Inter-Society Color Council *News*

Issue 403 Contents

May/June 2003

Letter from ISCC President

Our annual meeting and joint Symposium on Color and Appearance Instrumentation (SCAI) with the Federation of Societies of Coatings Technology was a great success. If you were unable to attend you missed another terrific chance to hear about and see the latest in color-measuring instruments and standards for making the readings more precise and accurate. There was a lot of lively dialog about calibration, verification and communication of color on an absolute basis across large distances.

The success of our two meetings this year plus a sizeable list of new members joining the Council has helped to stabilize our Council financially as well as technically. We have had changes in the leadership of two of our three Interest Groups and the new chairs show great enthusiasm for continuing to solicit interesting and exciting programs.

As always, the presentation of the Godlove Award for a lifetime of contributions to field of color science and technology is an emotional moment. This years recipient is Rolf G. Kuehni. You can read more about this elsewhere in this issue. Rolf was one of the first colorists that I met when switched from optical physic to color science and began taking classes in the Rensselaer Color Measurement Laboratory. He was an active ISCC member at that time and an inspiration to our group of graduate students in terms of his excellence in his scholarship and dedication to his field of study. The receipt of the Council's most prestigious award confirms that Rolf has kept that high level of contribution throughout his career.

While the Interest Groups and program chairs take a few deep breaths and begin thinking about next year, the activities of the Council will slow a bit during the summer and fall. But that does not mean that color will take a nap. The CIE will be meeting in San Diego this summer and color is certainly high on their list of activities. The CIE meets once every four years to review what has been accomplished. This year the US National Committee (CIEUSA) and the International Dark-Sky Association are hosting the 2003 quadrennial meeting in San Diego, CA from June 25 through July 2. Check out www.cie-usnc.org for further information. Also, two of our memberbodies, IS&T and SID host their annual Color Imaging Conference in Scottsdale, AZ in November.

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My pleas for assistance for the Publications Committee have not gone unheeded. We have a new Newsletter layout editor (Dr. Mary McKnight) and as you can see, she is doing a terrific job. I also had two responses, one from Evelyn Stephens and one from Robert Bassemir volunteering to assist in what every way that Editor Celikiz needs. A big THANK YOU to our volunteers who keep the Council, the foremost society for Color & Appearance in the world today. If you did not volunteer but are inspired by the response of these folks then send me an email as we still have other committees in need of chairs and activities.

Mentioning Evelyn Stephens reminds me that she and Louis Graham are the newest Honorary members of the ISCC. They were unable to attend our annual meeting but I want everyone to know just how much they mean to the Council and the current Board of Directors. Both have served on the Board in the past. You can read more about their lives and contributions elsewhere in the Newsletter.

I hope your summer is bright and full of warm shades of life.

Danny Rich

ISCC President

ISCC Project Committee Updates – April 2003

Project Committee 51— Guide to Material Standards - Art Springsteen, Chair

Art Springsteen, Jack Ladson and Danny Rich have revised the ISCC's Guide to Material Standards for instrument calibration and it has been sent to the Board of Directors for review. The draft will be edited for style. Plans are to make the document available to the Council in the fall.

Project Committee 52—Comparative List of Color Terms II — Ellen C. Carter, Chair

Project 52 was formed in 2000 to update the ISCC Comparative List of Color Terms, first published in 1949. Nineteen people attended the working session April 13, 2003 during the ISCC Annual meeting. Ellen Carter reviewed the scope and goals of PC 52 and the current status of the work.

So far, the following member bodies have been contacted to submit terms: AATCC, ASTM, ASPRS, CAUS, CMG, CPMA, CORM, DCC, FSCT, GIA, GATF, IESNA, NAPIM, OSA, IS&T, SID, SPE/CAD, TAGA, TAPPI. Individuals with the Fashion Institute of Technology, Munsell, Pantone, the Natural Color System, CIE, ISO, and VESA were also contacted. Groups that have submitted terms are AATCC, ASTM, CMG, CPMA, FSCT, TAGA, TAPPI, VESA, some CIE and ISO committees, and NCS. Most of the lists submitted have been loaded into the database. The chair also reported that some cross- referenced terms in Spanish, Swedish, and Japanese had also been submitted.

Outstanding issues that were discussed include the format of the report, other sources of terms, how to compare and contrast the terms, and what to do about antiquated terms.

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Rolf G. Kuehni Recieves ISCC'S Godlove Award

Mr. Rolf G. Kuehni was presented the prestigious Godlove Award during the ISCC Annual Meeting in Chicago, IL.

Mr. Kuehni received the degree of Textile Chemistry from Fachhochschule Niederrhein in Krefeld, Germany.

After a 30-year career with Bayer in the United States, where he became a divisional vice president, he joined DyStar L.P, a textile dyes joint venture of Bayer and Hoechst (and now BASF) serving as Vice President of Staff and Services.

