science and so is able to elucidate authoritatively on many of the recent advances that have occurred. He takes a very contemporary perspective in his treatment of much of the material covered in the original *Principles*.

The first chapter, "Defining Color," discusses the different roles that light, material interacting with light, and the eye play in the perception of color. The sections on the light sources and how materials modify light are similar to those of the second edition, with additional color graphics and an updated and an enhanced treatment of light sources. The section on perceiving color is more extensive than that of the first edition, and includes discussion of opponent channel processing of the trichromatic signal. The remainder of the chapter discusses the way in which we organize the visual sensation of color into the three attributes, and has an enlarged and more contemporary discussion of appearance.

The second chapter, "Describing Color" discusses several types of color systems: those based on color mixing, on color appearance and on color matching. There is an introduction to the Munsell, NCS, and OSA-UCS color-order systems. Much of the chapter examines how color can be specified using the CIE system of colorimetry. This section includes the derivation of the standard observer data, calculation of tristimulus values, the chromaticity diagram, CIELAB and color difference. Although the topics covered are largely the same as in the second edition, Berns has organized the exposition somewhat differently, and expanded much of the discussion.

The second edition's Chapter 3, "Color and Color Difference Measurement," has been expanded into two chapters: "Measuring Color" and "Measuring Color Quality" and much of the material has been reorganized and updated. The former chapter reviews the technology of color measurement, while the latter examines how such measurements are to be interpreted. In "Measuring Color" both visual and instrumental measurements are covered. The comprehensive section on instrumental measurement begins with measurement geometries, and goes on to introduce the reader to the spectrophotometer, the colorimeter, and other types of measurement instrumentation. This chapter also includes an extensive and very useful discussion of precision and accuracy in spectrophotometric measurements.



In Chapter 4, "Measuring Color Quality," the color difference problem is examined. After discussing perceptibility and acceptability, Berns describes the historical development of uniform color spaces and color difference measurements, discussing many of the important experiments upon which our present understanding is based. There is an extensive review of the various types of color difference measurements. He includes a "color tolerance experiment" in which a hypothetical colorist develops [which is a step-by-step exercise in developing] color tolerances from visually assessed samples. The chapter concludes with a brief discussion of other quality metrics.

Chapter 5, "Colorants," in which the dyes, pigments and their uses are discussed, is largely the same as the second edition with a couple of additions. The color graphics allow easy visualization of gamuts. Also the third edition has a more extensive treatment of special colorants such as fluorescents and flakes.

The sixth chapter, "Producing Color" is an update and expansion of the second edition's chapter "The Coloring of Materials in Industry." Whereas the second edition is wholly concerned with industrial color matching, the third edition broadens the treatment to encompass color matching of images and graphics and includes a short review of color management systems. The sections on industrial color matching have been largely reorganized, re-written and brought up to date. The chapter begins with an excellent elucidation of color modeling and color mixing laws. It gives several numerical examples involving Bouger-Beer's Law and Kubelka-Munk, and numerical examples of the colorimetry of a computer CRT display and the halftone print. Much of the chapter is concerned with instrument based color matching. The important distinction between spectral matching and colorimetric matching is made. The final sections of the chapter apply the concepts and methods developed earlier to the color matching of images and graphics.

I was a little disappointed that the second edition's final chapter "Problems and Future Directions in Color Technology" has been eliminated in the third edition, rather than being updated. It would be very interesting to learn what one of the leading practitioners in the field sees as its future, though I understand that such prognostications become outdated rather quickly. Berns' (very short) final chapter is titled "Back to Principles" where he reiterates the basic principles of color engineering.

The third edition includes an appendix in which some of the mathematics commonly used in color technology are explained. Of particular interest is a numerical example of color management, in which color is characterized and transformed between a digital camera and CRT display.

I found this edition of *Principles* to be very accessible and it was a pleasure to read. There are extensive color figures and graphics, on virtually every page, that are well integrated with the text. Whenever a new technical term is used, it is offset in bold, and a precise definition is given. The layout, graphics and language have a contemporary feel. I found few typos or errors in the text, all of which have been noted on the errata sheet.

