

# Inter-Society Color Council *News*

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## BOARD OF DIRECTORS NOMINEES

The following persons have been nominated to be elected to the Inter-Society Color Council's Board of Directors for a term to last from the Annual Meeting of 1993 to the Annual Meeting of 1996. The following biographies have been prepared to assist the voting delegates in making their choices.

### David L. Alston

David L. Alston is vice president of new product development at Color and Appearance Technology, Inc. Mr. Alston has more than 30 years' experience in color technology including 19 years' experience in the plastics industry. He held several managerial positions at Datacolor International before joining C.A.T. Prior to that he was the manager of the color laboratory at Plasticolors, Inc. Mr. Alston also worked for Bee Chemical and B.F. Goodrich Chemical Company. Dave has developed and contributed several systems in the area of color perception and appearance analysis and simulation. His efforts in this area include accurate color display capability for computer display devices, accurate color on

hardcopy printers, a camera based system for industrial color quality control, and product simulation capability to change spatial color in a textured product while maintaining image quality.

### Gary F. Beebe

Gary Beebe attended the University of Lowell where he received a B.S. degree in Plastics in 1972. In 1974, he received his M.S. in Color Science from Clemson University where he studied under Professor Fred Simon. In 1979, Gary received his M.B.A. from Ohio University. Gary has been employed by the Rohm & Haas Company in Bristol, PA since 1985. He is Manager of Color and Optical Services in the Plastics Technology Center. His responsibilities include product development of plexiglass molding resin and sheet plastic for transparent, translucent and opaque applications. Prior to joining Rohm & Haas, he was with Owings Corning Fiberglass Technical Center in Granville, OH as manager of the color and measurement laboratory. Gary is Technical Program Chairman of the Society of Plastic Engineers, Treasurer of the Delaware Valley Section of the SPE, and was the organizer of the RETEC (Regional Technical Conference) of the SPE/Color and Appearance Division held in Cherry Hill, NJ this past year.

### Joseph F. Campbell

Joseph F. Campbell received his B.S.E. degree from the University of Michigan in 1988. He is a Senior Engineer with DuPont Automotive Finishes in Troy, MI. Joe's responsibilities are for applied color research projects in automotive finishing. This includes computer color matching, dispensing systems, colorimetry, and color order systems. Joe is a member of the Detroit Color Council in which he has been active since becoming employed by DuPont. Joe has taken an active role in ISCC affairs. Last year Joe served on the ISCC Annual Meeting organizing committee singlehandedly managing the entire color matching instrument show and exposition which the ISCC held in conjunction with its Annual Meeting in Princeton. Joe and his wife Michele live with their two children in Sterling Heights, MI.

### Robert T. Marcus

Robert Marcus is the Manager of the Color Standards Laboratory at Pantone, Incorporated. His responsibilities include maintaining the integrity and quality of Pantone colored standards. He has published a number of papers on industrial color matching systems, color measurements, and color (con't ➡)



## COLORANT FORMULATION IN THE TEXTILE INDUSTRY

Colorant formulation in the textile industry has been practiced since the ancients began making colored fabrics. The textile industry ranks with the artists and craftsmen as the earliest users of colorant formulation. For millennia, the textile industry has met the desires and needs of an ever more demanding populous with a multitude of fabrics and colors.

It is only in the recent past that scientists have brought color from being primarily an art form into the realm of a science. In the early days of mechanized dyeing of textiles, there was no color theory to apply in order to generate scientific answers to color formulation problems.

### Board of Directors Nominees, continued

tolerancing. Bob did his undergraduate work at Rensselaer Polytechnic Institute in Troy, New York. In addition to a B.S. degree in Physics, he also received a Ph.D. in Chemistry (Color Science) from RPI. His graduate research investigated the visual spacing of the Munsell Color Order System and was done under the direction of Professor Fred W. Billmeyer, Jr. Bob previously served as Technical Director of the Munsell Color Laboratory and as the Technical Manager for Color Data Products for the MacBeth Division of Kollmorgen Instruments Corporation. Prior to starting his current position, Bob was doing research on metallic color matching in paints at PPG Industries. He is currently a member of the ASTM delegation to the ISCC, and serves as the Membership Secretary of ASTM Committee E12 on Appearance. Bob is a member of the Federation of Societies for Coating Technology (FSCT), and a member of the United States National Committee of the CIE (USNC).

As the demand of the industry grew, it became apparent that some tool was needed to aid the dyer. Color science came of age in 1931 with Kubelka's and Munk's paper on absorption and scattering, and Parke's and Stearns' paper in 1935 on equations for color formulation. In 1958, the Color Mixture Computer was manufactured by Davidson and Hemmendinger. In order to generate data, Instrument Development Laboratories manufactured the IDL Color Eye, the first widely used spectrophotometer in the industry. It was not until the early 1960's that digital computers were used on a wide scale. About this time, both ICI ("IMP") and American Cyanamid ("CCM") introduced computer color matching services with remote dial-up telephone connections to their computers. This filled a great need for smaller users who could not afford to generate their own computer programs.

What can we expect from color formulation today and why do we need this tool? The textile industry uses approximately a dozen major classes of substrates with several hundred significant variations. Onto these substrates, we apply colorants from approximately nine major classes with nearly twenty-five significant variations. The different colorants number into the hundreds. Using these materials, we formulate to thousands of standard shades or targets every year. Doing this successfully without the aid of computer-based color formulation would be nearly impossible. A good formulation system generates an acceptable prediction at least 85% of the time. Another significant benefit of a good formulation system is the improvement in overall plant performance: 1) reduction in dye inventories, 2) lower cost formulations, 3) less metamerism formulations, and 4) formulations with more predictable performance.

With the advent of automatic spectrophotometers, the use of technology took a great leap forward. These instruments freed the operator from the tedium of taking slow measurements. Once measuring became easier and more reliable, then usage started to pick up. Next came the introduction of mini-

computers to this industry. With the combination of automatic instruments controlled by the computer, operator error decreased, most of the drudgery was removed, and usage surged. With the introduction of low-cost, powerful microcomputers and fast, extremely precise spectrophotometers, came another large jump in the use of color technology.

Today, spectrophotometers are faster, less expensive, more stable, and more precise than ever before. Computers are many times more powerful today: personal computers can handle more data than micro computers of a few years ago. The DEC Micro-Vax™ computers, with their ability to support many users and instruments, along with advanced PCs, make it possible to perform functions in formulation that were not previously possible. Problems tackled by SLI-Form®, SheLyn's colorant formulation software system, solve problems not addressed seriously in previous systems.

What does a company do if it has completed setting up a dye file of 100 dyes and the government rules that a chemical it uses is harmful? This chemical, when replaced, may cause all of the dyes to perform differently. What is done? Some companies today re-dye all of the primaries unnecessarily. It is possible to calculate the effect of a change to the overall data with a minimum of new dyeings describing the change.

### Colorant Formulation

Blends present a serious problem, if not from a theoretical standpoint, then a practical one. The time and computer space required to obtain and store cross-staining data can be prohibitive. New approaches to this problem need to be investigated. It is not always desirable to dye both fibers in a blend to the same union shade. This presents unique challenges to both visual and instrumental systems.

Fluorescence presents the most difficult problem to solve. This is a problem of both theory and practical application. Fluorescence may be the culprit in many "problem" shades. Assuming the Kubelka-Munk theory deals adequately with the mixtures of both fluorescent and non-fluorescent

colorants, the problem of a standard and constant light source still plagues the industry. The problems with fluorescent dyes manifest themselves in three areas: optically brightened materials, obviously fluorescent dyes that produce very bright shades, and non-visible fluorescence. This is where absorption is in the visible spectrum and emission is in the near-infrared.

Sample presentation is critical in the development of formulation recipes. With the many different substrates a company has to deal with, making an accurate measurement of the color can be the most difficult problem. Since human color perception is affected by the total appearance of an object, instruments must

be sensitive to appearance.

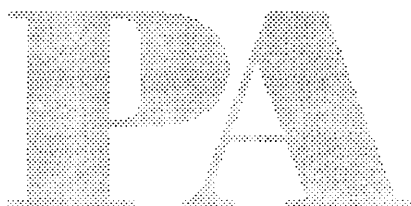
Customer awareness and sophistication have helped to push colorant formulation to the forefront of many companies. Numerous apparel manufacturers and retailers have their own quality control systems in order to evaluate the goods shipped to them.

Computer-aided color technology is a fact of life, and it is relied upon heavily by the textile industry. If the textile industry is to prosper, no opportunity can be missed to make it more efficient and capable of rapid change.

(MicroVAX is a trademark of Digital Equipment Corporation.)