After his retirement, Kuehni continued to actively pursue the study of color and made significant contributions to the understanding of why color space metrics like CIELAB do not always agree with visual experience. He has studied color and color-differences both from a current technological standpoint and from a historical perspective, as demonstrated by his just released new book *Color Space and its Divisions*. For more than two decades Kuehni has been a strong proponent of closer ties between the industrial scientists studying and applying color technology and the academic scientists studying color vision and developing the bases of color science.

Mr. Kuehni is an Adjunct Professor at North Carolina State University in Raleigh, NC. He has authored four books and some 60 peer-reviewed papers. Kuehni has served on the Editorial Board of *Color Research and Application* since its inception and as Editor from 1987 to1989. He was a Director of the ISCC from 1982 through 1985. Kuehni is active in two technical committees of the International Commission of Illumination (CIE) and he chaired and was active in several ISCC Problem Committees. He is a member of the American Association of Textile Chemists and Colorists (AATCC), where he is the incoming chairman of the color measurement committee.

Godlove Award Acceptance Speech

I would like to thank Roy Berns for his kind words of citation and the Godlove family for having established the award. It is clearly prestigious because among its winners are some of the most important names in color science. When looking recently at the work of Dr. Godlove, I found we have a number of common interests. To me this is an indication that what he and other pioneers did has continuing value and interest and remains open for further work.

My thanks go to the Godlove Award committee for recommending me as a candidate. I thank the ISCC and its board for bestowing the award on me. I must say that it was a complete surprise. I had no idea that my name was among those considered. When Danny Rich called me I was stunned and thankful and felt humble to stand among the awardees. Not least I would like to thank my wife Margret for having put up with me and my color absorption for all these years.

My supervisor in my first job initiated my interest in color after college at Ciba in Basel in 1962. Dr. Paul Ulrich, a research chemist, had a deep and broad interest in color and at the time was working through the color literature. He made me read some early psychological papers that did not mean much to me at the time. I was more interested in strength determination of dyes by transmittance and reflectance that, if reliable, would make my job easier and more productive. I quickly learned their limitations at a time when instrumentation was still in rapid development.

When beginning work at Verona Dyestuffs in 1965 part of my job responsibility was to try to make use of a Color Eye®. Some time later I talked the management into acquiring an IBM 1130 computer and thereby began my involvement in computer formulation. Color quality control, and with it color difference, became another subject of interest. A color course at Davidson and Hemmendinger and meeting Ralph Stanziola were important elements in steering me deeper into color technology. Becoming active in the ISCC was of great importance and I remember fondly Max Saltzman teaching me the ropes of this organization. Among many other things I also remember the sharp red pen of Deane Judd correcting our draft for a test procedure on dye strength determination. I am grateful for the mentoring, camaraderie and friendships I was able to experience through this organization.

As I advanced in managerial rank, the practical side of color more and more retreated to the background. My 3-year stint as the editor of Color Research and Application in the later 1980's was an effort to remain involved and knowledgeable but I had to give it up for lack of time. A general interest in color remained, however, and grew in the areas of culture and art, as well as its history, philosophy and its role in consciousness.

During my last few months of employment at DyStar and my stint as consultant I had relatively little meaningful work

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to do and involving myself in color saved my sanity. I decided to delve again into the mysteries of color space and its divisions, an effort resulting in a series of papers and now a just published book (*Color space and its divisions*, Wiley, 2003). As an Adjunct Professor at NCSU, I can share some of my experience with students and help establish color science as a solid part of the curriculum.

In the last couple of years I have come to believe that we know in reality considerably less about color perception than is generally assumed. I have recently come across some experimental facts that are very puzzling and make me wonder how much we really know about the variability of trichromatic color perception. The first has to do with standard observers. Using an idea of mine from 1979 a student calculated what we call the transition wavelengths of gray metamers where one is maximal in terms of the square root difference from the other. These three wavelengths are independent of linear transformation of the underlying observer data and are convenient identifiers for observers. The point is that in published observer data we seem to have two distinct groups of observers. It seems important for CIE Committee TC1-56 to arrange for additional experimental data to determine the effect of methodology on the results and separately the variability of observers.

Recently, I also looked at ten sets of published unique hue data. These have been established under several different experimental paradigms, from sub-second exposure to lights with black surround to indefinite exposure to arrays of color chips. There is, in my view, no pattern in regard to experimental paradigm detectable in the results. What struck me most, however, are the surprisingly large ranges of individual unique hues. Three of these in fact overlap. That is, unique blue for one observer can be unique green for another and unique green for one can be unique yellow for another. Most of the papers from which the data have been taken have been published in Vision Research and JOSA A and I am not about to doubt their veracity. The findings raise serious questions about the meaning of unique hues as well as the usefulness of color appearance and color difference formulas.