This book will make an excellent textbook for undergraduate and beginning graduate students in any field that deals with color in a technical way. It will also appeal to professionals who work with color, as it gives a broad up to the minute overview of color technology. Even experts will find much here of interest, as Berns' wide expertise allows him to provide vivid insight into a number of different fields. This is a significantly different book from the second edition; even if you have the second edition, you will probably find enough new material here to justify spending the price of this latest edition.

*Geoffrey Rogers, Ph.D., F.I.T./SUNY*

## **COLOR RESEARCH AND APPLICATION**

### **IN THIS ISSUE, DECEMBER 2000**

We open the issue with an article somewhat different than usual research articles. It is addressed to those who teach color. In "Web-based Interactive Dynamics for Learning Color Models," Alejandro C. Frery, Carlos Alberi dos Santos Melo, and Rodrigo C. Fernandes introduce a method of teaching basic color concepts. They describe an interactive web site that can help the undergraduate student to have an intuitive understanding of color concepts.

From basic color teaching, we move on to understanding more advanced principles important to the graphic arts and printing industries. Geoffrey Rogers presents a lucid and complete treatment of the optical and physical artifacts involved in halftone color reproduction in "A Generalized Clapper-Yule Model of Halftone Reflectance." In this article, a model is proposed to predict the optical dot gain due to scattering and internal reflection. While Dr. Rogers' presentation is mathematically rigorous, it is also easy to follow and very practical. It is useful for applied algorithm developers.

Our next authors Park Seung-ok, Kim Hong-suk, and Baek Jung-ki keep to this theme of practical explanations. While articles have been published in this journal describing the detailed characterization of CRT monitors. Often users look for shortcuts. In "Optimum Brightness Level and Simplified Characterization of CRT Color Monitors," Park and his co-authors provide a clever technique using the brightness and contrast controls. This technique has two advantages: it does not require the use of high precision measuring instruments, and the math is easy because it does not require a non-linear optimization.

In color reproduction we almost always want to know the range of colors that can be obtained with that particular reproduction technique, or stated in another way, the color gamut. However, determining the color gamut may be done for several differ-

ent reasons: to see the range of colors present in a given image, to evaluate various reproduction modes, to characterize appearance models, or for other reasons. The technique for mapping varies depending on the task at hand. In "Calculating Medium and Image Boundaries for Gamut Mapping," Ján Morovic and M. Ronnier Luo introduce a set of algorithms for the calculation of both image and medium gamut boundaries. They also review the published gamut calculation approaches, the basic geometry used in gamut boundary calculations, and the methods suggested as solutions to the problems of calculating medium and image gamut boundaries for gamut mapping.

Our next article addresses the problem of how to decide which linear combination of an observer's color-matching functions correspond to the 1931 CIE color-matching functions. Past studies have analyzed the variability inherent in the sets of color-matching functions of different observers. These studies point out that there are significant discrepancies among different sets of color matching functions. There are also differences between the colorimetric results obtained using real observers and the CIE 1931 standard observer. In "Optimization of Color-Representation Systems When Comparing Different Observers" Jesús Zoido proposes a transforming operator that optimizes the mapping of the color-representation system associated with an arbitrary observer into the system spanned by a standard set of color-matching functions. This transformation allows the researcher to obtain more reliable conclusions when comparing the experimental results for different observers.

A neural network is a useful approach for complicated problems in which an exact mathematical model is hard to establish or where the processing power is limited. While color-appearance models have been built into algorithms to give desirable reproductions of color originals, the practical issue of processing a complex image including a couple of hundred thousand pixels suggests that a neural network approach might be a desirable alternative. In "Colour-Appearance Modeling Using Feed-forward Networks with Bayesian Regularization Method - Pt. 1: Forward Model" John H. Xin, Sijie

Shao, and Korris Fu-lai Chung present a method of predicting color appearance using a neural network analysis.

In our Industrial Applications section, R. Fort, F. Mingarro, M. C. López de Azcona, and J. Rodriguez Blanco examine color parameters that can be used to evaluate the degree of soiling of buildings, or the effectiveness of cleaning techniques. Environmental pollution can change the color of buildings and even damage their construction. However, cleaning techniques could also produce wanted or unwanted color changes. Fort, Mingarro, López de Azcona, and Rodriguez determine the most effective cleaning method of the removal of dirt ingrained in the stone of the Cathedral Nueva Valladolid in "Chromatic Parameters as Performance Indicators for Stone Cleaning Techniques."