*Roland L. Connelly, Sr.*

## P R E S I D E N T ' S C O L U M N



In the spirit of keeping the general ISCC membership informed, I will summarize the ISCC Board of Directors meeting that took place on Saturday, October 3, 1992, at the Hyatt Regency in Rochester, New York.

The Officers present at the meeting were Paula Alessi (myself); President, Roland Connelly; President-Elect, Danny Rich; Secretary, Phil Hunter; Treasurer, and Hugh Fairman; Past President. The Directors present were Mike Brill, Ellen Carter, Robert Chung, Nancy Jo Howard, Ann Laidlaw, Joel Pokorny, Joann Taylor, and Magenta Yglesias.

### Report of Interest Groups

**Report of the Interest Group Coordinator** - Richard Harold submitted a written report with suggestions for reorganization of the Interest Groups. Since Richard could not be present, Roland Connelly, the former Interest Group Coordinator, conducted the

discussion. (Roland also alerted the ISCC membership of this Interest Group realignment in the last issue of ISCC News No. 340). A review process revealed that realignment of the Interest Groups was necessary in order to better serve the ISCC membership needs. The current four Interest Group structure was not adequately addressing the ISCC symbolic triangle featuring art, science and industry. Richard's proposal involved a realignment of the current Interest Groups I (Measurement and Colorimetry) and II (Appearance, Vision, and Modeling) with the elimination of Interest Group IV (Color Education). It was felt that Color Education is an important part of all aspects in the ISCC triangle. More specifically, Richard's proposal called for formation of the following three new Interest Groups each to have a Chairperson and a Vice Chairperson: IG I - Color Research, IG II - Industrial Application of Color, and IG III - Art, Design, and Psychology. Color Education should exist as an ISCC Standing Committee with a charge to serve the needs of ISCC educators as well as to address the color education needs of the ISCC membership. There was some feeling that the proposed Color Research name for Interest Group I was too vague. Joel Pokorny suggested that the name of Interest Group I be changed to

Fundamental and Applied Color Research. The Board voted to change the names and focus of the first three Interest Groups I, II, III, as recommended Richard Harold, including the suggested modification for the Interest Group I name. The Board then voted to convert the Color Education Interest Group IV to a Standing Committee, called Color Education, with a scope to include both education techniques and educators of color science, and to encourage other Interest Groups to include education in their Annual Meeting programs. Joel Pokorny suggested that the Education Standing Committee be charged with developing an Annual program for each ISCC Annual Meeting. As President, I was charged with an Action Item of finding a Chairperson for the Education Standing Committee. The suggestion was made that each Interest Group Vice-Chairperson serve on the Education Committee to insure that their Interest Group's color education needs are being met each year.

Ann Laidlaw brought up the issue of constituencies for Interest Groups. She has the information about the Interest Groups on the membership application and in the database. It is not currently being used but could be available to each Chairperson, in the form of selected mailing labels. All Board members felt that Ann's efforts should be used to provide the Interest Group leadership with constituencies.

### Standing Committee Reports

**Report of the Nominating Committee** - Hugh Fairman, as Past President, is the Chairperson. Other Committee members are Roland Connelly, Ralph Stanziola, Evelyn Stephens, and Allan Rodrigues. The Committee submitted 32 names for consideration for 3 open Director positions on the Board. The task is to reduce the 32 names down to 4 or 5 names to submit for ballot for the 1993-1996 Director terms. The target date for mailing of ballots is December 1. Ballots are to be returned by the January Board meeting.



**Report of the Finance Committee -** Phil Hunter, as Treasurer, is the Chairperson. Other Committee members are Hugh Fairman, as Vice-Chairperson, Nick Hale, Rich Riffel, and Allan Rodrigues. They met for the first time in late October.

I want to personally thank Rich Riffel for answering my plea in ISCC News No. 339 asking for people to step forward if they were interested in serving on the Finance Committee. Thank you Rich for not being shy!

**Report of the 1993 Godlove Award Committee -** Mike Brill handed out a written report naming Fred W. Billmeyer, Jr. as the Committee's choice for the 1993 Godlove recipient. The Board voted to accept the Committee's selection.

**Report of the Member-Bodies Liaison Committee -** Joann Taylor is the Chairperson. Other Committee members are Christina Burton and Robert Chung. Joann reported that 26 delegates attended the June luncheon at the ISCC 1992 Annual Meeting. It was a very successful luncheon and many good suggestions were made of ways to strengthen the ties between Member-Bodies and the ISCC. Joann formulated her action plan based on these suggestions. In order to provide the Member-Body delegates with a more timely forum for disseminating information, they are now encouraged to submit their reports to ISCC News immediately following their Member-Body Annual Meeting rather than for the Annual Report issue of ISCC News. Instead, the Annual Report Issue will be used to provide an index of issue numbers in which the Member-Body Reports appear. The Committee's commitment to individual contact with each Member-Body will be easier to accomplish now that there are three members comprising Joann's Committee. Each Committee member can take responsibility for eight of the 24 Member-Bodies. Another important responsibility of the Committee members is to clearly define the responsibilities of each Member-Body delegation Chairperson. There will also

be the need to consider the desirability and requirements associated with excerpting pertinent materials from Member-Body newsletters for inclusion in ISCC News. Joann Taylor requests that all Member-Body press releases be sent to her so that she may decide how best to disseminate the information. Finally, Joann Taylor suggested updating the document, The Story of the ISCC and using it to better describe the history and activities of the Council to recruit new Member-Bodies.

**Report of Membership Committee -** Due to Nick Hale's commitment on the Finance Committee, he will no longer serve as Membership Chairperson. Ann Laidlaw has happily agreed to chair this Committee. Ann would like to reissue the ISCC Membership Directory for release in the spring of 1993. Changes from the By-laws Committee and other text in the Directory are required. I agreed to find help for Ann in completing this task.

**Report of the IMG Member-Body Committee -** Paul Hoffenberg submitted a written report with a proposal of how he plans to proceed in his first year as IMG Delegate Chairperson. First, Paul will gather all survey information and produce a list of possible programs, activities, or other suggestions expressed by the IMG. Paul's Committee will review this and make further suggestions. By the January Board meeting, Paul will submit a proposal for some planned activity for the IMG at the 1993 ISCC Annual Meeting. The ISCC News will be used as Paul's vehicle for communicating with the IMG regarding activities in 1993.

**Report of the Publicity Committee -** This Committee now has three members with Ellen Carter serving as the Chairperson. Fred Billmeyer has agreed to serve as a continuing member who will help research information for upcoming press releases and proof-read the releases. The third member, who will serve for one year until the next Annual Meeting, has the responsibility to be the liaison for information concerning the Annual Meeting. This 1993 Annual-Meeting member will be named by Romesh

Kumar, the Chairperson for the 1993 Annual Meeting to be held in Newport, Rhode Island. A new third person will be named as soon as possible in 1993 for the 1994 Annual Meeting. The publicity mailing list is currently being reviewed. If anyone knows of an organization that should be added to our publicity mailing list, please contact Ellen Carter.

**Report of the Arrangements Committee -** Romesh Kumar submitted a written report with regard to the 1993 ISCC Annual Meeting to be held in Newport, Rhode Island. Romesh is trying to get the best nightly room rate possible from the Doubletree Hotel. The 1994 Annual Meeting will be held in Troy, Michigan at the Marriott. The nightly room rate will be no greater than \$90/night.

**Report of the Poster Papers Committee -** Ron Oldchurch will be replacing me as Chairperson for this Committee. All poster paper submissions for the 1993 Annual Meeting will be handled by Ron.

**Ad-Hoc Committee on Executive Staff -** One of the suggestions made at the Fredricksburg Long Range Planning Meeting was that the ISCC should pursue establishing an executive office with paid staff to conduct important daily ISCC business. Roland Connelly was asked to pursue this idea. He submitted a proposal for how the ISCC should proceed in order to establish such a part-time administrative assistant. The office should be in a permanent location such as the Washington D. C. area. The functions that this paid-staff person would be expected to perform are to answer the ISCC phone, respond to simple requests according to a set of guidelines, direct inquiries to appropriate ISCC members, coordinate activities including insuring deadlines are met, maintain files, assist in publicity needs, manage correspondence with Member-Bodies and IMG, be the primary interface with ISCC members, be responsible for literature production and delivery, and be a warehouse for records and literature. The immediate supervisor would be the ISCC Secretary. This

person would also help out with needs of the Executive Committee, Board members, and Committee Chairpersons. Initially, the job would be part-time for 3 hours a day for 5 days a week to total 15 hours a week. Working arrangements would be exercised via phone, mail, and FAX with an occasional visit from ISCC Board members. This person would be expected to attend all ISCC Board of Directors' meetings at an estimated annual cost of \$1500. This person should work out of an office, not out of their home. This means that the office would have to be equipped with operating office supplies that will be a new, but essential, ISCC expense. The staff person's pay should be between \$7 and \$10 per hour. The projected costs (i.e. salary, travel, office space; equipment, operation costs and start-up costs) for establishing this staff-position would be approximately \$25,000. We could not support such an executive staff position unless we increased our revenues with something like a dues increase. Our dues are currently on the low side compared to many other organizations. Thus a dues increase would be the most logical way that the ISCC could afford to establish such an executive staff position. Also Board members felt that the benefit that ISCC members would receive from this staff position would be well worth the dues increase. (Some mention was made of this dues increase in ISCC News No. 340.) The Board voted to increase individual member dues to \$45.00, overseas member dues to \$65.00, library dues to \$60.00 and sustaining member dues to \$500.00. Anyone having questions regarding these dues structure changes is encouraged to contact me. I would be happy to address any concerns that the ISCC constituency may have.

