



# Inter-Society Color Council News

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May/June

2001

## Paula Alessi to Receive ISCC's Nickerson Service Award



Ms. Paula J. Alessi will be presented the ISCC's Nickerson Service Award during AIC Color 01 Rochester, the International Color Association's (AIC) 9th Congress at the Rochester Riverside Convention Center, Rochester, NY, June 24-29, 2001. AIC Color 01 Rochester is being hosted by the ISCC, and the presentation will take place during the ISCC's Awards Luncheon on Sunday, June 24, 2001.

Ms. Alessi is the 15th recipient of the Nickerson Service Award. She joined the ISCC in 1978 and has been an active member ever since. Paula was on the ISCC Board of Directors from 1986 to 1989 and served as its President from 1992 to 1994. She chaired ISCC Project Committee 32 "Image Technology" from 1982 to 1992, and was co-chair of Interest group II on Appearance, Vision and Modeling until 1992. In 1986, she co-chaired the ISCC Annual Meeting, which was a joint meeting with the Canadian Society for Color in Toronto,

(continued on page 2)

**aic**  
2001

AIC Color 01 Rochester  
Rochester, NY  
June 24-29, 2001

".....Experience colorful images both inside and outside the lecture hall, that will last in your memory forever."

**ISCC Executive Officers**

<b>President</b> Mr. Jack Ladson	Color Innovation 1000 Plowshare Road Suite B-1 Yardley, PA 19067 215-369-5005 fax 215-369-3191 jaladson@earthlink.net
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Ontario, Canada featuring a symposium on Color Reproduction State-of-the-Art. In 1989 at the ISCC Annual Meeting in Chicago, she put together a Vision and Color Appearance Symposium featuring such prominent speakers as Dr. Robert W. G. Hunt, Dr. Yoshinobu Nayatani, Dr. Joel Pokorny, and Dr. M. Ronnier Luo. She has made numerous contributions to the ISCC News over the years including many very comprehensive summaries of talks given at ISCC Annual Meetings.

Ms. Alessi is a Senior Staff Research Scientist in the Color Systems Engineering Laboratory of the Imaging Science Division of the Eastman Kodak Company Research Laboratories. Her current work involves color investigations of Organic Light Emitting Diode (OLED) technology and color management systems. She has done work on color appearance evaluation for hardcopy/softcopy image comparisons. From 1985 through 1995 she spent much of her research efforts optimizing color reproduction of Kodacolor Gold 100 and Ektar 125 color print films.

Ms. Alessi received her B.S. in Chemistry from St. John Fisher, and her M.S. in Chemistry (Color Science) from Rensselaer Polytechnic Institute.

She has been Vice-President of the AIC since 1998 and will assume the AIC Presidency in January, 2002. Ms. Alessi has also served as Division 1 Editor of the International Committee on Illumination (CIE) and Chair of Technical Committee TC1-27 on Specification of Color Appearance for Reflective Media and Self-Luminous Display Comparisons. She is the voting member of CIE/USA to CIE Division 1. Ms. Alessi is a member of the American Society for Testing and Materials (ASTM).

*Robert Marcus*  
*ISCC Publicity Chair*

Issue #391

May/June 2001

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**All submissions must be in English.**

## **Inter-Society Color Council Elects New Directors**

Three new directors will be joining the ISCC board of directors at the close of the Annual Meeting in June. Elected to three year terms (2001 - 2004) were:

**Mr. James G. King**  
DuPont's Automotive Finishes  
R&D Laboratory Troy, Michigan

**Dr. Eileen Korenic**  
The University of Wisconsin-River Falls

**Ms. Margaret Miele**  
The Fashion Institute of Technology.

They will be replacing **Ms. Charla Haley, Mr. Craig Johnson and Mr. Yan Liu** whose terms will be completed.

Mr. King is a Research Fellow at DuPont's Automotive Finishes R&D Laboratory in Troy, Michigan. Since joining DuPont in 1964, King has worked in a succession of R&D and Marketing assignments. In 1978 he assumed his current responsibilities for color styling and pigmentation technology. Currently King is involved in selecting and qualifying color pigments for use in automotive topcoats, preparing and presenting color styling shows for automotive customers, and global consulting on the use of color pigments and the resolution of color-related problems. He also participates in DuPont's color marketing of automotive finishes in Europe and Japan. King holds several patents on pigment and dispersion technology. King received his B.A. in Chemistry from the College of Wooster (Ohio), and is currently on the Board of Directors of the Detroit Colour Council (DCC). He is a Chairholder in the Color Marketing Group (CMG) and has just completed a term on the CMG Board of Directors. King also supports color education activities at Eastern Michigan University and other local color organizations.

Dr. Korenic is an Assistant Professor of Physics at the University of Wisconsin-River Falls. Her primary research interest is the colorimetry of liquid crystals, and she is also extremely interested in activities that promote science literacy at all levels of education. Prior to joining the University of Wisconsin, Korenic worked for the Display Materials Technology Group of 3M Corporation. Korenic received her Ph.D. from the University of

Rochester Institute of Optics in 1997; her thesis was awarded the Glenn Brown prize for outstanding thesis from the International Liquid Crystal Society in 1998. She is an active member of the Optical Society of America (OSA), serving on its Membership and Educational Services Council, on the editorial advisory board of Optics and Photonics News and as chair of the K12 education subcommittee. Korenic is also a member of the National Science Teachers Association, the American Physical Society, the American Association of Physics Teachers, the Wisconsin Association of Physics Teachers, and the International Liquid Crystal Society.

Ms. Miele is an assistant Professor of Psychology and Assistant Chairperson of the Social Sciences Department at the Fashion Institute of Technology (F.I.T.). Her specialty area is the Psychology of Color. In her capacity as a Color Psychologist, she has served as a consultant to the All Japan Fashion Teachers as well as to several private businesses. Miele is Faculty Advisor to the F.I.T. Student Chapter of the ISCC, Vice-Chair of the ISCC Interest Group Three on Art Design and Psychology and has been assisting in the programming for the AIC 2001. She served as an outside reader for *The New Munsell Color Set (2nd. Ed.)*. Miele received her B.Sc. (Summa Cum Laude) from City University of New York and her M.A. from Hunter College. She is a member of American Association of University Women, the American Psychological Association and Psi Chi (The National Honor Society in Psychology).

## **Detroit Colour Council March 2001 Meeting**

The DCC's first meeting of the year was a look to the past. Noted automotive design legend Bill Porter presented a wonderful, historical look at early automotive design. He concentrated on the 30's, 40's and 50's. The topic of his fascinating slide show and commentary was "Streamlining." STREAMLINING gripped the human imagination.

Bill covered early 20th century aerodynamics and its effect on architecture, decorative arts, product design, boats, trains and automotive design. It was a very interesting and enlightening presentation.

*Jim Keiser*

**Welcome To The Following New ISCC Members.....**

Mr. Scot Brent Arndtson	3M, 3M Center Bldg., 30-1E-01 St. Paul, MN 55144-1000 651-778-4019 sbarndtson@mmm.com
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## ISCC Elects New Secretary

The Board of Directors received an announcement from Rich Riffel that he can no longer serve as the Secretary of the ISCC with his new position as Project Manager for Corning. Regrettably, we are forced to accept his resignation.

Rich brought a lot of talents with him. He did a wonderful job on the board, and I am sorry that we will lose him. We wish him all the very best in his future endeavors, and every success to him and his family. His resignation leaves a position vacant on the Executive Board.

The main function of Secretary's position is to be the source of historical continuity within the ISCC. His/her main duties are to take minutes for the Board meetings, to report at the Annual Meeting Luncheon, and to administer the election system within the ISCC. The Secretary also has the opportunity to interact with the public.

To fill the vacant Secretary's position, we followed the Bylaws, Article III, Section 6: "In the event of a vacancy occurring in the other [non-Presidential] offices, the remaining members of the Board of Directors by an affirmative vote of a majority thereof shall fill such vacancy for the period of the unexpired term."

I am pleased to announce that John McCann has been unanimously elected by the Board of Directors to complete the vacated term as Secretary of the ISCC. John is a consultant on color and image processing. He graduated from Harvard in 1964 with a degree in Biology. He had been working part-time for Polaroid as an undergraduate. In 1964 under the direction of Edwin Land he became the manager of the Vision Research Laboratory where his work on human psychophysics has included research on rods as color receptors, low-spatial-frequency vision, mathematical models of color vision and quantitative tests of Retinex theory. As Senior Manager in the Research Division of Polaroid, he directed the Vision Research Laboratory until retiring from Polaroid in 1996. From 1979 to 1996 he managed research on very-large format Polaroid photography, which includes the 20-24 cameras, the Museum Camera and Polaroid Replicas. Since 1974 he has been studying vision with computer processed digital images. This activity combines interests in mathematical models of vision with electronic imaging techniques. This basic research has concentrated on techniques for calculating color sensations and developing film recorders that control film exposures so that the photographic image is a record of color sensations

rather than the record of light coming from the scene. His work has led to 81 publications and 12 patents.



In 1984 he was elected a Fellow of the SPSE. He has served as Vice President, President and Past-President of the Society of Imaging Science and Technology. He has also served as Trustee and President of the Artists Foundation, Boston, and as Chairman of the Cultural Committee of the Polaroid Foundation.

Please join with me and welcome John to this new exciting position. We look forward to John's experience and his contribution. John's first board meeting will be in Rochester.