Finally we close this issue, and the year, with the annual index.

*Ellen C. Carter  
Editor, CR&A*

## **AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS**

**RA36 - Color Measurement Research Committee** met May 3, 2000 in Baltimore MD. Dr. David Hinks, the new chair presided at the meeting.

Dr. Hinks reported collecting spectroradiometric data from 15 different light booths showing big variations. For example, on a metameric pair of green samples, DEcmc varied 0.20 to 0.90. This is one standard-sample comparison, not necessarily representative of variability for other metameric objects. Dr. Hinks thinks more data needs to be collected.

RA36 held a "Color Symposium" on March 22-23; it was a great success. A large mix of people, including retailers, dyers, designers, stylist, and academics. The retailers were asked how they choose their lights; most were unsure. Some indicated that shopping malls sometimes determined the lighting used, while others described the "janitor effect". (whatever the maintenance staff used to replace the burned-out bulbs.)

In "Absolute Whiteness" Hinks reported that ASTM is also working on this problem and RA36 will be working with ASTM.

**Other Business:** Work is going on estimating sales potential for the replacement of the Davidson & Hemmendinger (D&H) Color Rule. This estimate was requested by Colorcurve™ Systems, Inc., and may be used by others who may be interested in reproducing the D&H Color Rule.

**Liaisons with other organizations:**

**ISCC -** The next Williamsburg conference is a two-day color course; Color Basics for Industry. Connelly is chairing this. The course is designed for people who work with color or work in industries where color and appearance are important factors in their products. The second day will have breakout sessions for various industries. The course will be held at the Cleveland Airport Marriott in Cleveland, OH on Monday and Tuesday, March 19 and 20, 2001. (More information is given elsewhere in this ISCC News.)

**ISO -** Hinks reported that work is in progress to get Evaluation Procedure 9: Visual Assessment of Color Difference of Textiles into ISO format.

**Detroit Colour Council:** Hinks is involved in DCC and will be exchanging information between RA36 and DCC.

The next meeting will be at The Research Triangle Park, NC during the first week of November 2000.

*Gregory Stehn  
Secretary, RA36*

# Welcome New Members!

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Mr. James Vasconcellos  
GretagMacbeth LLC  
617 Little Britain Rd.  
New Windsor, NY 12553  
vasconcellos@gretagmacbeth.com

The ISCC also welcomes our  
newest sustaining member:

**GretagMacbeth**

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College of Dentistry  
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P.O. Box 182857  
Columbus, OH 43218-2357  
wee.12@osu.edu

## Remembrance of AIC Meetings Past

Michael H. Brill, 2 October 2000

In a way, my life seems to be measured in units of AIC meetings attended. Important things happened at each one. The only problem is, I haven't been to an AIC meeting in over eight years, and my publication rate in color science shows the effects. This "dry season" will end in Rochester next June 24-29.

Berlin in 1981 (my first trip outside North America) was exciting for all who attended. Besides boat tours and museum-hopping, we flirted with the Brandenburg Gate, and stayed out of the way of the green-and-white Volkswagens that were taking police to a serious riot. It was very heartening to see national groups at the AIC meeting take care of their own—in one case, helping an attendee deal with the local hospital system (in a foreign language, of course). Because of that trip, I met my first international coauthor, Gerhard West, after which there were many visits and several publications in which I still take pride. I met Heinz Terstiege and Manfred Richter as well, and saw how a truly well organized conference is run, even in the presence of obstacles. I still remember the many-course banquet and the bottomless wine glass; I still hear the thump of the maitre d' s stanchion to announce each course.

Then there was the 1983 midterm meeting in Gothenburg, Sweden. The subject was color order systems, and my paper was with Henry Hemmendinger (whom I had met in Berlin). In Gothenburg, I learned what color atlases are for, and saw from Kungälv to Stockholm how environmental color design has benefited from the thoughtful Swedish approach. I also heard about the connection between Swedish DUI laws and how all those trees turn into Ikea furniture and such. The late-August weather was tropical even at the northern latitude, and flowers and fruits grew especially large. The bumblebees were also large, but not so large as the spirit of one of our tour-bus hosts, who

trapped a bee using his hand and a film container, and let it go outside the bus without injury either to himself or to the bee. Thanks to Gunilla Derefeldt, I had a great introduction to many practical applications of the Natural Color System, and we began a collaboration that led to SPIE conference involvement some years later.