**Ad-Hoc Committee on Annual Meeting** - Ellen Carter handed out a written report on different formats for Annual Meetings. Three formats, which have been used in the past, were outlined. The first is a basic two day meeting sponsored by ISCC alone. The second is a three day meeting co-sponsored with another organization (i.e. usually a Member-Body) with the third day

featuring a joint symposium. The third format is a four or five day meeting where ISCC meetings begin the week, then there is a bridge session co-sponsored with another organization followed by that organization's meeting at the end of the week. The Chairperson for an Annual Meeting can pick any one of these formats to follow. A Chairperson can choose a format different from the three outlined by Ellen's Committee only with Board approval. Ellen Carter will expand and formalize her report. It will be submitted to the Secretary's office for preparation as an official guideline addendum for the ISCC Technical Report 81-2: Program Chair's ISCC Guide.

**Report of the Problems Committee** - Hugh Fairman as Chairperson reported that there are three existing Problems Committees. PC-32, Image Technology, produced a color reproduction bibliography with a very broad basis. There will be one more round of revision and then it will be issued as a final report and printed as a technical report. The goal is to approve it at the January Board meeting and issue it as a Technical report at the 1993 Annual Meeting. PC-44, Color Order Systems, is active and some progress has been made. PC-49, Improved Colorimetry, has also made progress. A disk with all observations has been prepared. Efforts are now being placed on Committee member participation to maximize output of meaningful results from this PC. Hugh Fairman will prepare a schedule for PC Meetings to be held at the 1993 Annual Meeting.

### Report of Annual Meetings

1993 - Newport, RI - Romesh Kumar, the Meeting Chairperson reported that 15 speakers are lined up to speak at the joint symposium entitled, Color, Regulations and Environment. This meeting will be co-sponsored with the Dry Color Manufacturer's Association (DCMA). A request from Colorgen, Inc. was received by Romesh to host an evening social event in much the same way as Datacolor International did at the 1992 Princeton meeting. Preliminary

publicity & arrangements for this Annual Meeting are underway.

1994 - Detroit, Michigan - The Detroit Color Council will co-sponsor the symposium. I will appoint a Chairperson and pursue establishing a topic.

1995 and 1996 - We would like to try a different approach for deciding on meeting locations. Rather than starting with someone willing to host a meeting in their city, we would like to try selecting a meeting theme first and then select a logical Chairperson and a site. Anyone with suggestions is encouraged to contact me!

### Williamsburg Conferences

1994 - Richard Harold and Roland Connelly submitted a proposal for a meeting on fluorescence. The specific topics to be addressed would be what is fluorescence?, how is it manufactured or produced?, what are the problems and pitfalls associated with measuring it?, what are the standard fluorescent materials available for use?, what are some useful applications of fluorescence?, description of state and federal laws on safety colors, fluorescent whitening agents, and fluorescent colorant formulation. The following people have agreed to help put this conference together: Fred Billmeyer, Joanne Zwinkels, Heinz Terstiege, Mike Brill, Norbert Johnson, and Gary Lesley, the Chairperson of the ASTM subcommittee E12.08 on High Visibility Materials. The Board voted to accept the proposal with Richard Harold as meeting Chairperson.

1995 - Mike Brill submitted a proposal on a "Pan-Chromatic" Conference in Color to be based on the four broad categories of human vision (psychophysics, neurophysiology, and clinical research), multispectral sensing (machine vision and remote sensing), computer graphics, and colorimetry improvements. The motivation behind this proposal came from the idea that although the ISCC is an umbrella organization for people interested in color, there are large constituencies of

color, there are large constituencies of color-interested people who have still never become involved in ISCC. The Chairpersons will be Mike Brill, Steve Shafer, and Larry Arend. The following societies will be approached for technical paper submission: Association for Research in Vision and Ophthalmology (ARVO), Institute of Electrical and Electronic Engineering (IEEE), American Society for Photogrammetry and Remote Sensing (ASPRS), and SIGGRAPH. The Board voted to accept this proposal.

## Old Business

Bob Chung gave a report on establishing ISCC student chapters. There is a strong interest in having an RIT chapter of the ISCC. There are 24 student members of the ISCC, most of whom are at RIT. He sees great potential in imaging science and fine arts students. Bob Chung will prepare a proposal on the structure and operation of student chapters, beginning with RIT.

## New Business

**Ad-Hoc Committee on Appendices to Standing Rules** — The Executive Committee will review where these Appendices stand and put together a proposal to finish them as soon as possible.

**Historian** - Ellen Carter suggested that we appoint an ISCC historian to keep long-term records and provide information on activities of the Council and its members. The historian would also be responsible for updating the Story of the ISCC.

This concludes my summary. If anyone has any questions or concerns, please feel free to contact me by phone at 716-225-4614 or by mail at 24 Guinevere Dr., Rochester, NY 14626.

*Paula J. Alessi*

## E D I T O R ' S N O T E

I wish to thank all those who are contributing information to this newsletter. Without your efforts we would not have the quality (and quantity) of information we have!

If anyone has information for the newsletter, please see the back page for information on how to get it to the editor.

When submitting minutes or complete articles for inclusion in the newsletter, please abbreviate them as best you can before submitting them.

### Electronic Bulletin Board

To facilitate the sending of information electronically, the ISCC News now has an Electronic Bulletin Board available for your use. It is currently sharing the FAX line at the editors office, so you must call (716) 223-1823 before attempting to upload. The system must be put on line manually when it is to be used. We do not have a dedicated line at this time.

The BBS is set for 300, 1200, or 2400 BAUD with No parity, 8 Bits, 1 Stop Bit. Be sure to put your modem program in this mode before calling the BBS.

Uploads can be done by using one of the following protocols: Kermit (preferred for Mac to PC transfers), Xmodem (Preferred for PC to PC transfers) or one of the Ymodem systems.

If this system is used and enough people ask for it, we can put it on line - full time, thus permitting the uploading and downloading of ISCC and related items, 24 hours a day.

Let us know if you like the idea and will use it!

## NEW MEMBERS

We are pleased to list the latest members to the ISCC.  
Welcome!

Korean Color Research & Institute  
Korea Broadcasting System  
18, Yoido-dong  
Youngdungpo-gu  
Seoul  
Korea

Dr. Martin Bide  
Univ. of Rhode Island  
Dept Textiles  
Quinn Hall  
Kingston RI 02881-0809  
USA

Ms. Mimi F. Cartee  
CIBA-Geigy Corp.  
410 Swing Road  
Greensboro NC 27407  
USA

Dr. Marcia A. Finkelstein  
Univ. South Florida, Psychology Dept.  
4202 E. Fowler Ave.  
Tampa FL 33620  
USA

Mrs. Robin D. Giles  
RR 1 Box 3556  
Edgecomb ME 04556  
USA

Mr. Alec Greenfield  
556 Sierra Vista Lane  
Valley Cottage NY 10989  
USA

Ms. Charlotte Iseldyke  
The Color Company  
9409 Don's Court  
Huntsville AL 35803  
USA

Mr. Qiu Jin  
Visual Sciences Center  
The Univ. of Chicago  
939 East 57th Street  
Chicago IL 60637  
USA

Mr. Brian R. Kates  
Colorgen Industries Group, Inc.  
The Tannery  
12 Federal Street  
Newburyport MA 01950  
USA

Mr. William C. Kress  
CalComp, Inc.  
23636 Saint Elena  
Mission Viejo CA 92691  
USA

Mr. Arthur A. Leman  
Rohm and Haas Co.  
Building 2  
727 Norristown Road  
Spring House PA 19477  
USA