Remember—*"Become involved, make a difference, and have the time of your life."*

Your President,  
Jack A. Ladson



A car was stopped at a traffic light and a cop watched from across the street as the vehicle sat through a red, yellow, green..... red, yellow, green.... red, yellow, green. Finally, he walked over to the struggling motorist and said,

"What's wrong, sir, don't we have a color you like?"

## **Color Research And Application In This Issue, June 2001**

We open this issue with a "Tutorial on the Importance of Color in Language and Culture" by James Schirillo. The overall direction of the tutorial is to consider the relationship between different wavelengths of light and how they generate different color names across cultures. The tutorial has four main sections. First is a discussion of the steps from the physics of the wavelength of light to the perception of color. The second part discusses Berlin and Kay's hypothesis that ties color categorization to linguistics, and works supporting their view. The third part reviews the criticisms and counter-examples to Berlin & Kay's work. In the final section to gain additional insights, the tutorial explores how children acquire color names as they develop.

Continuing on in this theme of color naming, our next article is the second of a three part series dealing with "A Cross-Cultural Colour-Naming Study." The first part was published in issue #1 of this year. In that study, H. Lin, M. R. Luo, L. W. MacDonald, and A. W. S. Tarrant reported on a color-naming experiment, which allowed panels of Mandarin-speaking Taiwanese subjects and English-speaking British subjects complete freedom in naming the color samples presented to them. In this issue, "Cross-Cultural Colour-Naming Study Part 2 – Using a Constrained Method" describes a second experiment in which the participants were asked to find the colors corresponding to basic names, modifiers, and secondary names in terms of one focal color or color region. The main aim of this experiment was to map focal colors corresponding to each of the important basic and secondary terms found in Part 1. In the next issue the authors will report on modeling resulting from these studies.

When we organize the colors we name or perceive, we put them into a framework or space. In this type of modeling, it is important to distinguish between a psychological color space, representing for example, the collection of object-color perceptions and the mathematical/geometrical models based on measurement data, built to describe the psychological space. Both are important, but serve different purposes. In "Color Space and Its Divisions" Rolf Kuehni provides a synthesis of his recent work on color order systems and color-difference evaluation in the context of current knowledge and practices. He concludes that color space and color difference scaling can be modeled with

considerable accuracy using stimulus information and the tools of expanded colorimetry in the form of an opponent-color system.

Next we move into the area of understanding human color vision, which has been a long-time challenge. More work has been done studying the luminance channel than the chromatic channels and sometimes we can relate what we find for the luminance channel to the chromatic channels. Studies have shown that the response time of the luminance channel relates to stimulus luminance change by a power function. This is known as Piéron's Law. Using simple reaction time as a measure in their experiment, J. A. Díaz, L. Jiménez del Barco, J. R. Jiménez, and E. Hita explore the response time to chromatic changes in the opponent chromatic channels and assess the influence of the chromatic adaptation state in this response. Their findings in "Simple Reaction Time to Chromatic Changes Along L & M-Constant and S-Constant Cone Axes" show that the mean value of simple reaction time was described by a law similar to the one for luminance variations (Piéron's Law).

Next we move to a more application-specific modeling problem. Successful modeling of the optical properties of materials such as paint films has allowed computer prediction of the reflectance curve of materials, and thus the color of the materials. This capability has led to computer formulation of paint recipes and computer-predicted batch corrections in production. The "Application of Multi-Flux Theory Based on Mie Scattering to the Problem of Modeling the Optical Characteristics of Colored Pigmented Paint Films" is the topic of the next article.

In developing the theory for the optical properties of materials, there has been overlap with radiative-transfer theory by the scattering due to particles in the field of astrophysics. This background is reviewed in the article by J. J. Joshi, D. B. Vaidya, and H. S. Shah. They then go on to apply these models to pigmented materials, in particular paint systems. They study the effect of variation in average pigment size and pigment size distribution on reflectance spectra. The results show that there is a complex relationship between the morphology characteristics of pigments and the color exhibited by the paint system.

In the Industrial Applications Section, we have an article by Arnold J. Wilkins and Nirmal Sihra. They describe the development of "A Coloriser for Use in Determining an Optimal Ophthalmic Tint" to enable color anomalous patients with Meares-Irlen syndrome to obtain a color that

reduces perceptual distortion and increases their reading fluency.

We close this issue with two book reviews and an erratum. Lindsay MacDonald reviews *Color: A Multidisciplinary Approach* by Zollinger, and David McDowell reviews the Sixth Edition of *Color and Appearance Standards* published by the American Society of Testing and Materials, Committee E-12. Also, Park Seung-ok wants correct reference 6 from his article "Optimum Brightness Level and Simplified Characterization of CRT Monitors," published in Volume 25, Issue #6, December 2000.

*Ellen C. Carter*  
CR&A Editor

Please Note: The COL 20-Year cumulative index is now live on the journal home page:  
<http://www.interscience.wiley.com/jpages/0361-317/>

## Book Briefly Noted

### **The Fred W. Billmeyer Color Science Collection: A Catalog of the Special Collection at the Edward H Wadewitz Memorial Library of the Graphic Arts Technical Foundation**

by Cynthia L. Harrison and Amy J. Watson  
(Copyright 2001 by GATF Press, 200 Deer Run Road,  
Sewickley, PA 15143-2600). \$50 for members of GATF,  
\$75 for non-members.

This book is a catalog of the more than 400 books and other materials Fred W. Billmeyer Jr. donated to the GATF in 1999. The collection, containing many rare items, is a tribute to Billmeyer, and also attests to an excellent library that accepts such collections and makes them available in good order. Billmeyer selected the GATF library because of his long-time association with a student he mentored, Richard Harold, who was then a senior color scientist in GATF's Research Department. The book can be used for historical and research purposes, and may also encourage other contributions to the GATF library, to complement the collection documented here. We are grateful that the GATF gave the ISCC an office copy of the catalogue, and intend to use it as a resource in both these capacities.

[Note: An "Errata" sheet for the book, compiled by Fred Billmeyer, is available free of charge from the ISCC office.]

*Michael H. Brill*

## **Color Association of the United States (CAUS)**

### **Green Design**

Asher Derman, principal of Green October, recently spoke on "Green Design" at the Association's office. Dr. Derman is an environmental consultant who participated the design of the head offices of Scholastic, Inc. and Condé Nast Publications, New York City's first "green" high rise, a 1.6 million square foot office tower at 4 Times Square.

Dr. Derman noted that much of what is "green" in buildings is often not visible. Daylight is critical, he said, and the farther natural lighting can penetrate the better. Some of the strategies that "green" buildings employ include skylights and louvers to control daylight levels, installation of low maintenance, indigenous plants around the ground-level exterior, and recycling of water wherever possible.

According to Dr. Derman, 40% of the US population suffers from "unhealthy" buildings. As a result "green" design awareness is gaining consideration. Curiously enough, residential, rather than commercial spaces are more likely to be "unhealthy." Among the pollutants in a home are animal dander, finishes and cosmetics, mold, mildew, and high humidity.

What would a textile palette would like if it were environmentally correct? Dr. Derman suggested bright colors made from natural dyes, even though these are highly fugitive and would fade faster than synthetics. The problem of reprocessing fabrics, he pointed out, lies in the dyes and not the fibers.

Asher Derman also addressed the issue of resources like wood products that we take out of the eco-system and use for our needs. Awareness of the need for conservation and recycling programs can help us find ways to make these resources renewable and perennially useful.

*CAUS NEWS*  
*April 2001 Issue*



## COLOUR AS AN EVERY DAY SYMBOL

The survey of colour names in song titles written by Cynthia J Sturke (1) illustrates how important colours are to our visualization of events and situations. I am sure that the impact of the name Pink Panther without the Pink and the Blue Danube without the Blue would be severely reduced. For example we might attach the adjectives 'funny' or 'slinky' to the panther, or 'long' or even 'romantic' to the Danube and my visualization of the scene would be neither so great nor so permanent. The colour adjective does not even need to be accurate. We have all seen the animated drawings of PP but the stretches of the Danube I have seen were certainly not blue.

Each colour adjective can mean so many things to each one of us. Take the example of 'green' in Cynthia's list. I do not know some of the titles she quotes, but three are sufficient to illustrate the point. Kermit's 'Its not easy being green' is a soul searching lament, 'Wearing of the green' evokes the passion of the Irish, and 'Greensleeves' is about the joy, or otherwise, of a girl and a boy behaving quite naturally in the woods. So, here are three quite separate emotions and 'meanings' of green.

Shakespeare also uses green to reinforce positive as well as negative feelings. The following are among the positive associations.

- Freshness and fertility, hence youth and innocence (the nurse in *Romeo and Juliet* (Act 3 Scene 5) describing the positive attributes of an alternative lover, [Romeo] "Hath not so green, so quick, so fair an eye, As Paris hath,"). Hence also unripeness, inexperience and ignorance ("You speak like a green girl," *Hamlet* Act 1 Scene 3).

- Permanence, immortality, resurrection, faithfulness ("Though yet of Hamlet our dear brother's death The memory be green..." *Hamlet* Act 1 Scene 2).

- Lovers ("Green indeed is the colour of lovers" *Love's Labours Lost* Act 1 Scene 2); hence expectation and hope.

Negative associations of green derive from the colour of unripe fruit, mould, death, decomposition and decay. They include the green of poison and those emotions related to poison.