Finally, studying past large-scale efforts of determining constant chroma and constant hue differences in global color space I found that the three largest efforts have produced considerably different results. All three involved more than 10,000 observations. I would not want to claim that one of these results is more accurate. We do not know what causes these differences. It is evident that we do not have reliable, replicated global scaling of color space. The same applies to small color differences.

I think this is good news for the younger people in this room. There is a lot that we do not know about color perception and color science still offers many and large challenges to those wanting to take them on.

Rolf Kuehni

Carter Recieves Nickerson Service Award

Dr. Ellen Carter was presented the 2003 Nickerson Service Award at the ISCC Annual Meeting in Chicago, IL.

Dr. Carter is the 18th recipient of the Nickerson Service Award. She joined the ISCC in 1969 and has been an active member since that time. Carter was President of the ISCC from 1996 through 1998 and was on the Board of Directors from 1991-94. She was heavily involved in establishing the ISCC Office. Her early work on project committees included chairing Committee 22 on Materials for Instrument Calibration, which produced ISCC Publication 78-2 and later helped in its revision 89-1. She currently chairs Committee 52, which is developing a 21st Century Comparative List of Color Terms to replace the one published by the ISCC in 1949.

Currently a consultant, Dr. Carter has previously worked in industry and education. She was a Senior Color Scientist for the Sherwin-Williams Company and later Minolta Corporation. She has been the editor of the journal *Color Research and Application* since 1990.

Dr. Carter received her B.A. in chemistry from Manhattanville College of the Scared Heart in Purchase, NY and her Ph.D. in chemistry from Rensselaer Polytechnic Institute in Troy, NY. She has authored a number of technical papers. Dr. Carter is the Division 1 (Vision and Color) Editor of the International Committee on Illumination (CIE). She is a member of ASTM International, the Council on Optical Radiation Measurements (CORM), the Detroit Colour Council (DCC), the Optical Society of America (OSA), the Society for Imaging Science and Technology (IS&T), the Society of Sigma Xi, and the U.S. National Committee of the CIE (CIE/USA).

ISCC Elects New Directors

Mr. David Battle of GretagMacbeth in Research Triangle Park, NC, Mr. Sy Commanday of Techmer PM in Gainesville, GA and Dr. Maria Nadal of the National Institute for Standards and Technology (NIST) in Gaithersburg, MD were elected to three-year Board of Director terms (2003 – 2006).

Mr. Battle is the Director of Hardware Engineering at Gretag Macbeth. He leads a team of engineers designing color measurement instrumentation. Battle has been in the color measurement industry for 23 years starting with Instrumental Color Systems in England where as Technical Director he was responsible for the development of the Spectraflash 500 spectrophotometer and other color related software products. Battle relocated to the US in 1992 where he led instrument development and engineering for Datacolor International. In 1995 he wrote the color measurement section of "Colour Science for Industry," an international reference textbook published by the Society of Dyers and Colourists. Battle received his B.Sc. in Electronics from the University of Kent at Canterbury, England and his MBA from Temple University in Philadelphia, PA.

Mr. Commanday is a Color Scientist at Techmer PM. He is responsible for providing technical assistance to five plants and their customers in the areas of color and pigmentation. Mr. Commanday began his career as an analytical chemist at Ciba Pharmaceutical in Summit, NJ. In 1964 he transferred to the Ciba Chemical and Dye Company where he began working on color problems. Since leaving Ciba, he had various positions with Burlington Industries, Beckman Instruments, Phillips Fibers (now known as Drake Extrusion), Ampacet and Hercules Fibers (now known as FiberVisions). During his 39-year career in color, Commanday has presented papers covering various aspects of color technology, many of which concentrated on the problems and techniques of working with color in Polypropylene and other Fibers. Commanday received his B.S. in Chemistry from Brooklyn College (NY) and continued graduate studies in Chemistry at both the U. of Arizona and Stevens Institute in Hoboken, N. J. He was on the ISCC Board of Directors from 1976 until 1977 and is a member of the American Association of Textile Chemists and Colorists (AATCC), the Detroit Colour Council (DCC) and the Society of Plastic Engineers.

Dr. Nadal is currently involved with spectrophotometric measurements in the Optical Technology Division of NIST. Her primary areas of research are color and appearance. Nadal is involved in developing new calibration services and standard reference materials for surface color, specular gloss and is doing research in the goniochromatic attributes of special effect coatings. These services are NIST's first for appearance measurements in many years, a response to needs articulated in recent reports of the Council for Optical Radiation Measurements (CORM). She has published more than 20 papers in the scientific and technical arena. Nadal received her Ph.D. in Physical Chemistry from the University of Colorado at Boulder and is a member of ASTM International, CORM and Division 2 CIE.