Monte Carlo in 1985 was a panoply of color, as shown even by aerial photos of the conference center. (I think the conference organizers realized this.) One of the organizers passed away before the conference, but the rest pulled together to make a most memorable event. During a bus tour, I made a barbaric comment about "fashionism", but Margaret Walch had the sagacity to realize that all I needed was some civilization, so she and her co-workers took me to the ballet. A most enjoyable experience, much to my dismay! Later I had the privilege of contributing to her eclectic *Color Compendium*, and I no longer take visits to New York City quite so much for granted. I also met a French color researcher named Claude Pelissier, whose mathematical theory was very intriguing. Were it not for that trip, I would never have known of his work, because neither one of us communicated in the other's language. Several obliging young ladies helped a lot as translators during our Monte Carlo lunch. Incidentally, two color-journal editors accepted five of my papers at that conference—some kind of record, I think. Oh, and I lost about 75 cents in a slot machine—well worth the return in memories of other local color: the Monte Carlo Subways (i.e., elevators), and the black-stoned beach (and its occupants, of course).

Regrettably, I missed Buenos Aires in 1989, although in a way I felt Berlin had given me a taste (Argentine beef in a Chinese restaurant with a Scottish contingent and paying in Deutsche marks). But Princeton in 1992 was the source of new inspiration, from the elegant colorant-formulation theory of Tibor Illes (which did not appear elsewhere) to a first meeting with my friend Ron Oldchurch (who unfortunately passed away three years later). One has to take advantage of an opportune moment, and an AIC meeting seems to be made of such moments.

Perhaps at AIC 2001 I will find a collaboration leading to the holy grail of color management, or to a prescription for colorants guaranteed to span a convex color gamut once with no holes. Perhaps I will find a further civilizing influence from the New York fashion designers, or have a Finger Lakes adventure. What opportune moments will *you* be able to share from AIC 2001? There's only one way to find out.

*Michael H. Brill*  
*ISCC Past President*

nado struck scaring him and two other passengers as well as the pilot, who afterward said calmly, "Roughest landing I ever had!"

Your reviewer confesses that the book was brought to his attention by the Associated Press article, Scientists Explain Rare Fault in Vision, provided by Nola P. Sturke, and published in ISCC News #387, page 4, September/October 2000.

*Harry K. Hammond III*

\* Note that Nola P. Sturke is the mother-in-law of Cynthia J. Sturke

## **BOOK REVIEW**



**"The Island of the Color Blind and Cycad Island"**  
by Oliver Sacks. Published by Alfred A. Knopf, New York, 1997, 298 pages, \$13.00 paperback

Note that this publication consists of two related books: Book I, The Island of Colorblind, Pages 1 - 93, and Book II, Cycad Island, pages 97 - 199. Another hundred pages include Notes, Journals (references), Bibliography, and Index.

The author was drawn to the tiny Pacific atoll of Pingelap by reports of an isolated community of about 700 people born totally color-blind. The book is educational for those interested in what color-blind observers see. It is also informative about the primitive conditions of life on isolated atolls.

The author, Oliver Sacks was born in London in 1933, educated in London, Oxford and California. He is Professor of Neurology at the Albert Einstein College of Medicine, and lives on City Island in New York. He was drawn to the tiny Pacific atoll of Pingelap by intriguing reports of an isolated community of islanders born totally color-blind.

The title of the book caused this reviewer to assume that it would deal primarily with information on colorblindness. It includes interesting reports on everything the author found on Pingelap, as well as an account of his arrival by airplane just as a tor-

## **Publications For Sale**

**"Demystifying Color"**

by Bob Chung

11 pages (color)

\$5 each or 20 copies for \$50...

This technical report produced by Bob Chung of R.I.T. discusses and explains ten myths about color.

Available in December .....

Reprints of **"Color and Light"**

by Fred W. Billmeyer Jr. &

Harry K. Hammond, III.