Ms. Audrey A. Lester  
RIT  
607 Chambers Street  
Spencerport NY 14559  
USA

Mr. Roman Majkut  
Wm. E. Wright Ltd. Ptr.  
85 South Street  
W. Warren MA 01092  
USA

Mr. Lawrence E. McCarthy  
Benjamin Moore & Co.  
134 Lister Ave.  
Newark NJ 07105  
USA

Ms. Laura D. Mercurio  
Deubler Mercurio  
252 Sixth Avenue  
St. James NY 11780  
USA

Ms. Eriko Miyahara  
Visual Sciences Center  
The Univ. of Chicago  
939 East 57th Street  
Chicago IL 60637  
USA

Mr. James M. Shyu  
RIT  
263 Kimball Drive  
Rochester NY 14623  
USA

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The Color Council  
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400 East 20th Street  
New York NY 10009  
USA

Dr. Brian A. Wandell  
Stanford University  
Dept of Psychology  
Bldg 420  
Stanford CA 94305-2130  
USA

Ms. Kathy Willis  
PPG Industries  
7601 Business Park Dr.  
Greensboro NC 27409  
USA

## NEWS FROM MEMBER BODIES

### ASTM D01.57 SUBCOMMITTEE ON ARTISTS' PAINTS AND RELATED MATERIALS MEETING ANNOUNCEMENT

**ASTM** There will be a meeting of ASTM D01.57 Subcommittee on Artists' Paints and Related Materials on Sunday, January 17th and Monday, January 18th, 1993 at the Crown Sterling Suites Hotel in Ft. Lauderdale, FL.

The following meetings will take place: D01.57.02, Lightfastness of Pigments; D01.57.04, Specification of Artists' Paints; D01.57.07, Physical Properties; D01.57.08, Toxicity Labeling; D01.57.09, Watercolors; D01.57.10, Consumer Evaluation; D01.57.11, Gouache Paints; D01.57.12 Determination of Toxicity.

For more information, contact the Chairman, Mark David Gottsegen, Department of Art University of North Carolina at Greensboro, Greensboro, NC 27412-5001, (919) 334-5571, FAX (919) 334-3009.

### Help Wanted on Color Standards

Would you like to develop standards for evaluating colored objects on visual display units? The E12.06 Subcommittee on Appearance of Displays, part of

ASTM, is working on a new guide to extend and include application of the three existing standards on color measurement of displays. Subcommittee meetings were held Jan. 17 -20 in Fort Lauderdale, Florida and more will be held June 23-25 in Atlanta, Georgia. For more information contact Danny Rich, Datacolor International, 5 Princess Road, Lawrenceville, NJ 08648, (609) 895-7427; or Bode Buckley, ASTM, 1916 Race St., Philadelphia, PA 19103, (215) 299-5599.

### AATCC REPORT



Two consecutive Color Measurement Workshop sessions were held at Research

Triangle Park on October 27-28 and 29-30, 1992. Speakers included Richard Harold, Dan Randall, Donna Faber, Sue Wagner, Ernie Russell, Chuck Sweeny, Roland Connelly, and Robert Willis.

The technical committee meeting for RA36 Color Measurement was held in New York on Nov 19, 1992. Committee members decided to pursue reactivation of the Glenn Color Rule, since the Matchpoint is no longer available. Richard Harold announced a call for papers for the upcoming ISCC Williamsburg Conference on fluorescence. The next RA36 meeting will be held at Charlotte, NC in February 1993.

## COLOR MARKETING GROUP (CMG)

### Officers and Board Members Elected



The CMG has elected Nada Napoletan-Rutka, ASID, of Nada Associates, Pittsburgh, Pa., to a two-year term as President of the Board of

Directors. James A. Boone of Signature Color & Design, Marietta, Ga., was elected Vice President; Ann A. Price, ASID, of The Glidden Company in Westlake, Ohio, was elected Treasurer, and Pauline Ashworth of ZelC, Marketing by Design, Toronto, Canada will serve as Secretary. The new officers take over January 1, 1993 and will serve for a one-year term. Pat Verloft of Color Services, Hanover Park, Ill., Immediate Past President, will remain on the Executive Committee for 1993 and 1994.

## SOCIETY FOR INFORMATION DISPLAY (SID)

# SID

SID announces the 13th International Display Research Conference to be

held at Strasbourg, France August 31 to September 3, 1993. The conference is expected to cover basic principles, display devices, display and image quality (including human factors and vision models, display characterization and measurement, and color and grey scale), display systems, and processes and manufacturing. Eight seminars will be held on August 31st including one on device independent color reproduction and another on standards for displays.

Those wishing to present papers must supply an abstract and technical summary by March 31, 1993. Mail the information to program chairman Michel Le Contellec, CNET/LAB/OCM/TEP, BP40, 22301 Lannion CEDEX. More information can be received by contacting the program chairman or either of the United States Overseas Advisors: Peter Pleshko, IBM FAX (914) 383-4472 or Joyce Farrell, Hewlett Packard FAX (415) 857-4320.

## FEDERATION OF COATINGS TECHNOLOGY (FSCT)

### 1993 A. L. Hendry Awards Competition Announced

# FSCT

Prospective student authors are invited to

submit entries in the 1993 Southern Society for Coatings Technology Alfred L. Hendry Award Competition. The award consists of a \$1,000 cash prize for the best paper on some aspect of coatings technology, authored by an undergraduate student while enrolled in a college program. The papers must describe the results of research on a subject related to coatings technology, or present a significantly insightful, comprehensive review of a field of coatings technology. Work done on coatings-related topics as part of an undergraduate research project or as a Senior Thesis is appropriate for submission. Those wishing to enter the competi-

tion must send a letter of intent, along with the title of the proposed paper and a brief abstract, by March 15, 1993 to: Hendry Award Competition, c/o FSCT, 492 Norristown Rd., Blue Bell, PA 19422-2350. The deadline for the receipt of manuscripts is July 1, 1993.

### New Officers and Committees Announced

Colin D. Penny, Senior Vice President /Research and Development, of Kapsulkote, Inc., Hampton, VA, was elected President of the Federation at the Annual Meeting in Chicago, Illinois. John A. Lanning, of Courtaulds Coatings, Inc./Porter Paints Division, Louisville, Kentucky, was named President-Elect, and Joseph P. Walton, Executive Vice President, of Jamestown Paint Company, Jamestown, Pennsylvania was elected Secretary-Treasurer. Ralph Stanziola was reappointed as chairman of the Inter-Society Color Council Committee within the FSCT.

## GEMOLOGICAL INSTITUTE OF AMERICA (GIA)

### GIA Schedules Classes and Seminars

# GIA

The GIA has published its 1993 schedule of traveling classes

and seminars. "Our traveling classes are the training format of choice for developing high proficiency in a specialized area in the shortest time," said Judi Shechter-Lankford, GIA's manager of off-campus education. "We're offering both day and evening sessions that can help in learning new skills, updating old ones, and staying abreast of trends."

Four-day gemology classes that include Diamond Grading, Gem Identification and Colored Stone Grading are available in most major cities in the U.S. Seminars in Pearls and Pearl & Bead Stringing will be held at the Institute's campuses in Santa Monica, California and New York City.

Classes in jewelry manufacturing arts

that include Wax Model Making, Basic and Advanced Bench Techniques, Design Techniques for Sales Success, and Advanced Stone Setting are offered throughout the United States.

Counter Sketching is offered at Santa Monica, California, and New York City. Introduction to Gem Faceting and Basic Jewelry Making classes will be offered at Santa Monica.

A new series of evening seminars will be available at Santa Monica, including Day with Diamonds, Day with Colored Stones, Fine Jewelry Sales, The Gold Seminar, How to Identify Fracture-Filled Gemstones, Natural and Synthetic Separations, Recognizing Enhanced Gemstones, Penlight Techniques, Room Temperature Vulcanization and Introduction to Wax.

For a complete schedule of 1993 classes, tuition rates, cities and dates, write to GIA Educational Advisory Dept. PR21, P.O. Box 2110 Santa Monica, California 90407-2110. In the U.S.A., call toll-free (800) 421-7250, ext.292. Outside the U.S.A., call (310) 829-2991 ext. 292 or Fax (310) 453-7674.



## OPTICAL SOCIETY OF AMERICA (OSA)

### Light and Color in the Open Air



The OSA will sponsor the second topical meeting on Light and Color in the Open Air on June

16-18, 1993 at Pennsylvania State University, State College, Pennsylvania.

The focus of this meeting is on natural optical phenomena that can be seen and photographed and on experimental and theoretical investigations that help us to understand these phenomena rather than details of instruments or analytical methods. This meeting emphasizes what can be seen in the world around us.