- Envy, jealousy ("Beware, my lord, of jealousy; It is the green-eyed monster", *Othello* Act 3 Scene 3; "... green-ey'd jealousy", *Merchant of Venice* Act 3 Scene

2). A more modern expression is "to look through green glasses");

- Melancholy ("Green and yellow melancholy" *Twelfth Night* Act 2 Scene 4);

- Neutrality, passivity and indecision - emotions that might well surface in the spring when food is scarce and the diet poor. Such a diet can induce anaemia and greenness of skin in young girls, ("Out you, green-sickness carrion! You tallow face!" *Romeo and Juliet* Act 3 Scene 5).

Some writers are uncomfortable with the idea that colours can have opposite meanings. However, the positive and negative nature of symbolic green appears to be universal and certainly not confined to the English language. For Hindus and Buddhists it can mean life as well as death, for Chinese, life and disgrace, and for Muslims in North Africa, growth and corruption.

Good and bad symbolic aspects of green can be linked to a single event, growth. However, the emotions are far enough apart to wonder at the logic. How can a colour come to represent both life and death, both growth and decay? The answer lies in the nature of colour. Colour is not a single property of an object but a perception. That is, a colour can have any meaning the perceiver wishes to attach to it. This phenomenon can be termed the *Principle of Singularity*. This states that "at any one time to any one person, a colour symbolizes only one emotion or feeling regardless of what that colour may symbolize to another person or to the same person on another occasion" (2). This also works in the supermarket. Shoppers seem happy that package colours mean what the marketing men say they mean. A green lid to the jar of Nescafé indicates that it contains Blend 37 coffee, a green label on a can of dog food signifies that it contains lamb flavoured meat.

Attempts are occasionally made to attach meanings not just to green itself but to subtle shades thereof. A mid-nineteenth-century text noted that wedding dress ribbons coloured grass-green indicated youthful jollity, popinjay-green meant wantonness, willow meant forsaken, and sea-green indicated inconstancy. Such subtleties seldom gain wide acceptance because, as readers of ISCC News will be well aware, of differences in colour vision of individuals and because of disagreements about the names to be attached to particular shades.

In conclusion, the traditional function of a flag is to reinforce a sense of purpose, to act as a focus and to inflate emotions. When feelings and emotions are sym-



bolized in writing and speech, colours act like flags to reinforce meaning and association. The way we use colour in language can indeed, as Cynthia pointed out, convert an otherwise drab description of life into a colourful, memorable picture. It provides an impact we all use for cataloguing and pinpointing specific events, emotions and circumstances.

(1) Cynthia J Sturke, What would music be without color? *ISCC News* 390 March/April 2001, 16

(2) John Hutchings, Folklore and symbolism of green, *Folklore* 109 1997 55-64

*John Hutchings*

## Obituary

### Heinz Terstiege (1934-2001)



Heinz Terstiege, a long time representative of Germany's color science community and internationally renown, died suddenly on Easter, April 15, 2001 at his home in Pausdorf Northern Bavaria/Germany. He was born June 18, 1934 in Münster Northrhine-Westfalia/Germany, where he grew up and left high-school 1954. He studied electrical engineering at the Technical University of Berlin where he received a diploma in 1962. At that time he became acquainted with Prof. Manfred Richter, head of the Division of Colorimetry at the Federal Institute of Materials Testing (BAM) (later the word "Research" was added to the institute), and professor at the Technical University. Heinz Terstiege started work on a Ph. D. thesis at BAM investigating effects of high retinal illuminances on the validity of the persistence and coefficient laws of von Kries; finishing in 1966. Meanwhile he became an employee of BAM, and in 1967 he took over the chair of the laboratory on color measurement within the Division of Colorimetry. After three years Richter retired and

Heinz succeeded him as chair of the Division. He then broadened the scope of Colorimetry at BAM by filling up the positions of four chairs of laboratories: colorimetry (Dr. D. Gundlach), gloss (Dr. W. Czepluch), color engineering (Dr. K. Witt), and color rendition (Dr. K. Richter). The research work at BAM was focused on selected aspects of colorimetry and photometry.

This was the start of a broad career in international contacts. Heinz Terstiege was adviser for UNO and Carl Duisberg Society in Buenos Aires, Teheran and Shanghai in the field of colorimetry. He was a member of a variety of technical Committees in CIE and ISO dealing with all parts of colorimetry and photometry. He engaged himself in CIE Technical Committees on Signaling Colours, on Colours in Road Traffic, in ISO-Committees of Warning and Safety Colours where he could add his experience with ordinary colorimetry, and with retroreflecting and fluorescent colors for traffic, identification and safety. Another research project was the quantification of color rendering properties of light sources with respect to color matching. A practical application in Germany was the standardization of light sources for the illumination of meat at the butcher's shop. His list of publications extended to more than 100. He was the co-editor of the scientific German journal *Die Farbe* since 1975. He became editor in 1990 when Manfred Richter passed away.

His main activities concentrated on the representation in different organizations in part as member, in part as the chair. He became head of the German standardization group on color within DIN (FNF) from 1979 to 2000, and served as advisor in different other such groups in DIN. He was the first recipient of a Manfred-Richter FNF-Award in 1994. In 1974 he founded the German Scientific Society on Color together with Manfred Richter and others, and was elected vice president 1974-1982 and president since 1982. He was treasurer of the German National Committee of CIE 1975 to 1991 and chairman since 1991. For CIE he was secretary 1979 to 1991. He served as vice president for AIC 1982 - 1985 and as president 1986 - 1989. He became member of the Inter-Society Color Council (ISCC) in 1970.

Through his international contacts he made friends worldwide. He became an honorary member of the Grupo Argentino del Color in 1980, and in 1998 for the Color Association of Slovenia. Particularly notable was his receipt of the Deane B. Judd-AIC Award during the AIC midterm conference in Berlin 1995. He was honored because of his contributions to a variety of colorimetric aspects brought up while formulating technical standards or reports in Germany as well as in international organizations such as CIE and ISO.

The AIC Quadrennial Conferences in 1981 and the 1995 midterm meeting in Berlin were great successes because of his talent to manage such events very efficiently. Two smaller conferences organized by him were the AIC Stiles-Wyszecki Memorial Symposium on Color Vision Models 1987 in Flo-

rence, Italy, and the AIC Interim Symposium Instrumentation for Color Measurement 1990 again in Berlin.

He was also engaged in teaching colorimetry at BAM at first with biweekly, and later weekly tutorials together with the employees of the Division, and started two-and-a-half-day tutorials at the Technical Academy in Esslingen, Germany, together with D. Gundlach. The audiences were filled by a variety of interested people, mainly from industry and federal departments. More than 2000 students may have passed through these courses during all the years. In addition, he received a professorship of Zhejiang University in Hangzhou, Republic of China, where he taught colorimetry for several years.

His professional career at BAM ended with new duties, which he overtook when BAM was reorganized. He managed the international contacts of BAM in standardization work. This was a field for which he could supply great experience. When he retired in June 1999 he remained active with all his international contacts, touring around from conferences to meetings, etc.

He was a well-accepted partner in discussions on standardization where he consistently convinced people about the necessity of strictly obeying the guidelines. On the other hand he could become angry, if he felt that this understanding was missing. However, his unique ability to make social contacts with other people, and to find friends for relaxing meetings often brought consensus.

There was a great international family, who looked forward to seeing him again, when he attended meetings or conferences. One personal trait may be mentioned - he could fall asleep in any situation where he was not personally engaged. All of us knew about it, and smiled at that. Now he fell into his last sleep. The color family will miss him.

*Klaus Witt*

## **From the Office.....**

Please note that the membership application form found in your newsletter is there for you, an ISCC Member, to pass on to someone that may be interested in joining the ISCC. You do not need to fill it out again.

If you have not paid your 2001 ISCC Dues yet, this will be your last issue. If you are not sure whether you have paid this year, please contact me at the office to check your status. Thank you. Hope to see you all in Rochester!

*Cynthia J. Sturke*

## **ISCC Board of Directors Meets at Sarnoff Corporation**

The Board of Directors meet for their Spring Meeting at the Sarnoff Corporation in Princeton, NJ on March 17, 2001. We owe a debt of gratitude to Mr. Albert Pica, Dr. John C. Pearson, Mrs. Cleo Karolikowski, and Dr. Michael Brill of Sarnoff for all the hospitality extended to us. Their willingness to support the ISCC contributed to a very successful meeting. Thank you, again. The BOD had a great meeting, and we continue to advance the aims and purposes of your organization.



In attendance from left to right are: Jack Ladson, President; Ralph Stanziola, Board Member; Michael Brill, Past-President; Cynthia Sturke, Office Manager; Hugh Fairman, Treasurer; Tek Celikiz, Editor; Dan Phillips, Board Member; Ellen Carter, Secretary pro tem; Alan Kravetz, Board Member; and Mary McKnight, Board Member.

From the Office of the President – I wish to thank everyone that contributes; whether it is time, resources or finances. Your contribution is deeply appreciated. There are opportunities available for you to serve the most prestigious color organization in the United States, and in the world.