Louis A. Graham and Evelyn Stephens are Elected Honorary Members

Mr. Louis A. Graham and Evelyn Stephens have been elected as an ISCC Honorary Members. Honorary Membership is reserved for those ISCC members who have rendered signal service to the ISCC or to those fields served by the individual Member-Bodies of the ISCC, in such manner as to aid in accomplishing the objectives of the ISCC.

Mr. Graham joined the ISCC in 1957 while employed by the American Viscose Division of FMC and has been an active member since that time. Mr. Graham has served as a delegate for the American Association of Textile Chemists and Colorists (AATCC). He has served on and chaired numerous ISCC committees.

As a member of ISCC Project Committee 23, Expression of Historical Color Usage, he was instrumental in the formation of the Color Marketing Group (CMG) in 1962 and served as CMG's first president (1962 - 1965).

Mr. Graham was president of the ISCC from 1982 to 1984, and was chairman of the Council's Long Range Planning Committee from 1988 to 1993. He received the ISCC's Nickerson Service Award in 1998.

Mr. Graham received his B.S. in Chemical Engineering from the University of Virginia and his M.S. in Chemical Engineering from the University of Louisville.

Mr. Graham was a Senior Manager of Corporate Research and Development at Burlington Industries from 1967 until 1987, with responsibility for dyeing, computer and color laboratories. Following retirement from Burlington Industries, he served on International Executive Service Corps projects in Zimbabwe and Mauritius. He formed Lou Graham and Associates, Inc. and developed the HVC Color Vision Skill Test.

Evelyn Stephens biography will be in the next issue of ISCC news.

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The format of the report will most likely be a .pdf file on a CD. Several people agreed to track down other lists, the sources of the original lists, and/or to help input data.

Finally, two long lists of terms that had been compiled before the meeting were discussed, i.e., the list of terms included in the original publication and the list comprised of all the new terms submitted before the meeting. The group discussed which (if any) terms should be excluded, noted several missing terms, and asked whether glossaries in certain books should be included. The issues were not fully resolved.

The plan is to submit the entire new list for ISCC publication approval by the end of 2003. A special need is a person, who knows and has access to the Japanese character set to do data entry on the Japanese cross-reference list. Anyone interested in contributing to this project work is invited to contact the chair at ECCarter@bellatlantic.net.

Color Research and Application

In This Issue, June 2003

This issue contains seven articles and a note. The topics span such diverse areas as fashion trends, quantitative analyses in color theory, development of the basic standards necessary for colorimetry, colorblind school children, and various types of color perception.

For the first article, Chengwu Cui from Lexmark asks the question "Which Color is More Colorful, the Lighter One or the Darker One?" The answer could depend upon whom you ask, and the author is particularly interested in consumers in their everyday color experiences. In this article Dr. Cui describes a visual experiment to determine the effect of CIE lightness on the perceived colorfulness of a set of highly chromatic color samples, which are held constant in CIELAB hue but varied in CIELAB chroma and lightness. He is particularly looking at printed colors produced on an ink jet printer.

Almost every course relating to color covers the topic of color mixtures. The mathematical calculations of color mixture are most easily approached when color mixture theory is grouped by the phenomena involved. The most basic grouping is into two groups – additive, where lights are summed, and subtractive, where absorbing media are mixed or superimposed to produce the visual effect. Relative to additive mixtures, subtractive color mixture theory is much more complex, and systematization would be useful. In our next article, "Theoretical Analysis of Subtractive Color Mixture Characteristics" Nobuhito Matsushiro and Noboru Ohta assume the Lambert-Beer model for subtractive color mixture and prove several theorems regarding the stimulus values of colors obtained by subtractive color mixture. The authors then go on to provide numerical illustrations confirming their theories. In another article on systemization, A. Kimball Romney and Tarow Indow report on an investigation into the extent to which the reflectance spectra are well represented in a low dimensional Euclidean space. In "Munsell Reflectance Spectra Represented in Three-dimensional Euclidean Space" they first look at 1269 matte Munsell color chips, then examine a data set of natural objects. They find that although three dimensions represent the spectral data of the Munsell chips well, for natural objects four basis factors are required.

We have had many articles on color perception, but the most often the perceived color is a result of spectrally selective stimuli. However, for nearly two hundred years it has been known that interesting color perception effects can be produced using intermittent achromatic stimuli. These are sometimes known as Fechner's colors, and were demonstrated with Benham's top over a hundred years ago. A rotating disk produces temporal variations so the retina is stimulated in rapid succession by a pattern of luminance levels. Our next article discusses more about two parameters and how they relate to pattern-induced flicker colors. In "Remote Adaptation Effect on Perceived Subjective Color: A Model Approach," Avital Tsofe, Gil Rotgold, and Hedva Spitzer propose an analytical model to account for the results of the perceived hue shift when changing either the remote illumination area or the stimulus illumination.