Chapter 40 of ASTM Paint Manual, 23 pages

\$5 each or 20 copies for \$50

Authorized Reprint ASTM Manual 17

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Either publication can be obtained by sending a check or money order (if pre-paid,s&h included) to:

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Cynthia J. Sturke, Office Mgr.  
11491 Sunset Hills Road  
Reston, VA 20190

## Volunteer Labs Sought to Test Foundations of Colorimetry

Michael H. Brill, TC1-56 Chair, 20 September 2000

The one-year-old CIE technical committee TC1-56 has the charter to examine the fundamentals of colorimetry in view of some critical, empirically based questions that could affect the future of colorimetry. The Committee, "Improved Colour Matching Functions", must set to rest a problem noted by W. A. Thornton ("Toward a more accurate and extensible colorimetry, Parts I-III," Color Research and Application, Vol. 17, 79-122; 162-186, 240-262, April, June, and August 1992). Thornton found experimentally that color-matching functions for a single observer do not transform appropriately to predict color matches by the same observer using another set of primaries. Particularly relevant is Section IV.B.1 of that work, called "Transformation of Primaries." This issue was discussed at a CIE symposium in June, 1993 on Improved Colorimetry (see CIE Publication x007). Is the problem that Thornton cites compelling enough to require remedies in standard colorimetric practice?

In the eight years since Thornton's original papers, the crucial experiments have not been repeated, and the basic question remains unanswered: **For a single human observer, are color-matching specifications amenable to transformation of primaries?** Transformation of primaries amounts to two applications of Grassmann's additivity law. (Find the Set-2 match of each primary in Set 1, replace each Set-1 primary with its Set-2 match, and thereby predict the matches made with Set 2 in a new experiment.) Hence Grassmann additivity (the cornerstone of colorimetry) fails if transformability fails.

Accordingly, CIE TC 1-56 seeks a laboratory to conduct the following experiment:

- a. Acquire proven apparatus for measuring color matches, including spectroradiometers to measure the lights participating in the matches, monochromators that can traverse the visible spectrum and produce reliable color-matching functions at 10 nm intervals, a bipartite 10-degree field (binocularly viewed) in which to display (at high photopic light levels) the two halves of the match. The radiometer should be calibrated to a NIST Standard Lamp. To quantify the retinal illumination, one may use special apparatus to measure pupil diameter, or light levels may be high enough to use an artificial pupil.
- b. Screen from 6 to 10 subjects using Ishihara and Farnsworth tests for normal color perception. At least two of the subjects should be less than 30 years old, at least two should be between 30 and 50 years old, and at least two should be over 50 years old.
- c. Select two sets of wavelengths for the primary-light sets. To replicate Thornton's experiment, wavelengths near 452, 533, and 607 nm should comprise Set 1, and the wavelengths 497, 579, and 653 nm should comprise Set 2. The primary sets must be very different from each other in their selected wavelengths.
- d. Perform maximum-saturation matches to develop color-matching functions (cmf's) for each observer and for each primary set.
- e. Repeat Step d enough times on each subject to obtain a statistically significant estimate of intra-observer variability. Then, average the results within each given subject/primary-set to obtain color-matching functions.
- f. For each subject, compute a transformation from Set-1 cmf's to predicted functions from Set-2 primaries.. Compare these predicted functions to the Set-2 functions obtained directly by experiment.

NOTE: It may be sufficient to measure the color-matching functions at only a few wavelengths besides those of the two sets of primaries.

*We need least one laboratory to sign up for this experiment.* That laboratory must have the equivalent of a high-precision visual colorimeter, and expertise to use it. We have been looking for volunteers, but aside from a few good statements of future intent there has been no progress. Meanwhile, numerous queries from other standards bodies and industry were directed at TC1-56 even before its work was started. The world is waiting for an answer. Your work toward that answer will be globally appreciated.

To volunteer, please respond to [mbrill@sarnoff.com](mailto:mbrill@sarnoff.com).

## News from the Members.....

**Gary Field**, professor of graphic communication at the California Polytechnic State University in San Luis Obispo, CA has been named the recipient of the Robert F. Reed Technology Medal and was presented on October 12<sup>th</sup> in Coronado, CA at the annual Society of Fellows Banquet. First presented in 1974 by the Society of Fellows (SOF) of the Graphic Arts Technical Foundation (GATF), the award honors the memory of the "Dean of Lithography." It is presented annually to an individual who has made a major contribution to the technical and scientific development of the graphic arts industry.