*Jack Ladson*



## **MCSL Digital Visual Colorimeter (DVC), See It at AIC Color 01**

A few months ago the MCSL staff were discussing the idea of installing a visual colorimeter that could be used for education on color matching functions and observer metamerism as well as some research. WE considered purchasing a very nice optical device designed by Dr. Arthur Tarrant that I had seen at Derby. Dr. Tarrant will be describing his device at the AIC color 01 Congress in Rochester this June. Upon more closely examining that instrument, we concluded that we needed different features for our research interests and we commenced brainstorming on ideas for an instrument that we might build ourselves. Thus, the MCSL DVC was conceived. DVC is short for "Digital Visual Colorimeter." We had several objectives in mind when considering designs for the DVC. First, we were interested in having full computer control to simplify teaching labs and data collection. Secondly, we wanted an easy way to change the RGB matching primaries so that we could complete some experiments on transformability of primaries of interest to CIE TC1-56. Lastly, we wanted to incorporate a highly customizable image display into the system.

Considering those objectives, we designed the MCSL DVC that is currently under construction. For simple color matching experiments, observers will view a photometer cube that presents them with a split field. One half of the field will be the test color that is produced with a diffuse-field fiber-optic illuminator that can be filtered to produce desired spectral power distributions. The other half of the split field is the main DVC consisting of a high-resolution digital LCD that has been disassembled and reconstructed with a custom backlight. The LCD provides digital control of three broad-band RGB spectral regions. The custom backlight allows the illumination to be controlled to the degree that the RGB primaries can be specified as anything from selected monochromatic lights to the full broad-band RGB filters of the LCD panel. The

new backlight design (currently consisting of 3 independent high-intensity fiber-optic illuminators that can each be filtered as desired) allows control of the colorimeter primaries for simple matching experiments and display white point and luminance for imaging experiments. The resulting display is far more than a simple uniform colorimeter matching field, it is also a full-color image display. Its flexibility will enable a wide array of image display experiments and will also allow us to prototype future displays utilizing more than 3 channels. It is also worth noting that the luminance range of the "ultra display" is immense. With slight modifications, its luminance can range from that typical computer displays 100-200 cd/m<sup>2</sup> to uncomfortable levels of several thousand cd/m<sup>2</sup>.

Our first experiment with the MCSL DVC will be a test of Grassmann additivity through an evaluation of transformation of primaries. We will ask a number of observers to match several colored stimuli with two sets of primaries in order to assess the degree to which the two sets of matches can be accurately described by a linear transformation. One important aspect of this research will be a careful analysis of the intra- and inter-observer variability in making these matches. We hope to have the instrument fully functional and calibrated within the next two months and, if all goes well; it will be on display in our booth at the AIC Color 01 exhibition. At that time, we will be having congress participants make matches to a single color stimulus with two sets of primaries to enhance our statistical analyses. We hope you can come by our booth and give it a try. (If the instrument is not ready to transport to our booth, you will certainly be able to see it at the AIC Welcome Reception, which will be held with an open house at our laboratories.)

*The Chroma Zone, Winter 2001*  
MCSL's Newsletter

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"Now with this entree either a white wine or a light red would be appropriate," the waiter pointed out. "What would you like?"

"Suit yourself," replied the customer. "I'm color-blind."

## The ISCC at AIC

The ISCC is delighted to host the AIC Quadrennial Conference, and we have been working hard to welcome all our visitors. Many of the special activities are featured in earlier Newsletters and elsewhere in this issue of the *News*. However, we also want to let the *ISCC News* readers know about some of the more traditional ISCC activities that will be occurring during the AIC meeting. The events that are uniquely part of the ISCC are scheduled for Sunday June 24<sup>th</sup>. They include three project committee meetings followed by the ISCC Award Luncheon and Business Meeting.

There was a time when just about the only activities at an ISCC Annual Meeting were the project committee meetings. Now we have Interest Groups with sessions about research, industrial applications, art, design and psychology with perhaps special topical symposia. However, the project committees are becoming revitalized. Currently we have four active committees...Projects 51-54.

Begun in May 1996, Project 51 – Guide to Material Standards is nearing completion of the revision and updating of the ISCC Technical Report *Guide to Material Standards and Their Use in Color Measurement*. This committee will not meet this year, but the chair, Art Springsteen, will seek approval for the publication of the new edition of the technical report.

Projects 52 and 53 both held their first meetings at last year's Annual Meeting and will hold working meetings on June 24<sup>th</sup>. Project 52 - *Comparative List of Color Terms II* is chaired by Ellen Carter. The members of this committee are compiling a list of color terms and comparing the definitions and usage throughout the color community. They hope to publish a cross-referenced list of terms, and possibly extend it to languages other than English. The members of Project 53—*Annotated "Webliography" of Color* have been surfing the web. Under the leadership of the chair, Michael Brill, they are promoting the ISCC's role as a nexus for color information exchange, by developing criteria for a webliography

and actually posting an initial webliography by next year.

The newest project committee, Project 54 - *Colors of Maximum Contrast*, was approved at the October Board of Directors meeting. Hugh Fairman and Ralph Stanziola are co-chairs of the project, and will preside over its first meeting at this year's Annual Meeting. However, they have already begun work. The inspiration of the project is an article published in *Color Engineering* in 1965, in which twenty-two colors were identified as maximally different from each other. In the light of modern developments in color measurement and specification as well as expansion of the producible surface color gamut, these colors are no longer thought to be the optimal set of colors of highest contrast to each other. Yet sets of maximally different colors would be useful. Ralph Stanziola has obtained a quotation on the cost of producing samples of colors of maximum contrast in the paint medium. The new committee will need to translate the colors from the Munsell notation to spectral curves, then to real paint specimens. Join them in their work on Sunday.

The ISCC Awards and Business Luncheon is always a festive occasion. Following the project committee meetings the luncheon will feature a short business meeting and several awards. The ISCC will thank their departing directors, Charla Haley, Craig Johnson, and Yan Liu. Then they will welcome the newly elected directors: Jim King, Eileen Korenic, and Meg Miele. They will also introduce several new committee chairs and a new officer. John McCann will fill the remaining part of Rich Riffel's term as Secretary. Dick Fisch will replace Richard Harold as Interest Group and Problem Committee Chair, and Meg Miele will become Interest Group III Chair as Jean Bourges has completed her term. Hugh Davidson will join the very select group of Honorary Members of the ISCC. Paula Alessi will be given the Nickerson Service Award. The luncheon will be capped off with the presence of two very special guests, Barbara Saltzman and Mark Saltzman, the wife and son of Max Saltzman. They will be accepting the Godlove Award on behalf of Max Saltzman.

*Ellen C. Carter*

**AIC Color 01 Rochester**

**June 24-29, 2001**

**Schedule of Oral Papers and Symposia**

(The following information is as of April 26th. Please check our website: [www.iscc.org/aic2001/](http://www.iscc.org/aic2001/) for updated information.)

\* Indicates Invited Speaker

**Monday, June 25**

**8:30 am - 10:30 am**

**Opening Session and Special Lecture**

**11:00 am - 12:00 noon Color Appearance Session Chair: Mark Fairchild**

Moroney, *Background and the perception of lightness*

Juan, Luo, *Magnitude Estimation for Scaling Saturation*

Li, Luo, *A Uniform Colour Space Based upon CIECAM97s*

**11:00 am - 12:00 noon What is Color? Session Chair: Rolf Kuehni**

Roberson, *Color Categories are not universal: New evidence from Traditional and Western cultures*

Tillberg, *The Russian Avant-Garde and Colour as Worldview*

Maund, *A Pluralistic Framework for Thinking about Colour*

**1:00 pm - 3:00 pm Vision Session Chair: Mitsuo Ikeda**

Ishida, *Assessment of color search performance in photopic and mesopic illuminances based on color identification data*

Okajima et al., *Age-Related Changes in Color Appearance Depend on Unique-Hue Components*

Shaw & Fairchild, *Evaluating the 1931 CIE Color Matching Functions*

Shinoda, Ikeda, *Transition between color contrast and assimilation by perceived size manipulation*

Vienot, *Rating of tinted ophthalmic lenses*

Yamauchi, Williams, Brainard et al, *What determines the unique yellow, L/M cone ratio or visual experience?*

**1:00 pm - 3:00 pm The Why's and How's of Color Management: A Tutorial**

Coordinator: Rob Buckley, Xerox

*Why Color Management?*

\*James C. King, A Principal Scientist, Adobe Systems Incorporated

**1:00 pm - 3:00 pm Art & Design**

Menu, Colinart, Elias, *Colour studies in Encaustic Fayum Portraits*

Lazaro, Renaissance: *The color between the ideals of Beauty and reasons of Freedom*

Carrabot, Lewis, *A Method of Simulating Paint Mixing on Computer Monitors*

Albert-Vanel, *Optical Fusions and Proportional Syntheses*

Melita, *Applications of the Three Color Zone System: A cinematographers tool to understand color*

Charnay, *Colour, light and altruistic creation*

**4:00 - 6:20 pm Vision Session Chair: Joel Pokorney**

Ayama et al, *Whiteness Perception in Japanese and Finnish under Cool and Warm Fluorescent Lamps*

DaPos, Sponga, *Fluorescence thresholds for some reddish colours*

Nakano et al, *A Uniform Color Space Based on Color Vision Mechanisms*

Ripamonti, Westland, *Perceptual Transparency*

Sagawa, *Visual Comfort Evaluated by Opponent Colors*

Guth, *ATD01 Model for Color Appearances and Differences*

Aoki, Shinoda, Ikeda, *Floating phenomenon and Mode of Color Appearance*

**Monday, June 25 Symposium - What is Color?**

**4:00 pm - 6:00 pm**

Coordinator: Paul Green-Armytage, School of Design, Curtin University of Technology, Western Australia