The CIE system of colorimetry is based on the use of a set of color matching functions developed for a "standard observer." Two such observers have been recommended, the *CIE 1931 Standard Observer* and the *CIE 1964 Supplementary Observer*. The differences between the two observers relate primarily to the size of the stimulus being observed. The 1931 observer, sometimes known as the 2° observer is for small field of view, where the 1964 observer, sometimes known as the 10° observer is recommended for use when the field of view is larger than 4 degrees. Investigations of the variability inherent in the color matching functions of groups of observers with normal color vision led the CIE to establish a so-called *Standard Deviate Observer* in 1989. The standard deviate observer, which was based on 10° determinations, enabled evaluation of the discrepancies resulting from variability between observers. Recently, in the Optics Laboratories of the University of Granada new experimental measurements of small field color matching functions of several observers have been made [see the article in the last issue of this journal (#2, 2003)]. Now J. A. Martínez, F. Pérez-Ocón, A. García-Beltrán, and E. Hita have generated a new deviate observer from small field observations of nine real observers. In our next article they report on their proposal in "New Deviate Observer (JF-DO) Obtained from Experimental Color-Matching Functions for Small Fields of Real Observers."

The next article deals with the effects of color vision deficiencies on children in school. In "Some Psychological Aspects of Colour Blindness at School: A Field Study in Calbría and Basilicata (Southern Italy)," Gallo, Panza, Mantieri, Bisso, Conforti, Piro, Tagarelli, and Tagarelli report on a massive study surveying nearly 64,000 students and teachers.

In clothing, cars, and most consumer products, color trends are an important part of marketing. Producing the colored products that match the rapidly changing consumer's tastes is important in many industries but especially in apparel. Although previous studies have addressed individual design elements, few dealt with compound elements. The final article in this issue, "Effect of Color on Fashion Fabric Image" reports on two fashion elements - color and fabric. Sunhyung Choo and Youngin Kim studied color variables, tones, and texture variables, correlating the image and design elements.

From time to time we have another class of items published in this journal – Notes. Editorially, notes are the same as articles, except for the length. That is, they are subject to the same requirements and scrutiny by referees. In the note "About the Theoretical Aspect of Multiple Light Scattering," Jean-Francis Bloch and Robert Sève report on the relationship between Kubelka-Munk parameters and the more intrinsic quantities related to the properties of the media introduced by the photon model.

We close this issue with four book reviews, a meeting report and an announcement about the 2003 AIC Interim Meeting in

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Bangkok. The books reviewed are: *Bright Earth: Art and the Invention of Color* by Ball; *Theories, Technologies, Instrumentalities of Color: anthropological and historiographic perspectives* edited by Barbara Saunders and Jaap van Brakel; *Basic Principles of Textile Coloration* by Broadbent; and *Colour Image Science Exploiting Digital Media* edited by MacDonald and Luo. Drs. Golob, Jeler, and Stjepanoviè tell us about the 2002 AIC Interim Meeting that was held in Maribor, Slovenia in August 2002.

Center for Visual Science 40th Anniversary Celebration October 10-11, 2003

All interested individuals are invited to a celebration of the 40th anniversary of the founding of the Center by Bob Boynton in 1963.

Speakers will survey the advances in six areas of visual science since the founding of the Center, and Dave Williams will show some of the stunning recent advances in physiological optics.

The celebration will begin with an open house on the evening of October 10 and culminate with a banquet on the evening of October 11.

Program:

Peter Lennie, New York University: "Chasing color signals"

John Maunsell, Baylor College of Medicine: "Advances into the visual cortex"

Daphne Bavelier, University of Rochester: "Imaging the plastic brain"

Richard Aslin, University of Rochester: "Visual development in human infants: Clarity emerges from 40 years of research"

Dana Ballard, University of Rochester: "The Ontogeny of Computer Vision"

David Brainard, University of Pennsylvania: "That was then, this is now: Forty years of color vision"

David Williams, University of Rochester: "There's more to vision than meets the eye"

Registration: $100 USD, includes breakfast, lunch, receptions, and breaks; Banquet, $30 additional

Register online at:

http://www.cvs.rochester.edu/cvs40th_reg.html

For more information, see http://www.cvs.rochester.edu or contact

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GretagMacbeth Completes Acquision of Key Technology From SheLyn, Inc.

April 21, 2003, New Windsor, N.Y. – GretagMacbeth today announced that it has completed the acquisition of color supply chain management technology from SheLyn, Inc.

"This strategic technology acquisition solidifies our offering to the retail supply chain and textile markets, and it expands our Enterprise Color Management (ECM) program in a substantial way," said Tom Vacchiano, GretagMacbeth president and CEO. "It also demonstrates our commitment to grow our business in these important markets."