Papers are solicited in, but not limited to, the following areas: 1) optics of water drops: rainbows, glories, coronas; 2) optics of ice crystals: halos and arcs, subsuns, sun pillars; 3) atmospheric refraction: mirages, green flash, twinkling of stars; 4) atmospheric scatter: sky colors, twilight, visibility, polarization of skylight; 5) iridescence: structural colors of feathers, beetles, fish scales, insect wings, sea shells; 6) colors of plants and animals; 7) optical illusions in nature: Mach bands, the moon illusion, apparent shape of the sky; and 8) scattering within the eye. A session is scheduled to include informal presentations of outstanding slides and observations of unusual phenomena, unexplained optical effects, beautiful photographs and other relevant and stimulating topics. For more information about submitting papers or attending the conference contact: Light & Color, Optical Society of America; 2010 Massachusetts Avenue, NW; Washington, DC 20036-1023. The abstract deadline is February 28, 1993.

The following are abbreviated abstracts of current articles from JOSA which might be of interest to ISCC members.

"Sensitivity of macaque retinal

## SOCIETY FOR IMAGING SCIENCE & TECHNOLOGY (IS&T)

### COLOR IMAGING CONFERENCE ANNOUNCEMENT AND CALL FOR PAPERS

**IS&T** The challenges of transforms and transportability of color will be examined at the Color Imaging Conference to be held November 7 - 10, 1993 at the Pointe Hilton Hotel at Squaw Peak, Phoenix, Arizona. This conference is sponsored by IS&T and SID with the ISCC as a cooperating society.

Imaging has undergone tremendous change in the past few years. Technological breakthroughs have pushed hardware to resolution limits only dreamed of a few years ago and competitive pricing has allowed the average user to have equipment that only the specialist had access to before. True, while it has been said for many years that "color is coming", finally, it really looks like it is here! Now we must begin to deal with the problems that using color brings. We have been able to exchange color data, often without knowledge about the nature of the original color image, across different input and output devices and across different computer platforms, systems, and networks. We must output the data on many different types of devices at different resolutions from monitors and scanners that image in red, green, and blue to printers that image in cyan, magenta, yellow, and black. It is no wonder that confusion exists which limits the usefulness of all the elements of color imaging systems.

This conference will provide a forum for the initiation of a dialogue among the many professionals that are needed to solve the problems that the transformation and transport of color in documents create. In an informal setting with ample discussion time reserved between sessions, we will try to bridge the distances between input and output, between hardware and software and the end users. The program will feature world renowned, technically expert, invited speakers from academia and industry along with contributed papers, tutorials, an electronic poster session, and panel discussions.

Tentative Sessions include Color Theory and Basics; Color at the Desktop; and Creation and Visualization of Color in Science, Medicine and the Arts. Please send an abstract of 100-200 words to the General Co-chairs by May 7, 1993. Dr. Annette Jaffe, Apple Computer, Inc., 2525 Monroe St. M.S. 69D, Santa Clara, CA 95051, Tel. (408) 974-2524, FAX (408) 974-4157 or Dr. Andras Lakatos, Xerox Corporation, 800 Phillips Rd., M.S. 147-57A, Webster, NY 14580, Tel. (716) 422-2170, FAX (716) 422-8548.

ganglion cells and human observers to combined luminance and chromatic temporal modulation" by J. Kremers, B. B. Lee, and P. K. Kaiser [Vol. 9: 1477, 1992]. We measured the sensitivity of macaque retinal ganglion cells and human subjects to luminance and chromatic modulation and to two combined conditions as a function of temporal frequency. For both physiological and psychophysical data,

we compared the sensitivities to luminance and chromatic modulation with the sensitivities in the combined conditions, using an additivity measure. When the physiological and the psychophysical data were taken together, the results suggested that under the combined conditions, psychophysical sensitivity was the envelope of independent achromatic and chromatic mechanisms with (con't ➡)

## SOCIETY FOR PLASTIC ENGINEERS (SPE)

**SPE** The 1992 SPE Color & Appearance Div. RETEC was held in September in Cherry Hill, New Jersey.

This year's conference covered the basics of color measurement and the organizers deserve commendations for arranging the papers to present the subject in logical order. There was some repetition or overlap between papers, but it was beneficial to hear the same information from several points of view.

The CAD extended its support of Terra Tech by sponsoring attendance of their Color Matching Technology students - who performed admirably directing movement of conference participants in the various rooms for instrument demos.

Two points permeated the conference: 1) CMC equations give color limits closer to visual acceptability than CIELAB. The most prevalent l:c ratio was 2:1 with a scaling coefficient of .4; 2) Instrumental color measurement was widely recommended, but was tempered with the advice to look at the color visually. Several papers described how the visual process differs from instrumental measurement but unfortunately no one emphasized that most of the time the two agree.

### Summary of the papers

1) "Color Vision: How We See It by the Numbers", L. Graham gave a thorough review of color aptitude and color blindness tests.

2) "Spectrophotometric Sample Preparation", J. Deak described special sample holders sold by Datacolor.

3) "Measurement of Critical Samples", F. Simon showed how to get data from one instrument to agree with that from another.

4) "Color Measurement for the Plastics Market: Which Geometry is Correct?", T. Mabon of BYK-Gardner said 45/0 was.

### OSA, from previous page

physiological substrates in the magnocellular and the parvocellular pathways, respectively. In the combined conditions tested, sensitivity appeared to be set by a chromatic channel below 3 HZ and an achromatic channel above this frequency. This hypothesis was supported by a comparison of detection sensitivities with discrimination thresholds for the presence of chromatic alternation.

"Full-spectrum cone sensitivity functions for X-chromosome-linked anomalous trichromats" by Paul DeMarco, Joel Pokorny, and Vivianne C. Smith [Vol. 9: 1465]. We derived the cone fundamentals for X-chromosome-linked anomalous trichromats for the wavelength range of 400-700 nm. Pigment templates were constructed from the cone fundamentals of normal

trichromats after correction for ocular media absorption. The resultant retinal-level sensitivities had small irregularities in the short-wavelength region that were smoothed. The pigment templates, expressed as quantal sensitivities, were then shifted on a frequency abscissa to solve for the  $\lambda_{\max}$  of the pigments of anomalous trichromats needed to predict average anomaloscope matching data. We found that the protanomalous M- and L-cone pigments are separated by 10 nm and the deuteranomalous M- and L-cone pigments are separated by 6 nm (rounded to the nearest nanometer), where M and L indicate middle- and long-wavelength sensitivity, respectively. The triads of peak wavelengths for the corneal energy-based sensitivities were as follows: Normal 440, 543, and 588 nm; protanomalous: 440, 543, and 553 nm; and deuteranomalous: 440, 560, and 566 nm.

5) "Quality Demands and Measurement Accuracy", A Theoretical discussion of measurement error propagation from standardization. Unfortunately D. Porter left no time for questions.

6) "Color Tolerancing: The Practical Way", S. Ehr described the problems of meeting unreasonable color limits; the advice was to try anyhow.

7) "Measuring Up to Today's Standards", D. Mowrey described two ASTM methods for getting  $\Delta E$ .

8) "CMC in Polypropylene Production: How Well Is It Working?" A. Liebknecht updated us on further experience at Tennessee Eastman with the CMC equations where a year's experience changed the l:c ratio from 1.3:1 to 1.8:1 to 2:1.

9) "Color Matching Is Not Just a  $\Delta E$ ", J. Kettenacher said one should consider all pigment properties in selecting pigments for computer formulation.

10) "The Application of CMC Color Difference to Lot Acceptance of Colorants", B. West gave another testimonial to the success of CMC.

11) "Quality Systems Based on the ISO 9002 Standard", L. Valencourt gave the message that ISO means "write down what you do" and "do what you write down".

The remainder of the time was turned over to color instrument and software people who participated in a round robin test and described their wares. The test results were summarized at the end of the session, but the outliers were not identified by instrument.

*Ed Cairns*

**WE WELCOME  
ARTICLES FROM  
ALL ISCC  
MEMBERBODIES.**



## ISCC NEWS

# FRED W. BILLMEYER, JR. TO RECEIVE ISCC GODLOVE AWARD



At the Awards Luncheon during the ISCC Annual Meeting in Newport, Rhode Island (April 18-21,

1993), Dr. Fred W. Billmeyer, Jr. will be honored with the presentation of the Godlove Award. The Godlove Award, named for Dr. I. H. Godlove, is the highest honor bestowed by the ISCC, and is given in recognition of a lifetime of distinguished service to the color community.