Moderator: Larry Hardin, Emeritus Professor of Philosophy, Syracuse University

Introduction: Paul Green-Armytage, Curtin University of Technology, Western Australia

**Color Experience and the Human Animal** \*C.L. Hardin, Emeritus Professor of Philosophy, Syracuse University

**What is Color?** \*Lois Swirnof, Feltman Prof. of Light and Color, Cooper Union for the Advancement of Science and Art

**Color vision is form and object vision** \*John S. Werner, Ophthalmology Department, University of California

**On the nature of colours** \*Osvaldo da Pos, Department of General Psychology, University of Padua, Italy

**Color: what could it be?** \*Rolf G. Kuehni, Color Consultant



**Tuesday June 26 - Symposium Imaging Techniques of Spectral Estimation (Spectral Imaging)**

Moderator: Roy Berns, MCSL, Rochester Institute of Technology, Rochester, NY  
8:30 am - 10:30 am

Welcome and Overview \*Roy Berns, Rochester Institute of Technology

10:30 am - 11:00am Coffee Break

11:00 am - 12:00 noon

**Optimization of total multispectral imaging systems: Best spectral match versus least observer metamerism**

\*Bernard Hill, Aachen University of Technology

**Gonio-Photometric Imaging for Recording of Reflectance Spectra of Three Dimensional Object**

\*Yoichi Miyake, H. Haneishi, Norimichi Tsumura, and Junichiro Hayashi, Chiba University

**Spectral estimation from laser scanner data for accurate color rendering of objects**

Réjean Baribeau, National Research Council Canada

**A New Procedure for Capturing Spectral Images of Human Portraiture**

Qun Sun, Mark Fairchild, MCSL, Rochester Institute of Technology

**Representation of Spectral Images in Data Communications**

Markku Hauta-Kasari, Juha Lehtonen, Jussi Parkkinen, and Timo Jaaskelainen, Univ. of Joensuu Finland

**Spectral estimation of artists oil paints using multi-filter trichromatic imaging**

Francisco Imai, Roy Berns, MCSL, Rochester Institute of Technology

**Wrap-up, Roy Berns**

**Tuesday June 26 - Symposium The Artist and Digital Media**

8:30 am - 10:30 am

Moderator: Wade Thompson, Assistant Head, Art and Design, Southwest Missouri State University

**Title TBD** \*Donna Cox, Beckman Institute, University of Illinois

**Painting by Numbers** \*Liz Lee, State University of New York at Fredonia

**The Paperless or Vanishing Society?** \*Joy Luke, Studio 321

**Architecture Tuesday June 26** Session Chair: Jin-Sook Lee

11:00 am - 12:00 noon

Billger, *Colour Appearance in Virtual Reality: A Comparison Between a Full-Scale Room and a Virtual Reality Simulation*

Toda, Ishida, *How does our visual system interpret the color of light filled in a three-dimensional space?*

Oberascher, *"LUMINOS 3" - A New Tool to Explore Colour and Light in 3-D*

1:00 pm - 3:00 pm Session Chair: Monica Billger

Metcalf, Gender, *Color and the Domestic Sphere*

Servantie, Color: *Architectural Dimension*

Schindler, *Color in Present Culture of European Architecture*

Ural, *An Analysis on Architectural Coloring Process*

Cler, Cler, *CHROMATIC TOWNSCAPE and Colour Words*

Minah, *Color Constellations in the Seattle Cityscape*

**Color Appearance Tuesday, June 26** Paula Alessi

1:00 pm - 1:40 pm

Mizokami, Shinoda, Ikeda, *Degree of color constancy yielded in a photograph perceived as 3D space*

Yamauchi, Ikeda Shinoda, *Demonstration of the Light Source Color on a Photograph*

**Symposium - Tuesday, June 26 Color Issues for Digital Archives**

**1:00 pm - 3:00 pm**

Moderator: Franziska Frey, Image Permanence Institute, Rochester Institute of Technology

Introduction \*Franziska Frey, Rochester Institute of Technology

**Accurate colour images: from expensive luxury to essential resource**

\*David Saunders, Scientific Department, The National Gallery, London, U.K.

**Color Strategies for Image Databases**

\*Sabine Susstrunk, Audiovisual Communications Lab, Swiss Federal Inst. of Technology (EPFL), Lausanne, Switzerland

**Digital Slide Reproduction using Densitometry**

Peter R. Fornaro, \*Rudolf Gschwind<sup>1</sup> and Pip Laurenson<sup>2</sup> 1) Univ. of Basel, Scientific Photo. Lab 2) Tate Gallery London

**Spaces of probability distributions and their applications to color based image database search**

Linh Tran, Reiner Lenz, Linköping University, Sweden

**Color Difference Tuesday June 26** Klaus Witt

**1:40 pm - 3:00 pm**

Hong & Luo, *Perceptually based colour difference for complex images*

Klassen, *Colour Difference Metrics and Surround Effects: Preliminary Results*

Zhu, Cui, Luo, *New Experimental Data for Investigating Uniform Colour Spaces*

Xin, *Comparative Study of Visual Colour Differences Using Reflective and Self-luminous Colour Stimuli*

**Color Difference Tuesday June 26** Jim Nobbs

**4:00 pm - 5:20 pm**

Cui, Luo, Rigg, *Investigation of the 'Crispening Effect' on Lightness Differences*

Berns, *Derivation of a hue-angle dependent, hue-difference weighting function for CIEDE2000*

Kuehni, *Uniform color space is not homogeneous*

Gay, Hirschler, *Determination of Industrial Colour Tolerance Limits-Case Studies in the Textile Industry*

**Symposium Tuesday June 26 What is Color For**

**4:00 pm - 6:00 pm**

Organized by ISCC Interest Group III, Art, Design and Psychology

Co-moderators: Georgia Kalivas, Meg Miele, Fashion Institute of Technology, NY

**The Aesthetics and Commercial Value of Color** \*Margaret Walch, Assoc. Dir., The Color Association of the United States (CAUS)

**Color in Home Furnishings** \*Catharine Stein, Director of the Color Council for the Home Furnishings Industries

**Color as a Language in Architecture** \*Grete Smedal, Centre for Form and Colour, The Art and Design School, Bergen, Norway

**Color and the Worldwide Web** \*Ray Kinlock, Surface Design Department, Fashion Institute of Technology, New York

**Industrial Color - Tuesday June 26** Session Chair: Robert Hirschler

**5:20 pm - 6:00 pm**

Hutchings et al., *Food Colour and Appearance Measurement, Specification and Communication, can do Better*

Simon, *The Process Industries- Graphic Arts, Paint, Plastics and Textiles: All Cousins under the Skin*

**Wednesday June 27** General Assembly

**8:30 am - 9:30 am**

**Color Physics Wednesday June 27**

**9:30 am - 10:30 am**

Hernandez-Andres, Romero, Nieves, *Daylight Spectral Power Distribution Recovery Through a Linear Model and Few Filters*

Callet, Seve, *From mean diffuse external reflectance to color and visual appearance representation*

Liu, *The Iridescence Color of Shells*

**Art & Design - Wednesday June 27** Grete Smedel

**9:30 am - 10:30 am**

MacDonald, *Effective Colour Design for Displays*  
Guan, *A Study of color harmony relating with area ratio*  
McGinley, *The Development of a Large Colour Range for a Paint Company*

**Industrial Color, Thursday, June 28** Session Chair: Ralph Stanziola

**8:30 - 10:30 am.**

Kettler, *Complex refractive index and colour of quinacridone pigments*  
MacDougall, *Discontinuity, bubbles and translucence: major factors in food colour measurement*  
Chong, *The Role of Digital Printing and Color Technology in the Digital Revolution for the Textile World*  
Simeonova et al, *Colored Light Application in Retail Display*  
Xu, Luo, *Evaluating the Quality of Daylight Simulators Using Metameric Samples*  
Viggiano, *A Perception-referenced Method for Comparison of Radiance Ratio Spectra and its Application as an Index of Metamerism*

**Symposium Thursday June 28 The State of the Art and Future of Color Management**

**8:30 am - 10:30 am**

Moderator: Rob Buckley, Xerox

**The Evolution of the ICC Profile Connection Space** \*George Pawle (Eastman Kodak) and Lars Borg (Adobe Systems)  
**Quality Evaluation of current ICC profile-Generation-Tools for CMYK-output** \* Eggert Jung (NexPress); Hendrik Buring (ITE), Patrick G. Herzog (ITE)  
**CMS for Digital Photography, A Case Study** Bob Chung, Darunee Sa-aredee, Rochester Institute of Technology  
**Image-dependent Color Mapping for Pleasant Image Renditions** Hiroaki Kotera, Mitsunori Suzuki, Takeshi Mita, and Ryoichi Saito, Chiba University, Japan  
**Image State Architecture** Geoffrey J. Woolfe, Kevin E. Spaulding, Eastman Kodak, Rochester, NY  
**Trends in Color Imaging on the Internet** Giordano Beretta (Hewlett Packard), Rob Buckley (Xerox)

**ECD/Architecture - Thursday June 28** John Hutchings

**8:30 am - 10:30 am**

Herneojá, *Colors of Home*  
Basoglu, *Color Scheme Preferences of Elementary School Children in their School Environments*  
Smith, *RED or READ? — Built Environment Coloured*  
Inagaki, *A Study on Evaluation of Exterior Colors of Buildings with Effects of Colors of Foreground Buildings*  
Rizzo, *Works on color design installed in a urban environment*  
Avila, *The colour and urban image at the beginning of 21st century*