The SheLyn product is being offered worldwide and includes formulation, quality control and shade sequencing-clustering software applications, and in-line continuous monitoring systems.

"Textile manufacturers and apparel retailers rely on accurate formulation and quality control software throughout their supply chains to ensure color compliance which, in turn, accelerates time to market," said Ken Boyle, vice president and general manager, GretagMacbeth Color and Appearance business unit. "SheLyn's technology is truly best-in-class and, with the addition of Roland Connelly, Ann Laidlaw and Robert Willis to our management team, we are in a very strong position."

Joint CIE/IAU/IDA June 30 Workshop Artificial Sky Glow - Measurement and Control

The workshop consists of two sessions. The first will discuss ways for measuring sky glow together with an analysis of the relative importance of the direct light from luminaires to that of the reflected light from surfaces. The second will discuss the light technical parameters relevant to luminaires in order to minimize their effects on sky glow. A limited number of presentations will be presented in order to introduce the topics, with the majority of time left for open discussion. For further information, contact Nigel Pollard, nigelpollard@neplightingconsultancy.co.uk.

CIE/USA

Commission Internationale de l'Eclairage

is hosting and welcomes everyone to the

"International Lighting Conference"

Theme
Light, Dark Skies, and Space

June 25 - July 2, 2003

This session, hosted by the USA's National Committee (CIE/USA), is the first since 1967 in this country. It includes over 170 presentations on the science and applications of light and lighting. Papers cover lighting research, color, interior and exterior lighting, roadway lighting, photobiology and image technology. Our keynote speaker is **Dr. Harrison Schmitt**, Apollo 17 astronaut, the first scientist to fly in space, and the only scientist to visit the moon. Join us in welcoming the other 40 countries to San Diego. See our website for details and registration forms: *www.cie-usnc.org.*

As a constituent society member of the US National Committee this is your opportunity to lend your expertise in advancing the art and science of lighting.

CORM 2003 Annual Conference

The CORM 2003 Annual Conference, "Optics in the 21st Century: Latest Developments in Optical Measurements, Light Sources and Standards for the Lighting and Telecommunications Industries" will be held in the SLAC auditorium, Stanford Linear Accelerator Center, Stanford University, Menlo Park, California June 18-20, 2003. The CORM Technical Committee Meetings will be held on June 17, 2003 from 8:30 a.m. to 5:00 p.m. at Hyatt Rickey's Hotel with a wine and cheese reception on Tuesday evening. See **www.CORM.org** for more information. This is first CORM Conference to be held on the West Coast and the Conference will feature advances in optical measurements and standards for a variety of industries, applications and emerging technologies as described in the program below.

Wednesday, June 18, 2003

8:30 AM Opening remarks

9:00 AM **Session: LED Measurements,** *Joe Tajnai,* Consultant in Optical Radiation Safety, chair
Katheryn Conway (LED Consulting): "LEDs Leave the Lab: Pragmatic Concerns about Measurement"
Werner Horak (Siemens AG): "Impact of Optical Radiation Safety Standards on LEDs"
Richard Young (Optronic Laboratories Inc.): "Qualifying detectors for LED measurements"
Cameron Miller (NIST): "Development of Photometric LED Standards at NIST"
Gunther Heidel (Osram) "How to Measure Narrow Angle LEDs"

11:30 AM **CORM Annual Business Meeting**

2:00 PM **Session: Sensors/Detectors,** *George Eppeldauer, NIST,* chair
Richard L. Austin (Gamma Scientific): "Performance of New Current-to-Voltage Amplifier Design for NIST Working Standards"
Tom Flournoy (US Army PSL): "Army Primary Standards Laboratory Detector Characterization Measurements"
John H. Lehman (NIST): "Analysis of acoustic noise in pyroelectric-detector based radiometry
George Eppeldauer (NIST): "Spectral Responsivity Calibrations at NIST"

Thursday, June 19, 2003

8:30 AM **Session: Microtechnology,** *Lawrence Muray,* Glimmer Glass Inc., chair
Olav Soolgard (Stanford University): "Tunable Filters Based on Diffractive Optical MEMS"
Joe Kahn (Stanford University): "MEMS for Free-Space Optical Communications"
Steven Rishton: "Widely Tunable Distributed-Feedback Laser Grating Arrays"
Alex Liddle (Lawrence Berkeley Laboratories): "Design Issues in a MEMS-Based Optical Cross-Connect"
Paul Pax (GlimmerGlass networks): "High Precision Tilt Measurement for MEMs Mirrors"