Dr. Billmeyer's career-long contributions in color science and color education amply justify his selection for the award. Dr. Billmeyer has to his credit tireless work in the ISCC and ASTM, twelve years of founding editorship of *Color Research and Application*, a textbook (*Principles of Color Technology*, co-authored with Max Saltzman) that is used in many universities, more than 260 publications whose influence can easily be seen in the Science Citation Index, and more than ten graduate students who achieved extraordinary success in color science. His technical contributions to color science include some of the first work in computer colorant formulation, colorimetry of fluorescent materials, and work on color order systems.

Dr. Billmeyer was for many years the head of the Color Measurement Laboratory at Rensselaer Polytechnic Institute. He received his Bachelor of Science degree in chemistry from California Institute of Technology in

1941 and his Ph.D. in physical chemistry from Cornell University in 1945 (under Dr. Peter Debye). From 1945 to 1964 he worked for E. I. du Pont de Nemours, and after 1951 was also Lecturer in High Polymers at the University of Delaware. In 1964 he came to Rensselaer as Professor of

Analytical Chemistry, and subsequently became instrumental in establishing the Color Measurement Laboratory. He remained head of the Laboratory until his retirement from Rensselaer in 1984.

*Michael H. Brill, Chairman, 1993  
Godlove Award Committee*

## O T H E R N E W S

## COUNCIL FOR OPTICAL RADIATION MEASUREMENTS

An International conference on Optical Radiation  
Measurements in National Standardizing Laboratories

CORM '93, the 1993 annual meeting and conference will be held at the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland from Tuesday May 18, 1993 through Friday May 21, 1993. This conference will feature invited papers from national standardizing laboratories and related organizations. The emphasis will be on current research activities and ongoing programs towards increased precision and accuracy in optical radiation measurements.

Presentations will highlight available and planned new standard reference materials and calibrated artifacts, as well as measurement services available both nationally and internationally from these laboratories. Expected to be included are the results of intercomparisons with participation at the international level, measurement assurance programs and information about the organizations represented. The spectrum of optical radiation measurements of concern at this conference include the UV-VIS-IR wavelengths.

For further information about attending and/or participating in this conference, one of the conference coordinators should be contacted. The coordinators for this conference are:

Jack J. Hsia  
NIST  
Room B-306/Bldg. 220  
Gaithersburg, MD 20899  
(301) 975-2342  
FAX (301) 840-8551

Norbert L. Johnson  
3M Company  
3M Center 582-1-15  
St. Paul, MN 55144-1000  
(612) 733-5939  
FAX (612) 733-6211

William E. Schneider  
Optronic Laboratories  
4470 35th Street  
Orlando, FL 32811  
(407) 422-3171  
FAX (407) 648-5412

Justin J. Rennilson  
Advanced Retro Technology  
2733 Via Orange Way, Suite 104  
Spring Valley, CA 91978  
(619) 670-5105  
FAX (619) 670-5107



## COLOUR IN ARCHAEOLOGY

**CG** The Colour Group (GB) and The Institute of Archaeology, University College London are jointly organizing a day school on the subject of Colour In Archaeology. This will be held on Wednesday, March 31, 1993 at University College London.

Speakers will include: Stephen J. Mithen (Cambridge University) on palaeolithic colours and symbolism; Peter McTaggart (Mac and Me Ltd) on the use of pigments in the past; Paul Craddock (British Museum Dept. Scientific Research) on copper alloys; John Merkel (Institute of Archaeology) on the use of colour on Colombian gold face masks; Michael Heyworth (Institute of Archaeology) on the colour of glass; Evelyn Baker (Bedfordshire Archaeological Unit) on colour in medieval floor tiles; Christine Cox (Aerial Photographic Services) on false colour air photography of archaeological sites; and John Hutchings (Colour Group (GB)) on color measurement in archaeology.

The cost of entry is 6 pounds, please make checks payable to the Colour Group (GB). Further details and tickets can be obtained from:

John Hutchings, 6 Queens Road  
Colmworth, Bedford, England MK44 2LA

## COLOR RESEARCH & APPLICATION

In This Issue, February 1993

**CR&A** You can't teach an old dog new tricks, but can you give an old hue circle new names? Or better yet when are five hues equal to six

colors? The number of hues - five - is a clue to this riddle — Munsell, one of the earliest color order systems, is the only color order system with five primary hues. Recently a rumor has circulated that there are new colors in the Munsell Color Order System. In "The Primary Hue Circle", Calvin S. McCamy puts the Munsell hues in a new light. He describes a reoriented hue circle, labeled with the additive and subtractive primaries, but retaining the existing Munsell hue spacing. The primary hue circle is useful because it relates to vision and color reproduction processes as well as retaining Munsell's system of colors as they are perceived.

As the use of instrumental color tolerances becomes more and more common in industries throughout the world, the question arises to what extent are the measurements that are made with different instruments comparable and correlated. Andrea Raggi and Giancarlo Barbiroli examined this issue for spectrophotometers in "Colour Difference Measurement: The Sensitivity of Various Instruments Compared". In this study they examined eleven instruments used with their normal operating procedures. Although a few instruments gave quite different results from the average, they concluded that color differences measured with the instruments in this study are well

correlated.

In another study of instrumentation around the world, Kenneth Eckerle, Jean Bastie, Joanne Zwinkels, Victor Sapritsky, and Andrey Ulynov collaborate in an effort to obtain international standardization. In "Comparison of Regular Transmittance Scales of Four National Standardizing Laboratories", measurements taken in the United States, Canada, France, and Russia are evaluated. A previous study compared the United States, Germany, Hungary, and the United Kingdom. Results show that agreement between national standardizing laboratories is better than the small total uncertainty. This is in contrast to results of transmittance measurement assurance programs in which similar comparisons were made with industrial laboratories. There disagreement was often much larger than the total measurement uncertainty.

Rather than comparing instruments, Neville S. Smith is interested in comparing color order systems. In earlier articles he has examined many of the commonly used systems. Now in "Determination of Colorcurve Color Atlas Sample Deviation and Comparison with NCS, DIN, and OSA-UCS Atlas Sample Deviation", samples in the relatively newly developed Colorcurve Atlas are examined and compared to the previously studied systems.

Everyday we look at pictures, either photographs, magazines prints, or viewed on television. We take them and their reproduction for granted. However, when we look at a picture on a computer screen, we probably do not stop to think that digital processing of a picture on a computer is completely different than the analog reproductions cited above. Producing a computer picture is a task of gigantic proportions. For example, one 8 cm by 12 cm color print is composed of 3,840,000 picture elements (pixels). Ideally each pixel might have 4096 density levels (12 bits) per color, thus the picture a total of 138 million bits. This takes large amounts of computer memory. One way to save space in the computer memory is to reduce the color from 12 to 8 bits per pixel. For this reduction to be acceptable, the 8 bits (256 levels) per color must be assigned in a way to achieve the maximum uniformity of color images. Noboru Ohta in "Optimal Density Division for Color Imaging Systems" shows that the equal step division of psychometric lightness of gray scales assures the maximum uniformity for all the other colors as well.

The final article in this issue brings us full circle - back to the problem of hue and hue circles. Most hue scales in color order systems cover a full hue cycle. For example let us start with red, to orange, yellow, green, blue, purple, and back to red. Yet the most widely used psychophysical scale, the CIE system of dominant wavelength, does not cover the full hue cycle; the red and violet ends of the spectrum do not connect. About 30% of the hues are nonspectral, i.e., they do not correspond to a spectral wavelength. In a physical scale, it is not possible to extend the spectrum to include the nonspectral hues, but they may be represented by arbitrary numbers. In "Extension of Dominant Wavelength Scale to Designate the Hue Cycle", Ralph M. Pridmore numbers the nonspectral hues so that a symmetry of opposing complementary pairs of hues exists.

Two items appear in this month's Communications and Comments Column. First, William A. Thornton and Fred W. Billmeyer, the co-chairmen of ISCC Project 49, "Improved Colorimetry", respond to David L. MacAdam's recent letter to the editor. Second, is an invitation from Christina Burton for the readers to participate in a color conversation by sending her their comments to the survey by Burton.

# CALENDAR

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

Harry K. Hammond, III  
BYK-Gardner, Inc.  
2435 Linden Lane  
Silver Spring, MD 20910  
301-495-7150 FAX 301-585-4067

## 1993

### COLOUR GROUP, Jan. 6

Colour Deficiencies and Anomalies, City  
University. Information: Hon. Secretary 081 943-6539

### ASTM COMMITTEE D-1 ON PAINT, Jan. 17-20

Crown Sterling Suites, Ft. Lauderdale South, Florida. Information: Scott Orthey, (215) 299-5507.

### ASTM COMMITTEE E-12 ON APPEARANCE, Jan. 17-20

Crown Sterling Suites, Ft. Lauderdale South, Florida. Information: Bode Buckley, (215) 299-5599.