**Color Measurement - Thursday June 28** Frank Rochow

**11:00 am - 12:00 noon**

Eppeldauer, *A Reference Tristimulus Colorimeter*  
Miyazawa, Toyooka, Kurashiki, Hauta-Kasari, *Broad-band color filters with arbitrary spectral transmittance using a Liquid Crystal Tunable Filter (LCTF).*  
Nadal, *Standardization of Reflectance Colorimetry*

**Teaching Aids - Thursday June 28** Javier Romero

**11:00 am - 12:00 noon**

Tarrant, *Visual Color Matching Equipment for Teaching and Research*  
Gaudio, De Ponti, *Interactive Multimedia Systems as communication channels in color workshops*  
Sobotka, CBT – *a new approach for designing color teaching aids for the media industry*

**Symposium - Thursday June 28 How is CIE Helping Us Make Color Work**

**1:00 pm - 3:30 pm**

Moderator: Michael Pointer, National Physical Laboratory, Teddington,, UK

**CIE: Vision, Colour and Imaging**

\*Michael R Pointer, National Physical Laboratory, Teddington,, UK

**Status of CIE Color Appearance Models**

\*Mark D. Fairchild, Munsell Color Science Laboratory, Rochester, NY

**The CIE 2000 Colour Difference Formula: CIEDE2000**

\*M. Ronnier Luo, Colour & Imaging Institute, University of Derby, U.K.

**Making Color Work in Image Technology**

\*Todd Newman, Director, CIE Division 8, Canon R&D Center Americas, Inc

**Report on a fundamental chromaticity diagram with physiologically significant axes**

\*Francoise Vienot, chair of CIE TC 1-36

**Discussion and Wrap-up: Michael Pointer**

**Symposium - Thursday June 28 Environmental Color Design**

**1:00 pm - 3:30 pm**

Moderators: José Caivano, Buenos Aires University, Argentina

Leonhard Oberascher, ÖKO-PSY, Austria

**Report of activities of the ECD study group** José Caivano, Leonhard Oberascher

**Colour appearance in rooms lit by daylight: observations of hue shifts in sunlight and skylight**

Maud Hårleman, Royal Institute of Technology, Stockholm

**Colour contrasts in advertising** John Hutchings

**Climate and coloured walls, in search of visual comfort** Malvina Arrarte-Grau, Universidad Ricardo Palma, Lima-Perú

**What colour is the red house? Perceived colours of painted facades** Karin Fridell Anter, Royal Inst.of Technology, Stockholm

**Transformation of "paint" to "color" in urban space: Bursa example** Susan Habib, Nihal Cetinturk, Gazi Univ., Ankara, Turkey

**Black -meaning and connotation in Europe and Africa** Fatumata Oberascher, Leonhard Oberascher

**Color Education - Thursday June 28 Berit Bergstrom**

**1:00 pm - 3:30 pm**

Linton, *Expanding Color Design Methods For Architecture And Allied Disciplines*

Unver, *Color Education in Architecture*

Kwon, Kim, *A Study of Web-based Color Education*

Colla, *Rainbow Solfege: A New Perspective for Color Theory and Music Education*

Appell, *Colorimetry as a General Model of Observations in the Resolution of Quantum Paradoxes*

Smith, *The Colour Studio in Crisis – Managing Change*

Estevez, *How do we teach color?*

**Color Measurement - Thursday June 28 Gerhard Rosler**

**4:00 pm - 6:00 pm**

White, Taylor, *The Effect Of Instrument Design On Diffuse Reflectance Measurements*

Sakatani & Itoh, *The effect of gloss on perceived lightness*

Baba, Suzuki, *Study on Geometric Conditions for Reflection Measurement (2).- The Effects of Light Trap Size of Integrating Sphere*

Hirschler, Gay, *Industrial Colour Measurement - the State of the Art*

Witt, *Colorimetric control of photographic prints: the problem of fluorescence*

Schanda et al., *LED Colorimetry*

**Symposium - Thursday June 28 How Should We Teach Color?**

**4:00 pm - 6:00 pm**

Coordinators: Geoffrey Rogers, Fashion Institute of Technology, NY, Chair, ISCC Education Committee

Manuel Melgosa, University of Granada, Spain

Moderator: Geoffrey Rogers

**Creative Colour Education** \*Berit Bergström, Scandanavian Colour Institute Chair, AIC Education Committee

**Interactive bibliographical database on color** Jose Caivano, Buenos Aires University, Argentina

**Distance Learning: A Discussion of the Implementation of a Graduate Course of Study Using Various On-Line Technologies** \*Ethan Montag, Rochester Institute of Technology

**Colour Zones - Connecting Colour Order and Everyday Language** Paul Green-Armytage, School of Design, Curtin University of Technology, Western Australia

**Color Education as an Interactive Experience** \*Margaret Miele, Fashion Institute of Technology

**Color Order Systems - Friday June 29** Gunilla Derefeldt**8:30 am - 10:10 am**

Brill et al., *The Color-Order Screen Book: A Softcopy-simulated color atlas with selectable observer and illuminant*  
Choi, *A Verificational Study of NCS (Natural Colour System) Notation - Validity of Colour Notation by NCS Three Attribute Diagram*  
Indow, *Uniformities in OSA-UCS and in NCS tested by color difference prediction based on principal hue components*  
Kobayasi & Yosiki, *An Effective Conversion Algorithm from OSA-UCS to CIEXYZ*  
Oleari, *Color Opponency and scale uniformity in the OSA-UCS system: the geometrical structure*

**Symposium - Friday June 29 The Future Role of Color in the Three Dimensional World****8:30 am - 10:30 am**

Moderator: Shashi Caan, Design Director, Skidmore Owings &amp; Merrill, Architects

Introduction \*Shashi Caan

**Painting with Light: Enlightening Your Architecture with Color** \*Paul Gregory, Focus Lighting Inc**From Dante's Inferno to a Garden of Paradise: How color affects this global World** \*Chris Rainier**Color Imaging Applications- Friday June 29** Raja Balasubramanian**10:10 am - 10:30 am****11:00 am - 12:00 noon**Ingram, *Printing Processes-Opportunities and Limitations*MacDonald Morovic, Xiao, *Evaluation of a Colour Gamut Mapping Algorithm*Song, Luo, *Colour Difference Thresholds for Cross-media Colour Image Reproductions*Koenig, et al, *A multiprimary Display: Discounting observer metamerism***Art & Design - Friday June 29****11:00 am - 12:00 noon**Sakamoto, Kato, *How do we find and handle colors with the same undertone? - A proposal of method to manage colors according to their color undertones*Martinson, Waldron, *Color in Graphic Design: An Analysis of Meanings and Trends*Cheng, Xin, Taylor, *Colour Planner for Designers to Select Colours based on Colour Emotions***Image Analysis & Synthesis - Friday June 29** Janos Schanda**1:00 pm - 3:30 pm**Bouzit, MacDonald, *Does Sharpness Affect the Reproduction of Colour Images?*Takemura et al, *Developing a new psychophysical experimental method to assess image quality*Wesolkowski, Fieguth, *Color Image Segmentation Using a Region Growing Method*Kobayasi & Suzuki, *Mathematical Analysis of Color Combination and Color Composition of Images*Tominaga, Ishida, Wandell, *Illuminant Estimation of Natural Scene Using the Sensor Correlation Method*Meyer, Westland, Walker, *A Computer Graphic System for Rendering Gonio-Apparent Colors*Tanaka, Tominaga, *Estimation of a 3D Spectral Reflection Model for Color Image Rendering***Color Preference - Friday June 29****1:00 pm - 3:30 pm**Buss, *A Paler Shade of White*Saito, Date, et al., *A Comparative Study in Japan and China Concerning Aspiration of Asian Women Towards Quality of Skin Fairness*Camgoz, Yenner, *Effects of Hue, Saturation, and Brightness on Preference*Lee, KJ, *Cross-cultural Differences in Color Preferences: Implications for International Film distribution*LeeTR, *How Life Associated with Colors in Chinese Culture - Utilizing Colors Based-on Chinese Five-Essence Theory*Ohno, Koizumi, *A Study on the Mood-Perception of Interior Colors Using Chromatic and Achromatic-Colors in an**Exercise Room -A relationship between subjects aged in their twenties and forties to fifties*Sato, Kajiwar, Xin, *Numerical Expression of Colour Emotion and its Application***Symposium - Friday June 29 The Future of Color****4:00 - pm - 5:30 pm**

Coordinator and Moderator: Jack Ladson, ISCC President

**The Future of Color in Design**

\*Melanie Wood, Design Consultant, Mannington Mills, Inc.