2:00 PM **Session: Optical Measurements and Standards in Biophysics and Medical Science,** *John Libert,* NIST, Chair
Bill Pavlicek (Mayo Clinic): "Electronic Display Acceptance Testing for a State-of-the art Radiology Facility"
Elizabeth Krupinski (University of Arizona): "Medical Image perception: Diagnostic Accuracy Using Digital Displays"
Hans Roehrig (University of Arizona): "Image Quality of LCD Displays for Medical Imaging"
Haisong Liu (University of Rochester): "Optical Measurements in Patient Positioning in Radiation Therapy"

7:00 PM **Franc Grum Memorial Dinner and Lecture,** Guest Speaker: *Dr. Sheldon C Roberts* (one of the founders of Fairchild Semiconductor), "How it All Started in the Silicon Valley"

Friday, June 20, 2003

8:30 AM **Session: Human Interface,** *Janos Schanda,* Veszprem University, chair
Ken Sagawa (Inst. for Human Science and Biomedical Eng.): "Photometry in the Future and the Equivalent Luminance"
Sam Berman (Lawrence Berkely Lab.): "The Illumination Consequences of Rod Activity at Office Light Levels"
W. Thornton (Prime Color Inc.): "Certified Color Matching Functions"
W. Thornton (Prime Color Inc.): "The Prime Colors of Human Vision"
Mark Rhea (Lighting Research Center): "Circadian Photometry"
Liisa Halonen (Helsinki Univ. of Tech.): "The Effects of Light Spectrum on Peripheral Visibility at Mesopic Levels"

2:00 PM **Session: Displays,** *Frank Kenter,* LED Marketing consultant, chair
Janos Schanda (University of Veszprem): Colour Reproduction with Different Types of Projectors
John Libert (NIST): "Precision Measurements of Electronic Displays for Medical Diagnosis
Homer Antoniadis (Osram Opto Semiconductors): OLED Displays
Mark Hodapp (Lumileds Inc.): Non-indicator type LED displays

AIC Color 01 Symposia Videos -- Order Information and Form

All AIC Color 01 meeting symposia were recorded, and videos are now available in NTCS and PAL format VHS tapes. The symposia included in the packages are:

- What is Color?
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- Environmental Color Design
- The Artist and Digital Media
- How is CIE Helping Us Make Color Work?
- What is Color For?
- Color Issues for Digital Archives
- Role of Color in the 3-D World
- How Should We Teach Color?
- Spectral Imaging
- The Future of Color

The videos were digitally mastered and fully edited. They also include important discussions and papers that were NOT included in the AIC Color 01 Proceedings.

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____PAL Video Pkg for Residents of all other countries $160.00

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Cynthia Sturke, ISCC Office Manager

CALENDAR

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

Ms. Cynthia Sturke
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11491 Sunset Hills Road, Reston, VA 20190
703-318-0263 tel 703-318-0514 fax
iscc@compuserve.com **website:** *http://www.iscc.org*

2003

May 3-9	**ASPRS Annual Conference,** Anchorage, AK
May 13-16	**The Digital Photography Conference, PICS 2003,** Hyatt Regency, Rochester, NY. For registration and hotel information, contact The Society for Imaging Science & Technology, 7003 Kilworth Lane, Springfield, VA, USA 22151, Pamela Forness, Program Mgr, 703-642-9090; fax: 703-642-9094, *pics@imaging.org; http://www.imaging.org*
May 20	**CMG Northeastern Regional Meeting** , New York, New York, USA, *www.colormarketing.org*
June 12-13	**CMG's European Meeting** Copenhagen, Denmark, *www.colormarketing.org*
June 16-18	**CMG's Central Regional Meeting** Chicago, Illinois, USA, *www.colormarketing.org*
June 18-20	**CORM Annual Meeting, Optics in the 21st Century,** Standford Linear Accelerator Center, Standford University, Menlo Park, CA, *www.corm.org*
June 23-25	**ASTM E-12 Color and Appearance** Meeting/Housing: San Diego Town and Country Hotel and Convention Center, San Diego, CA In Conj. with: CIE Meeting (Intl Commission on Illumination)
June 25-July 2	**CIE's 25th Session entitled "Light, Dark Skies and Space"** San Diego, CA International Dark-Sky Association, ida@darksky.org or *www.cie-usnc.org,* 520-293-3198, fax 520-293-3192
Aug 3-6	**Illuminating Engineering Society of North America - IESNA Annual Conference,** Chicago, IL. Contact Valerie Landers, IESNA 120 Wall St. 17th Fl, New York, NY 10005, *www.iesna.org*
Aug 4-6	**Midterm Mtg: AIC Color 2003 "Color Communication & Management"** Bangkok, Thailand. Contact: *aran@sc.chula.ac.th*
Sept 8-9	**UMIST Visual Sciences Lab Conference, "LIMITS OF VISION - Space, Time and Colour",** Manchester, United Kingdom, info@limits.org.uk
Sept 9	**Detroit Colour Council Panel Discussion, Instrument Fair and Education Session on Color Measurement of Automotive Parts,** *www.detroitcc.org*
Sept 9-12	**AATCC's 2003 International Conference & Exhibition,** Palmetto Expo Center in Greenville, SC.
Sept 18-19	**CMG's Canadian Regional Meeting** Toronto, Canada, *www.colormarketing.org*
Oct 9-11	**Colour Society of Australia, "Colour Communication 03",** Melbourne Australia. Contact: Derek Grantham, derek@cathaypigments.com.au.
Nov 1-4	**CMG's Fall International Conference San Francisco, Calif.** *www.colormarketing.org*
Nov 6	**Automotive Color and Design over the Decades, Detroit Colour Council Meeting,** *www.detroitcc.org*
Nov 4-7	**Eleventh Color Imaging Conference, Scottsdale AZ,** *www.imaging.org/conferences/cic11/*
Nov 12-14	**FSCTs Annual Meeting and International Coatings Exposition, "Spirit of Innovation,"**Pennsylvania Convention Center, Philadelphia, PA, *www.coatingstech.org*
Nov 24-25	**CIE/USA and CIE/Canada Joint Annual Meeting,** Montreal, Canada