### IS&T/SPIE SYMPOSIUM, Jan. 31- Feb. 5

The Society for Imaging Science and Technology Symposium on Electronic Imaging: Science and Technology, San Jose Convention Center, San Jose, California. Information: (703) 642-9094.

### COLOUR GROUP, Feb. 3

Newton Lecture and Dinner, Royal Society. Information: Hon. Secretary 081 943-6539

### OSA TOPICAL MEETING OPHTHALMIC AND VISUAL OPTICS, Feb. 19-20

The Optical Society of America - Third Topical Meeting on Ophthalmic and Visual Optics, Doubletree Hotel, Monterey, California. Information: OSA (202) 223-0920.

### OSA TOPICAL MEETING NONINVASIVE ASSESSMENT OF THE VISUAL SYSTEM, Feb. 21-23

The Optical Society of America - Topical Meeting on Noninvasive Assessment of the Visual System, Doubletree Hotel, Monterey, California. Information: OSA (202) 223-0920.

### REGIONAL FSCT EVENT, Feb. 24-26

20th Annual Waterborne, High-Solids and Powder Coatings Symposium, New Orleans, LA. Information: Federation Office: (215) 940-0777

### ASTM COMMITTEE D-20 ON PLASTICS, Mar. 1-4

Atlanta, Georgia. Information: Katharine Schaff, (215) 299-5529.

### COLOUR GROUP, Mar. 3

Colour in Architecture, National Gallery. Information: Hon. Secretary 081 943-6539

### REGIONAL FSCT EVENT, Mar. 10

Piedmont Society Symposium, Holiday Inn Market Square, High Point, NC. Information: Federation Office: (215) 940-0777

### REGIONAL FSCT EVENT, Mar. 17-19

Southwestern Paint Convention of Houston and Dallas Societies, Four Seasons Hotel, Los Colinas, TX. Information: Federation Office: (215) 940-0777

### CORM ANNUAL MEETING, Mar. 18-21

Gaithersburg, Maryland. Information: Jack Hsia (301) 975-2342.

### REGIONAL FSCT EVENT, Mar. 23-25

Western Coatings Societies's 21st Biennial Symposium and Show, Disneyland Hotel and Convention Center, Anaheim, CA. Information: Federation Office: (215) 940-0777

### COLOUR GROUP, Mar. 31

Colour in Archeology, Institute of Archeology. Information: Hon. Secretary 081 943-6539

### CMG - CONFERENCE, Apr. 4-6

Color Marketing Group International Color Directions Conference, Hyatt Crystal City, Washington, District of Columbia. Information: Katie Register (703) 528-7666.

### LUX EUROPA 1993, Apr. 4-7

Chartered Institution of Building Services Engineers, Edinburgh, Scotland. Information: CIBSE, Delta House, 222 Balham High Rd., London SW12 9BS.

### ISCC ANNUAL MEETING, Apr. 18-20

Color: Regulations and Environment, Newport Islander Doubletree Hotel, Newport, Rhode Island. Information: Romesh Kumar (401) 823-2161.

### REGIONAL FSCT EVENT, Apr. 21-23

Southern Society Annual Meeting, Opryland Hotel, Nashville, TN. Information: Federation Office: (215) 940-0777

### TAGA ANNUAL CONFERENCE, Apr. 25-28

Technical Association of the Graphic Arts Annual Technical Conference, Minneapolis - St. Paul, Minnesota. Information: Karen Lawrence, (716) 475-7470.

### REGIONAL FSCT EVENT, Apr. 29- May 1

Pacific Northwest Society Annual Symposium, Red Lion Hotel, Bellevue, WA. Information: Federation Office: (215) 940-0777

### IS&T ANNUAL CONFERENCE, May 9-14

The Society for Imaging Science and Technology 46th Annual Conference, Boston Marriott Cambridge Hotel, Cambridge, Massachusetts. Information: IS&T (703) 642-9090.

### REGIONAL FSCT EVENT, May. 16-19

League City, TX. Board of Directors Meeting on 16th. Society Officers Meeting on 17th. Seminars on 18th and 19th. Information: Federation Office: (215) 940-0777

### CORM '93, May 18-21

National Institute for Standards and Technology, Gaithersburg, Maryland. Information: Dr. Jack Hsia (301) 975-2342.

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# **ASPRS WORKSHOP ON COLOR PHOTOGRAPHY AND VIDEOGRAPHY IN RESOURCE MONITORING, May 24-27**

American Society for Photogrammetry and Remote Sensing - 14th Biennial Workshop on Color Photography and Videography in Resource Monitoring, Utah State University, Logan, Utah. Information: Christopher Neale (801) 750-3689.

# **REGIONAL FSCT EVENT, Jun. 4-5**

Joint Meeting of St. Louis and Kansas City Societies, Holiday Inn, Lake of Ozarks, MO. Information: Federation Office: (215) 940-0777

# **AIC-7TH CONGRESS, Jun. 14-18**

International Colour Association - 7th Congress, Technical University of Budapest, Budapest, Hungary. Information: Prof. Antal Nemcsics, Technical University of Budapest, Conference Office, Building Z, Room 101/b, H-1521 Budapest, Muegyetem rkp.3-9, Hungary, Phone and FAX (36-1) 185-2218.

# **LIGHT AND COLOR IN THE OPEN AIR, Jun. 16-18**

Optical Society of America Second Topical Meeting on Light and Color in the Open Air, The Pennsylvania State University State College, Pennsylvania. Information: OSA Office (202) 223-0920.

# **IS&T INTERNATIONAL SYMPOSIUM, Jun 21-25**

International Symposium on Electronic Imaging Device Engineering, Munich Fairgrounds South, Munich, Germany. Information: IS&T (703) 642-9090.

# **ASTM COMMITTEE E-12 ON APPEARANCE, Jun. 23-25**

Atlanta, Georgia. Information: Bode Buckley, (215) 299-5599.

# **ASTM COMMITTEE D-1 ON PAINT, Jun. 27-30**

Wyndham Franklin Hotel, Philadelphia, Pennsylvania. Information: Scott Orthey, (215) 299-5507.

# **MONTAGE 93, Jul.11-Aug.7**

Montage 93: International Festival of the Image, Rochester, New York. Information: Montage 93 (716) 442-8898.

# **IESNA ANNUAL CONFERENCE, Aug. 8-12**

Illuminating Engineering Society of North America, 87th Annual Conference, Houston, Texas. Information: Valerie Landers, (212) 705-7269.

# **CMG - CONFERENCE, Sep. 12-14**

Color Marketing Group International Color Directions Conference, Hotel del Coronado, San Diego, California. Information: Katie Register (703) 528-7666.

# **DCC MEETING, Sep. 23**

Detroit Colour Council New Pigments for Automotive Applications, Michigan State Management Education Center, Troy, Michigan. Information: James Hall (313) 947-5428

# **AATCC - CONFERENCE AND EXHIBITION, Oct. 3-6**

American Association of Textile Chemists and Colorists, Montreal, Quebec, Canada. Information: AATCC, (919) 549-8141.

# **OSA - ANNUAL MEETING, Oct. 3-8**

Optical Society of America Annual Meeting Toronto, Canada. Information: OSA (202) 223-0920.

# **IS&T 9th INTERNATIONAL CONGRESS, Oct. 4-8**

The Society for Imaging Science & Technology, 9th International Congress on Advances in Non-Impact Printing Technologies with Exhibit, Pacific Convention Plaza, Yokohama, Japan. Information: IS&T (703) 642-9090.

# **REGIONAL FSCT EVENT, Oct. 27-29**

71st Annual Meeting and 58th Paint Industries' Show, Georgia World Congress Center, Atlanta, GA. Information: Federation Office: (215) 940-0777

# **COLOR IMAGING SYSTEMS, Nov. 7-10**

Color Imaging Systems co-sponsored by the Society for Imaging Science and Technology and Society for Information Display, The Pointe Hilton Resort at Squaw Peak, Phoenix, Arizona. Information: IS&T (703) 642-9090.

# **ASTM COMMITTEE D-20 ON PLASTICS, Nov. 15-18**

Fort Worth, Texas. Information: Katharine Schaff, (215) 299-5529.

## **LONG RANGE CALENDAR**

### **1994**

# **ASTM COMMITTEE D-1 ON PAINT, Jan. 23-26**

Crown Sterling Suites, Fort Lauderdale South, Florida. Information: Scott Orthey, (215) 299-5507.

# **ASTM COMMITTEE E-12 ON APPEARANCE, Jan. 23-26**

Crown Sterling Suites, Fort Lauderdale South, Florida. Information: Bode Buckley, (215) 299-5599.