**Where have we come from, where were we all week, where do we go from here?**

\*Paul Green-Armytage, School of Design, Curtin University of Technology, Western Australia

\*Robert Hunt, Consultant

**Closing Session**



## AIC Poster Presentations

Author	Title
Aguilar & Urtubia	Direct and inverse contrast interaction in a periodic test viewing
Ahn, Moon, Song	A study of skin colors of Korean women
Akbar	Color Matching Techniques
Akimoto, Takata, et al.	Measurement of skin colors of world population and application for preparing make-up products
Akita	Increasing Use of Yellow Colors in Kyoto
Alessi, Cottone, et al	Color Reproduction Scheme For Kodak Smart Picture Frame
Awano	The effect of the luminous of the peripheral visual field on the binocular vision~Aspects of the three-dimensional seeing on the different color
Ayama, Suda, Kumagai	Quantitative evaluation of color appearance between different media and appearance modes
Azuma, Kituo, Naruse, Sugiura	Acceptability color tolerances for CRT reproductions of real objects
Battle, Oana, Shannon	Advances in Color Measurement
Breitkopf	Realisation aspects of a „Colour Centre” to be established in Hungary
Chalmers	Colour aliasing and colour reproduction in digital photography
Charnay-2	Colours fallen from Heaven
Chung, Xin, Sin	A Comprehensive Comparison Between Different Mathematical Models for Inter-instrument Agreement of Reflectance Spectrophotometers
Csányi	Color reproducibility and dyestuff concentration
Cunthasaksiri, et al	Color Image Processing using sRGB sub-divided space technique
Gabel	Goniochromatic Color Measurement Systems-The past 20 Years
Gavrik	Tetrachromacy of Human Vision: Spectral Channels and Primary Colors
Glicksman	White Is Green - New Schematic Diagrams
Golob, Golob, Rogan	Color quality control of sewing thread production for the automotive
Golob, Strafela, Golob	Color management in creating a seasonal fabric collection
Goncalves, Pereira, Neves	Conceptions of color harmony applied to internal environments using computer simulation
Goncalves, Pereira, Pereira	Color applied to printing graphic design: The importance of lighting in the color perception and specification process
Graham	HVC Color Vision Skill Test: A Technical Update
Green-Armytage-2	Colour zones - explanatory diagrams, colour names and descriptive adjectives
Habib, Cetinturk	Transformation of “paint” to “color” in urban space; bursa example
Han, Chou, Cui, Rigg, Luo	Instrumental Color Control for Metallic Coatings
Haneisha, Sakuda,	Polyhedral Gamut Representation of Natural Objects based on Spectral Reflectance -
Honda	Database and its Application
Hiltunen et al	Thermochromism in color measurement
Hirschler, Gay, Ferreira	Field Trials of Three Tests for Colour Vision and Colour Aptitude
Ichihara	What do you see in a color dot picture such as the Ishihara pseudoisochromatic plates?
Iwase	Study on Sports and Colors - The Color Effect of Team Shirts on the Basketball Games
Kalivas	Dyeing Fabrics with Metals
Karman	The Outside Colours of the Traditional Hungarian Country Houses
Kawai, Akita	A Phenomenal Observation on Transparency and Layer of Depth: Brightness Effects
Kim, CS	Geometry free white standard reference plate
Kim, Song, Kim	Lightness-Difference Data Set for Evaluation of CIELAB-Based Colour-Difference Formulae
Kiss-Papp	Colours and Shades, Proportions and Silhouettes in Dressing
Koszeghy	Changing of coloring of facades – changing of culture
Kurioka, Ohnishi, Iwata, Tanaka	Influence of Light Source and Illuminance on Benham Type Subjective Colors
Kusumi, Ikeda, Shinoda	Color Constancy and Color Appearance Mode in Relation to the Visual Field Size
Kwak, MacDonald, Luo	Colour Appearance Comparison between Projected and Self-luminous Colours in Dark Surround
Kwok, Xin, Sin	“Green” Computer Color Matching System forWaste Minimization in Textile Coloration Industry
Lam et al-1	A Study of Psychophysical Property in Qualifying the Quality of Daylight D65 SimulatorLam et
Lam et al-2	The Influence of Visible Wavelength Range and Interval Selections in Daylight D65 Simulator for Instrumental Metamer Color Difference in Textile Industry Application

Author	Title
LeeTR-2	A New Comparisons of Psychological Meaning of Colors on Samples and Objects with Semantic Ratings
Ligory	Line Space and Color
Liu et al.	The CIE Colorimetric System fails to Calculate the Chroma of a Nd:YAG Crystal under the Fluorescence Illuminant F7
Luebbe	Visually assessed colour description including the luminance of the background
Madyar	Human Biocolor as a Starting Point for Developing Spatial, Temporal Color Harmonic Modules for Treating Symptoms of Jetlag
Manganiello	Argentina Color Preferences
Marcus, Ruevski, Battle, Galloway	Personal Digital Assistants and Color Measurement
Matsushiro, Ohta	Orthogonal spectral reflectance model
Mattiello	Movement and colour : independent or complementary channels?
McCann	Image Processing Analysis of Traditional Gestalt Experiments
Mima, Sato, et al	Relation between blocking property against uv- rays by dyed fabric and its color fastness to light
Montes, Campos, Pons, Heredia	Tristimulus weights functions to calculate must colors coordinates from 10 nm bandwidth spectral data
Morton	The Multi-Dimensional Effects of Color on the World Wide Web
Mukai et al.	An objective method for quantifying whiteness perception by applying CIECAM97s
Nemcsics	Recent experiments investigating the harmony interval based colour space of the coloroid colour system
Neumann, Nemcsics, Neumann	Aesthetically Uniform Colour Space: A Generalization of Coloroid Colour Order System
Newton	Inter-connections between Perception, Association and Symbolism
Nieves, Hernandez et al	Influence of the mean luminance on the detection threshold for redgreen chromatic gratings
Nilsson	the quality of the ncs colour samples today and tomorrow
Noriega et al	Colour Characterisation of Cine Film
Ohno	Uncertainty of Color Quantities by Numerical Approach
Ohsawa, Koenig, Yamaguchi, Ohyama	Multi-primary display optimized for CIE1931 and CIE1964 color matching functions
Onishi, Ishida, Katsuya	Influence of outdoor advertisement colors on psychological evaluation of townscape in Kyoto
Osaki	Reproduction of various colors on Jacquard textiles by only eight kinds of color wefts
Rainero, Rio	Rosario, a Grey City
Rinaldi	The concept of <i>white light</i> in stage lighting
Rodrigues, Locke	Weighting Function for the Measurement of Lightness Differences in Gonioapparent and Dark Colors
Ronchi	On the Transfer of Visual Data from the Laboratory to the Real World
Rosenthal	Color Vocabulary of Inherited and Acquired Color Vision Confusion (CVC)
Rozsovit	Products of Coloroid Color System
Sakahara	An Exterior Expression of the Houses on the CG and a Color Assessment on the Method of Pair Comparison
Sakata	Colour also decides motion direction
Sanchez, Fairchild	Lightness Appearance Matching Model, and Data, for the Re-Mapping of Chromatic Video Images to Their Corresponding NTSC Gray Image Lightness Appearance
Serov-1	Semantics of color in Chromatism
Serov-2	Semantics of color and determination of information
Yamaguchi, Shinoda, Ikeda	Effects of interior coloring on size of recognized visual space of illumination
Sueeprasan, Luo	Modelling Incomplete Adaptation under Mixed Illuminants
Suryani	Harmony of color families in color environment design
Takahasi, Sato et al	Analysis of Colors used on Outdoor Advertising in Urban Landscape? A Case Study in Osaka City
Thomson, Paltridge, Westland	Color spaces for discrimination and categorization in natural scenes

Author	Title
Varela	Color and symbology: symbolic color order systems
Vozchikov	To Question about chromatic theory light mixing
Wenzel, Samu, Ladunga	Colour and luminance contrast sensitivity function of people with anomalous colour vision
Westland, Connor, Thomson	Parametric Investigation of Multispectral Imaging
Westland, Iovine, Bishop	Kubelka-Munk or Neural Networks for Computer Colorant Formulation
White, Pointer	The Measurement of Appearance
Xu, Yaguchi, Shiori	Relationship between Color Discrimination Threshold and Suprathreshold Color-Difference Perception
Yamamoto et al	Colors in Japanese streets and European streets
Yoshioka, Mochizuki,	A study on color conspicuity at the Purkinje shift
Zoch	Even Proportional Color Triangle
Funt, Ciurea	Parameters for Retinex
Clarke, Hanson	Harmonisation of scales of colour measurement
Hanson, Clarke	The determination and correction of errors in surface colour measurement
Hanson, Clarke-2	The determination of uncertainty in spectrophotometric surface colour measurement
Kehlibarov, Kolentsov, Yourukova	New advances in brightness and color characteristics of hybrid electroluminescent display structures
Lee, Kim, Yim, Lee	Measurement of area effect by the color panel size
Peña	The Treatment of Light With Matter
Cugley	Seeing and sensing place

## AIC Color 01 Awards

The AIC is proud to announce that the following awards will given at the 9th Congress of the International Colour Association in Rochester, New York. First, the **2001 AIC Deane B. Judd Award** will be given to Lic. Roberto Daniel Lozano at the Thursday, June 28th, Evening Banquet at the Rochester Riverside Convention Center. Please register for this momentous event!

Second, for the first time in AIC history, we will be presenting awards to the **Best Student Poster Paper and the Best Student Oral Paper**. This came about at President Ikeda's request and was approved by the AIC Executive Committee. The hope is that such awards will promote student interest and excellence as they enter the field of color science. We anticipate these student awards will become common practice at all future AIC Congresses.