Gary Field has worked as a professional in the graphic arts field since 1960 when he received a diploma in printing technology from Trent Polytechnic, now Nottingham Trent University. Early in his career, he worked as a color separator and printing technologist at a number of companies prior to joining GATF's research staff in 1970 as a supervisor of color and photography. Since 1977 he has been an educator and consultant, most recently as professor of graphic communication at California Polytechnic State University which he joined in 1984.

Field has a long record of scientific accomplishments in the area of color reproduction and control. He pioneered the development of test images and analytical methods for linking prepress and printing manufacturing systems. He conducted a series of color printing dynamic studies that produces new strategies for optimizing prepress color presswork. He significantly contributed to the development of industry standards through service over many years on two ANSI subcommittees, four CGATS task forces, and one CIE technical committee. Additionally, he conducted the industry's first web offset magazine printing survey. Field is also the author of several textbooks and countless research papers and articles. Field is also a delegate to the ISCC from TAGA. He has also received numerous awards including the TAGA Honors Award, the GATF Education Award of Excellence, the Gold and Silver Medals from the Institute of printing and a fellowship from the Institute of Printing.

**Robert A. Charvat**, President, Charvat and Associates, Inc., Cleveland, OH, has been elected Fellow of the Society of Plastics Engineers (SPE) in recognition of his outstanding, long-term contribution to the industry. Mr. Charvat was one of 14 SPE Senior members to acquire this distinction. Since the award's inception in 1984, only 168 of the current 32,000 SPE membership have been so honored.

He has been recognized as one of the first to develop computerized color matching and automated color control for high compounding lines. This is said to have made a significant improvement that revolutionized both precolored compound and color concentrate production. He led the development of complex inorganic pigments that provide suitable outdoor colors with infrared reflectance to minimize heat buildup within polymeric products used for outdoor applications thus extending product service life.

A member of the Society since 1957, Mr. Charvat is affiliated with the Ohio Firelands Section and the Color & Appearance division (CAD) of SPE. As a member of the CAD board of directors, he serves as Education Chair and a past Division chair. In 1994 the Society elected him to Honored Service Member status. A graduate of Cleveland State University (BME), he teaches "Coloring of Plastics" at Terra Community College, Fremont, OH and is on The Terra College Foundation Board of Directors as well as serving on the Board's Executive Committee.

## From the ISCC Office.....



Keep your eye on your mailbox! The 2001 ISCC Membership Dues will be arriving soon. This year we continue to offer the opportunity to pay your dues by credit card, check or money order. Please pay promptly so that your name won't be left off the ISCC News 2001 mailing list and any other "colorful" mailings throughout the year. This is also a great time to update your contact information for our database. 2001 promises to be an exciting year for the ISCC - don't miss out! Have a colorful Holiday Season! *Cynthia Sturke, ISCC Office Mgr.*



## GRAPHIC ARTS TECHNICAL FOUNDATION

GATF has named Carol J. Hurlburt and Dr. Lenore Collins as recipients of the Education Awards of Excellence. The awards are presented annually to one industry representative and one academic representative in recognition of outstanding contributions to education and training in the graphic arts.

Representing industry, Ms. Hurlburt is the director of communications and marketing for NPES The Association for Suppliers of printing, Publishing and Converting Technologies in Reston, VA. She also serves as a part-time administrator of the Graphic Communications Council, Formerly the Education Council of the Graphic Arts Industry, Inc. Additionally she is the NPES designated representative of the International Graphic Arts Education Association (IGAEA) and a member of the board of directors of the National Council for skill Standards in Graphic Communications.

Representing academics, Dr. Lenore Collins is an associate professor, Dept. of Management & Technology at the Rhode Island College in Providence, RI. She is a teacher, a counselor, an expert in understanding students needs, a researcher for the latest technology, a job developer, and a person who respects her students for the diversity they bring to her class room.