# **WILLIAMSBURG CONFERENCE, Feb.**

Inter-Society Color Council Williamsburg Conference on Fluorescence, Williamsburg, Virginia. Information: Richard Harold (703) 471-6870.

# **ISCC - ANNUAL MEETING, Apr. 24-26, 1994**

Inter-Society Color Council Annual Meeting & Joint Symposium with Detroit Colour Council, Troy Marriott, Detroit, Michigan. Information: Jim Kaiser

# **TAGA ANNUAL CONFERENCE, May 1-4**

Technical Association of the Graphic Arts Annual Technical Conference, Baltimore, Maryland. Information: Karen Lawrence, (716) 475-7470.

# **CMG - CONFERENCE, May 8-10**

Color Marketing Group International Color Directions Conference, Sheraton New York Hotel & Towers, New York, New York. Information: Katie Register (703) 528-7666.

# **ASTM COMMITTEE D-1 ON PAINT, Jun. 26-29**

Marriott Crab Tree Valley, Raleigh, North Carolina. Information: Scott Orthey, (215) 299-5507.



**ASTM COMMITTEE E-12 ON APPEARANCE**, Jun. 19-23  
Montreal, Canada. Information: Bode Buckley, (215) 299-5599.

**IESNA ANNUAL CONFERENCE**, Aug. 7-11  
Illuminating Engineering Society of North America, 88th Annual Conference, Maimi, Florida. Information: Valerie Landers, (212) 705-7269.

**CMG - CONFERENCE**, Sep. 25-27  
Color Marketing Group International Color Directions Conference, Sheraton Bal Harbour, Miami, Florida. Information: Katie Register (703) 528-7666.

**AATCC - CONFERENCE AND EXHIBITION**, Oct. 11-14  
American Association of Textile Chemists and Colorists, Convention Center, Charlotte, North Carolina. Information: AATCC, (919) 549-8141.

## 1995

**ASTM COMMITTEE E-12 ON APPEARANCE**, Jan. 22-26  
San Antonio, Texas. Information: Bode Buckley, (215) 299-5599.

**WILLIAMSBURG CONFERENCE**, Feb.  
Inter-Society Color Council Williamsburg Pan-Chromatic Conference, Information: Michael Brill (703) 734-4027.

**TAGA ANNUAL CONFERENCE**, Apr. 2-5  
Technical Association of the Graphic Arts Annual Technical Conference, Orlando, Florida. Information: Karen Lawrence, (716) 475-7470.

**ISCC ANNUAL MEETING**, Apr. 23-25

**CMG - CONFERENCE**, May 14-16  
Color Marketing Group International Color Directions Conference, Dallas Texas. Information: Katie Register (703) 528-7666. CIE Quadrennial Meeting, Sept. New Delhi, India

**AATCC - CONFERENCE AND EXHIBITION**, Oct. 8-11  
American Association of Textile Chemists and Colorists, Hyatt Regency, Atlanta, Georgia. Information: AATCC, (919) 549-8141.

## 1996

**ISCC ANNUAL MEETING**, Apr. 21-23

**TAGA ANNUAL CONFERENCE**, Apr 28-May 1  
Technical Association of the Graphic Arts Annual Technical Conference, Dallas, Texas. Information: Karen Lawrence, (716) 475-7470.

**AATCC - CONFERENCE AND EXHIBITION**, Oct. 8-11  
American Association of Textile Chemists and Colorists, Opryland Hotel, Nashville, Tennessee. Information: AATCC, (919) 549-8141.

## 1997

**TAGA ANNUAL CONFERENCE**, May 4-7  
Technical Association of the Graphic Arts Annual Technical Conference, Montreal or Quebec City, Canada. Information: Karen Lawrence, (716) 475-7470.

**AATCC - CONFERENCE AND EXHIBITION**,  
Sep. 28- Oct. 1  
American Association of Textile Chemists and Colorists, Marriot Marquis, Atlanta, Georgia. Information: AATCC, (919) 549-8141.

## 1998

**TAGA ANNUAL CONFERENCE**, May 3-6  
Technical Association of the Graphic Arts Annual Technical Conference, Chicago, Illinois. Information: Karen Lawrence, (716) 475-7470.

**AATCC - CONFERENCE AND EXHIBITION**, Oct. 4-7  
American Association of Textile Chemists and Colorists, Philadelphia, Pennsylvania. Information: AATCC, (919) 549-8141.

## 1999

**TAGA ANNUAL CONFERENCE**, May 2-5  
Technical Association of the Graphic Arts Annual Technical Conference, Philadelphia, Pennsylvania. Information: Karen Lawrence, (716) .

**AATCC - CONFERENCE AND EXHIBITION**, Oct. 12-15  
American Association of Textile Chemists and Colorists, Convention Center, Charlotte, North Carolina. Information: AATCC, (919) 549-8141.

# INSERTS

## IN THIS ISSUE OF ISCC NEWS

Individual Membership Application & Bylaws

Second Call For Papers IG I  
Second Call For Papers IG II  
Second Call For Papers IG III  
Call For Papers Poster Papers Session

## NEWSLETTER EDITOR Michael A. Hammel

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(3.5"-1.44 Meg, or 730K).

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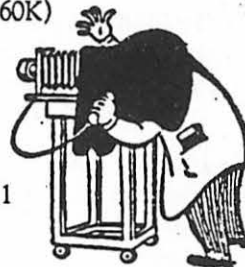
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Please note: the deadline for submission of material is the 1st of even numbered months.



meeting reports



photos



contributions from members

## OFFICERS 1990-1992

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President	Ms. Paula J. Alessi	Eastman Kodak Company, Rochester, NY 14650	(716) 477-7673	(716) 722-1116
Pres.-Elect	Mr. Roland L. Connelly, Sr.	SheLyn, Inc., 1108 Greccade Street, Greensboro, NC 27408	(919) 274-1963	(919) 274-1971
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Past-Pres.	Mr. Hugh S. Fairman	334 Springbrook Trail, Sparta, NJ 07871	(201) 729-9402	(201) 729-7278

## LIST OF DIRECTORS

### 1990-1993

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Dr. Nancy Jo Howard	Phil. Coll. of Textiles & Sci., Henry Av. & Schoolhouse Lane, Phila., PA 19144	(215) 951-2888	
Dr. Romesh Kumar	Hoechst Celanese Corporation, 500 Washington St., Coventry, RI 02816	(401) 823-2161	(401) 823-2750

### 1991-1994

Dr. Joanne M. Taylor	17890 NW Deercreek Court, Portland, OR 97229-3060	(503) 645-5129	(503) 645-5129
Dr. Ellen C. Carter	2509 N. Utah St., Arlington, VA 22207	(703) 527-6003	
Ms. Magenta Yglesias	JI, Inc., 1827 23rd St. NW, Washington, DC 20008-4030	(202) 328-2120	(202) 232-5602

### 1992-1995

Dr. Michael H. Brill	Science Applications, Int'l Corp., 1710 Goodrich Dr., MS-1-11-1, McLean, VA 22102	(703) 734-4027	(703) 821-3576
Prof. Robert Chung	Rochester Inst. of Tech., School of Printing, One Lomb Memorial Dr., PO Box 9887, Rochester, NY 14623-0887	(716) 475-2722	(716) 465-7063
Dr. Joel Pokorny	939 East 59th Street, Chicago, IL 60637	(312) 702-1983	

## ISCC MEMBER-BODIES

American Association of Textile Chemists and Colorists (AATCC)	Graphic Arts Technical Foundation (GATF)
American Chemical Society (ACS)	The Human Factors Society
American College of Prosthodontists (ACP)	Illuminating Engineering Society of North America (IESNA)
American Psychological Association (APA)	National Artists Equity Association (NAEA)
American Society for Testing and Materials (ASTM)	National Association of Printing Ink Manufacturers (NAPIM)
American Society of Interior Designers (ASID)	National Paint and Coatings Association, Inc. (NPCA)
American Society for Photogrammetry and Remote Sensing (ASPRS)	Optical Society of America (OSA)
The Color Association of the United States, Inc. (CAUS)	Society for Information Display (SID)
Color Marketing Group (CMG)	Society of Motion Picture and Television Engineers (SMPTE)
Detroit Colour Council (DCC)	Society of Plastics Engineers, Color & Appearance Division
Dry Color Manufacturers Association (DCMA)	Society for Imaging Science and Technology (IS&T)
Federation of Societies for Coatings Technology (FSCT)	Technical Association of the Graphic Arts (TAGA)
Gemological Institute of America (GIA)	Technical Association of the Pulp and Paper Industry (TAPPI)

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