*Paula J. Alessi, AIC Vice President*

## AIC Welcome Reception

On Sunday evening, beginning at 6:00 P.M., there will be a Welcome Reception at the Chester F. Carlson Center for Imaging Science, Rochester Institute of Technology. Busses will be available to shuttle attendees back and forth (on a continuing basis) between the Rochester Convention Center and R.I.T. Please make sure to mark down on your registration form whether or not you are planning to attend this opening reception in order to have the proper catering supplies on hand.

## AIC Social Events Updates

Please be aware that the Sporting Event will take place on Wednesday evening only. The Monday Sporting event has been removed from the line-up of social events available. Some of the Social Events for the Companions are limited to 40 attendees. Please make your reservation asap. We will try to accommodate all requests as space allows.

## SCIENTIST LOOKING FOR A SPONSOR AND A JOB

A Russian scientist, (PhD in Spectroscopy and a D.Sc. in semantics of color) is looking for a sponsor and a job.

Dr. Nikolai Serov received his Doctor of Philosophy from the State University of Leningrad in Chemistry (spectroscopy) in 1975 and Doctor of Science in Culturology (semantics of color) in 1998. He has written several monographs on these topics. He would like to present some posters in AIC 01. There is no funding in Russia for him to travel to Rochester, NY, USA, register and take part in AIC 01. Nick is willing to sign a contract and work for a corporation or company if that company is willing to pay for his travel expenses and registration at AIC 01.

He is willing to take part in research, work hard, give lectures and write monographs and books to show perfectly unknown aspects of color that he has been investigating since 1964. He is eager to devote all his experience, knowledge and time to a firm that will make him a suitable offer.

Please contact: [nv\\_serov@mail.ru](mailto:nv_serov@mail.ru).

### "Color and Light"

by Fred W. Billmeyer Jr., & Harry K. Hammond, III.  
ASTM Paint Manual, Chapter 40, 23 pages  
\$5 each or 20 copies \$50.00

Authorized reprint from:  
ASTM Manual 17, Copyright 1996  
American Society for Testing and Materials  
100 Bar Harbor Dr., W. Conshahocken, PA 19428

### "Demystifying Color"

by Bob Chung  
11 pages (color)  
\$5 each or 20 copies/\$50.00

Discusses and explains ten myths about color.

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

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Cynthia J. Sturke, Admin. Asst.  
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**Berit Bergstrom**, Mgr. Dir. of SCI Colour School  
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Speaker: "Creative Color Education" June 28<sup>th</sup>  
**Dr. Karin Fridell Anter**, Architect, speaker  
**Grete Smedal**, Architect, speaker  
**Anders Nilsson**, SCI Technical Manager

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## Jobs Wanted!

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, fax, email)
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 editor are responsible for any errors.
6. You must advise us in writing when you have obtained employment.

Contact the ISCC News Editor, Prof. Gultekin (Tek) Celikiz for more information. [celikiz@aol.com](mailto:celikiz@aol.com)

## CALENDAR

Please send any information on Member-Body and other organization meetings involving color and appearance functions to:  
 Cynthia Sturke, ISCC Office Manager 703-318-0263 tel 703-318-0514 fax  
 11491 Sunset Hills Rd., Reston, VA 20190 email: [iscc@compuserve.com](mailto:iscc@compuserve.com) website: <http://www.iscc.org>

## -----2001-----

- May 6-9** TAGA Annual Technical Conference, San Diego, CA. Info: 716- 475-7470; fax: 716-475-2250, [TAGAOfc@aol.com](mailto: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](mailto:Ohno@nist.gov)
- May 13-16** 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  
 NIST, Gaithersburg, MD. Contact: Danny Rich, Sun Chemical Inc. (GPI), 201-933-4500 x1144 or [RichD@sunchem.com](mailto:RichD@sunchem.com)
- May 17-20** 2001 CIE Division 2 Annual Meetings, NIST, Gaithersburg, MD, contact: Y. Ohno, NIST, [Ohno@nist.gov](mailto:Ohno@nist.gov)
- June 3-8** SID 2001, San Jose McEnery Convention Ctr, San Jose, CA Contact: Bill Klein 212-460-8090 x204, Fax 212-460-5460 [wklein@palisades.org](mailto:wklein@palisades.org)
- June 18-23** RIT's Munsell Color Science Lab Summer School of Industrial Short Courses  
[www.cis.rit.edu/mcsl](http://www.cis.rit.edu/mcsl)
- June 19-22** ASTM E12 Committee on Color Appearance, Four Points by Sheraton, Rochester, NY  
 Contact: Bode Hennegan 610-832-9500 [bhennegan@astm.org](mailto:bhennegan@astm.org)
- June 24-29** ISCC/AIC Mtg, Rochester, NY; Paula J. Alessi, 716-477-7673; Fax: 716-722-1116  
[paula.alessi@kodak.com](mailto:paula.alessi@kodak.com)
- Sept 11** DCC, Panel Discussion on "Weathering", MSU Management Edu. Ctr., Troy, MI  
 Contact: Jim Keiser, [james.r.keiser@dupont.usa.com](mailto:james.r.keiser@dupont.usa.com)
- Sept 23-25** CAD/SPE RETEC 2001 "Hot Color - - - Cool Plastics", Marriott Resort Hotel, Marco Island, FL. Chair: Gary Beebe, A. Schulman, 330-239-3059 [gary\\_beebe@aschulman.com](mailto:gary_beebe@aschulman.com)
- Oct 13-15** Color and Vision Mtg of the OSA followed immediately by OSA Annual Mtg  
 Long Beach Convention Ctr, Long Beach, CA
- Oct 14-18** OSA Annual Meeting, Long Beach Convention Ctr, Long Beach, CA
- Oct 21-24** AATCC International Conference and Exhibition, Palmetto Expo Center, Greenville, SC, Contact: Shirley Clifton 919-549-8141 919-549-8933 fax
- Oct 22-26** NewRad at Nist, Gaithersburg, MD
- Nov. 5-9** IS&T/SID 8th Color Imaging Conf., Color Science, Systems & Applications, Scottsdale, AZ. Fax: 703-642-9094, [info@imaging.org](mailto:info@imaging.org)

## -----2002-----

- Jan 20-23** ASTM D-1 on Paints, Embassy Suites, Ft. Lauderdale, FL
- Jan 22-25** ASTM E12 on Color and Appearance, Embassy Suites, Ft. Lauderdale, FL
- Rescheduled** ISCC Williamsburg Conference, Solutions for Industrial Color Problems,  
 Chair: Ralph Stanziola, [rascolor@juno.com](mailto:rascolor@juno.com) **Changed to early 2003**
- April 14-17** TAGA 2002, Asheville Renaissance Hotel, Asheville, NC
- April 20-23** ISCC/Detroit Colour Council Joint Meeting, Troy, MI Chair: Jim Keiser,  
[james.r.keiser@usa.dupont.com](mailto:james.r.keiser@usa.dupont.com)
- May 6-8** CORM Annual Meeting, Sheraton Westport, St. Louis, MO
- June 3-7** SID Annual Meeting, Boston, MA Contact: Bill Klein, 212-460-8090x204 Fax: 212-460-5460  
[wklein@palisades.org](mailto:wklein@palisades.org)
- June 9-13** Fourth Oxford Conference on Spectrometry, Davidson College, Davidson, N.C.  
 Info: Art Springsteen [arts@aviantechnologies.com](mailto:arts@aviantechnologies.com) Teresa Goodman [tmg@npl.co.uk](mailto:tmg@npl.co.uk)
- June 16-20** ASTM D-1 on Paints - Meeting and Centennial Symposium, Philadelphia, PA
- June 26-28** ASTM E-12 on Color and Appearance, Little America Hotel & Towers, Salt Lake City, UT
- Oct 1-4** AATCC International Conference and Exhibition, Charlotte Convention Ctr, Charlotte, NC Contact: Shirley Clifton 919-549-8141 919-549-8933 fax



## **ISCC Sustaining Members**

Barr Associates, Inc.	<a href="http://www.barrassociates.com">www.barrassociates.com</a>	978-692-7513
BYK-Gardner USA	<a href="http://www.bykgardner.com">www.bykgardner.com</a>	301-483-6500
Chromatics Color Sciences Intl, Inc.		212-717-6544
Ciba Specialty Chemicals	<a href="http://www.cibasc.com">www.cibasc.com</a>	302-633-2042
Color Communications, Inc.	<a href="http://www.ccicolor.com">www.ccicolor.com</a>	773-638-1400
DuPont Performance Coatings	<a href="http://www.dupont.com">www.dupont.com</a>	248-583-8345
Flex Products, Inc.	<a href="http://www.colorshift.com">www.colorshift.com</a>	707-525-7337
GretagMacbeth, LLC	<a href="http://www.gretagmacbeth.com">www.gretagmacbeth.com</a>	800-622-2384
Hewlett-Packard Company	<a href="http://www.hp.com">www.hp.com</a>	650-857-1501
Hunter Associates Laboratory, Inc.	<a href="http://www.hunterlab.com">www.hunterlab.com</a>	703-471-6870
Labsphere, Inc.	<a href="http://www.labsphere.com">www.labsphere.com</a>	603-927-4266
Minolta Corporation	<a href="http://www.color.minoltausa.com">www.color.minoltausa.com</a>	201-934-5291
Pantone, Inc.	<a href="http://www.pantone.com">www.pantone.com</a>	201-935-5500
PPG Industries, Inc.	<a href="http://www.ppg.com">www.ppg.com</a>	724-274-3532

## **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)

### **ISCC News Editor**

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