When two of Rhode Island's largest printing plants closed, displacing 300 union workers, Dr. Collins pulled together a program to retrain these people in desktop publishing. All the people who participated in her classes are employed because of her efforts. Likewise she was responsible for developing a training program to retrain highly educated former Soviet refugees and placing them in printing and graphics jobs. The program received national recognition by the US Department of Human Services.

Dr. Collins has conducted a number of studies that have benefited academia and the industry. She has been involved in countless industry and academic clubs and committees. She is a founding member of

the Printing Industries of Rhode Island (PIRI) in which she currently serves as Second Vice Chair. She is past president of IGA and served on the Board of Governors for the Provident Club of Printing House Craftsmen, and the Board of Directors for the Association of Graphic Arts Trainers (AGAT).

\*\*\*\*\*

A new book distributed by GATF Press succeeds in chronicling historic events in publishing and the graphics arts like no other book before. Covering a time span from prehistory up to the year 2000, *Publishing Timeline 2000* lists more than 2,600 historic events. Packaged with a searchable CD-ROM version of the text, *Timeline* is a valuable research and educational tool, allowing users to quickly search any event, date, or keyword in the printing and electronic texts.

*Publishing Timeline 2000: A Chronology of Publishing & Graphic Arts Events* (ISBN 0-9679051-1-7), published by QBC Publishing Systems in Hawley, PA. is available as a hardcover edition for \$100 (\$80 for GATF/PIA members), or as a softcover edition for \$80 (\$65 for GATF/PIA members), not including shipping. Orders may be placed by contacting GATF by Phone at 800-662-3916 (US and Canada) or 412-741-5733 (all other countries fax at 412-741-0609; or on-line at [www.gain.net](http://www.gain.net). Mail orders to GATF Orders: P.O.Box 1020, Sewickley, PA 15143-1020. Indicate Order No. 1901 for hardcover and No.1902 for softcover.

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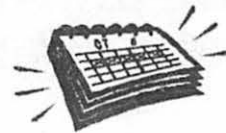
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## CALENDAR



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

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 703-318-0514 fax      website: <http://www.iscc.org>

### 2000

- Nov. 1-3**      **Human Factors and Ergonomics Society, Europe Chapter**, Maastricht, The Netherlands. Further information: [http://utopia.knoware.nl/users/hfesecc/meeting/ec\\_meet.htm](http://utopia.knoware.nl/users/hfesecc/meeting/ec_meet.htm). (It is not necessary to be a member of the HFES to participate.)
- Nov. 6-7**      **2000 AIC Meeting Seoul**, Color and Environment. Seoul, Korea, 82-2-365-514 fax: 82-2-365-0014
- Nov. 7-10**      **IS&T/SID 8th Color Imaging Conference** Color Science, Systems & Applications, SunBurst Resort Hotel, Scottsdale, AZ. 703-642-9090 Fax: 703-642-9094 [info@imaging.org](mailto:info@imaging.org); [www.imaging.org](http://www.imaging.org)
- Dec 3-5**      **GATF Color Management Conference**, Embassy Suites, Paradise Valley, Phoenix, AZ tel: 412-741-6860

### 2001

- Jan. 23-26**      **ASTM Committee D-1**, Paint and Related Coatings, Materials and Applications, Embassy Suites, Ft. Lauderdale, FL. Info: T. Brooke, 610-832-9729; fax: 610-83-9666; [tbrooke@astm.org](mailto:tbrooke@astm.org)
- Jan 23-26**      **ASTM Committee E-12**, Color and Appearance, Embassy Suites, Ft. Lauderdale, FL. Info: Bode Hennegan, 610-832-9740; fax: 610-832-1547; [bbuckley@astm.org](mailto:bbuckley@astm.org)
- Feb 25-28**      **Continuous Improvement Network Annual Conference**, Drake Hotel, Chicago, IL tel: 412-741-6860
- March 19-20**      **Williamsburg Conference, ISCC Color Course**, Color Basics for Industry, Cleveland, OH, Airport Marriott. Info: Roland Connelly, SheLyn, Inc., [roland@shelyn.com](mailto:roland@shelyn.com), Richard Harold, Color and Appearance Consulting, 703-709-5454 [rwharold@worldnet.att.net](mailto:rwharold@worldnet.att.net)
- April 1-3**      **Color Marketing Group Spring International Conference**, Orlando, FL 703-329-8500 [cmg@colormarketing.org](mailto:cmg@colormarketing.org)