Calendar (Cont)

2004

Jan 12-14	**ASTM E12 Color and Appearance** Meeting/Housing: Embassy Suites Hotel, Ft. Lauderdale, FL, in conj. with D01/G03
Jan 18-24	**Electronic Imaging Conference,** San Jose, CA, *www.electronicimaging.org*
Apr 5-8	**CG:IV 2004 - Second European Conference on Color in Graphics Imaging and Vision,** Technology Center AFIT, Aachen, Germany, *www.imaging.org/conferences/cgiv2004/*
April 18-21	**TAGA/IS&T 2004 San Antonio,** Hyatt Regency Riverwalk Hotel, San Anotnio, TX Contact: TAGA at 585-475-7470, *http://www.taga.org*
May 10-14	**ISCC Annual Meeting and Symposium,** Co-sponsered by ISCC and NIST, National Institute of Standards and Technology, Gaithersburg, MD. ISCC meeting will be May 10 and 11; May 12 will be joint meetings with tour of NIST laboratories; and May 13 and May 14 will be the CORM meeting

International Lighting and Colour Conference

Celebrating the 50th Anniversary of SANCI in Association with the Colour Group of South Africa, the International Lighting and Colour Conference is being held in Cape Town, South Africa, November 2-5, 2003 and will bring together experts to exchange the latest information on the trends and developments in the fields of lighting and color.

The technical program will be conducted in English and divided into three fields: Lighting, Photobiology and Color & Appearance. There will be plenary and parallel sessions, as well as poster presentations.

In addition to the technical program there will be the opportunity to experience Cape Town, a sophisticated city at the gateway to a majestic continent. Also included is an exhibition of leading manufacturers of technical equipment.

For registration or further information please go to the websites www.sanci.co.za or www.colourgroupsa.co.za or contact the conference secretariat: Ms. Martie Cronjé, 37 Wenning Street, 0181 Groenkloof, South Africa, telephone +27 12 460 3719, fax +27 12 460 4264, email drcronje@mweb.co.za.

Publications Available from ISCC Office

Color and Light by Fred W. Billmeyer Jr. & Harry K. Hammond., III. Authorized reprint from: ASTM Manual 17, Copyright 1996, ASTM International, 100 Bar Harbor Dr., W. Con-shohocken, PA 19428 ..... $5 ea or 20 copies/$50.00

Demystifying Color by Bob Chung, 11 pages. Discusses and explains ten myths about color ... $5 ea or 20 copies/$50.00

Proceedings - 9th Congress of the International Colour Association, AIC Color 01 Rochester, Allan Rodrigues, Editor, papers given at technical sessions $75*

*Plus shipping and handling

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The ISCC advertising policy for the ISCC News is as follows: Pre-paid color-related advertising will be accepted 30 days in advance of the publishing date. The rates are:

$ 100	**business card-size ad**
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$ 500	**1/2 page ad**
$1,000	**full page ad**

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All submissions must be in English. Please note that the submission of materials is due the first of each even numbered month. Materials submitted later will be printed in the following issue.

ISCC Sustaining Members

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Ciba Specialty Chemicals	*www.cibasc.com*	302-633-2042
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Labsphere, Inc.	*www.labsphere.com*	603-927-4266
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PPG Industries, Inc.	*www.ppg.com*	724-274-3532
Prime-Color, Inc.	*watprime@hotmail.com*	908-272-5759

ISCC Member Bodies

American Association of Textile Chemists and Colorists (AATCC)
American Society for Testing and Materials International (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)
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Graphic Arts Technical Foundation (GATF)
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)

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