- April 23-27** ASPRS Annual Conference, St. Louis, MO, 301-493-0290; Fax: 301-493-0208  
*www.asprs.org.*
- May 6-9** TAGA Annual Technical Conference, San Diego, CA. Info: 716- 475-7470; fax: 716-475-2250, *TAGAOfc@aol.com*; website: *http://www.taga.org*
- May 10-12** CIE Experts Symposium on Light Emitting Diodes, Holiday Inn, Gaithersburg, MD  
contact: Y. Ohno, NIST, *Ohno@nist.gov*
- May 13 -17** CORM 2001: 100 Years of Optical Radiation Standards for Commerce for the United States and in the Global Community - Shrinking Uncertainties for a Shrinking World to be held at NIST, Gaithersburg, MD. Contact: Danny Rich at SunChemical Ink (GPI), 201-933-4500 x1144 or *RichD@sunchem.com*
- May 17-20** 2001 CIE Division 2 Annual Meetings, NIST, Gaithersburg, MD, contact: Y. Ohno, NIST, *Ohno@nist.gov*
- June 24-29** ISCC/AIC Mtg, Rochester, NY; Paula J.Alessi, 716-477-7673; Fax: 716-722-1116  
*paula.alessi@kodak.com*
- Sept 23-25** CAD/SPE RETEC 2001 "Hot Color - - - -Cool Plastics", Marriott Resort Hotel, Marco Island, Florida. Chairperson: Gary Beebe, A. Schulman, tel: 330-239-3059,  
*gary\_beebe@schulman.com*
- Nov. 5-9** IS&T/SID 8th Color Imaging Conf., Color Science, Systems & Applications, Scottsdale, AZ. Fax: 703-642-9094, *info@imaging.org*  
**2002**
- February** ISCC Williamsburg Conference, Solutions for Industrial Color Problems, Chair: Ralph Stanziola, *rascolor@juno.com*
- April** ISCC/Detroit Colour Council Joint Meeting, Troy, MI Chair: Jim Keiser,  
*james.r.keiser@usa.dupont.com*
- June 9-13** Fourth Oxford Conference on Spectrometry, Davidson College, Davidson, N.C. Info: Art Springsteen, *avian@kear.tds.net* Teresa Goodman *tmg@npl.co.uk*



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**Please note: Next issue deadline for material submission is December 1st.**

**All submissions must be in English.**

## Advertising Policy

The ISCC advertising policy for the Inter-Society Color Council News is as follows Pre-paid color-related advertising will be accepted thirty days in advance of the publishing date. The rates are:

\$ 100	business card-size ad
\$ 250	1/4 page ad
\$ 500	1/2 page ad
\$1,000	full page ad

Artwork must be publisher ready and will be returned within 30 days after publication. The publishers reserve the right to determine the acceptability of the advertising. A 20% discount is offered for a yearly contract. Contact: Tek Celikiz, ISCC News Editor or Cynthia Sturke, ISCC Office Mgr.

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## ISCC Member-Bodies

American Association of Textile Chemists and Colorists (AATCC)  
 American Society for Testing and Materials (ASTM)  
 American Society for Photogrammetry & Remote Sensing (ASPRS)  
 The Color Association of the United States, Inc. (CAUS)  
 Color Marketing Group (CMG)  
 Color Pigments Manufacturing Association (CPMA)  
 Council on Optical Radiation Measurements (CORM)  
 Detroit Colour Council (DCC)  
 Federation of Societies for Coatings Technology (FSCT)  
 Gemological Institute of America (GIA)  
 Graphic Arts Technical Foundation (GATF)  
 Graphic Communications Association (GCA)  
 Illumination Engineering Society of N. America (IESNA)  
 National Association of Printing Ink Manufacturers (NAPIM)  
 Optical Society of America (OSA)  
 Society for Information Display (SID)  
 Society of Plastics Engineers, Color & Appearance Div.(SPE)  
 Society for Imaging Science and Technology (IS&T)  
 Technical Association of the Graphic Arts (TAGA)  
 Technical Association of the Pulp and Paper Industry (TAPPI)

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