Inter-Society Color Council *News*

Issue 429 Contents

Sep/Oct 2007

President's Column

When I originally sat down to write this column, it was to be about the two strengths of the ISCC that I described in my first column in the 75th Anniversary of the ISCC newsletter last summer. They are the strong spirit of community among ISCC members and the broad scope of their interests in color. Sadly, there is now a third topic for this column, the passing of Ralph Stanziola and Therese Commerford.

It's hard to talk about the strengths of the ISCC without thinking of people like Ralph and Terry who have contributed so much and were a steady and enthusiastic presence at our meetings. The tributes to them in this issue are a reminder of where our strengths ultimately come from.

Our next meeting illustrates one of those strengths, the scope of the color interests brought together under the umbrella of the ISCC and its member bodies. We are joining with one of them, Color Marketing Group (CMG), to sponsor a day-and-a-half-long program on the "The RGB's of Color," covering the emotional impact, sustainability and reproduction of color. Who else but the ISCC, along with a member body like CMG, could host a meeting linking such diverse areas of color? Jim Roberts of BYK-Gardner and Barbara Parker of JDSU - Flex Products Group will chair the meeting next spring, March 28-29, in Montreal. For details, see the Call for Papers that appears later in this newsletter. When I talked about the spirit of community in my first column, I also talked about how the Web and social networking tools present opportunities for this community to express itself and interact in new ways. With this issue of the newsletter, we will take advantage of one of these opportunities with a blog.

Since the Hue Angles column, edited by Mike Brill of Datacolor, debuted in the Nov/Dec 2006 issue of the newsletter, some readers have said how they wanted to comment on its content, but that there wasn't a good way to do it. A reflector was one possibility but a blog seemed like an easier way and one that could extend the reach of the ISCC.

So Dave Wyble, our webmaster, created HueAngles.blogspot.com, which is linked to our web site, www.iscc.org. It is currently configured so that you can comment without having to log in. After you read this month's Hue Angles column on Colors and Contextual Effects and have something to say about it, try using our new Hue Angles blog.

Robert Buckley
Xerox Corporation

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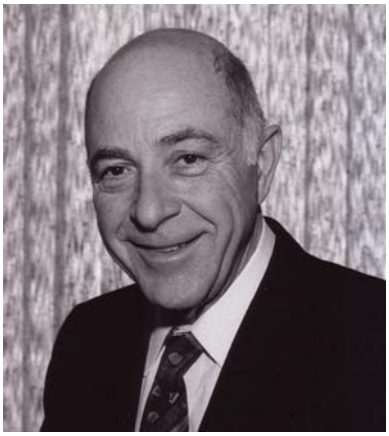
Ralph A. Stanziola

(August 4, 1931 - August 25, 2007)

Ralph A. Stanziola, 76, a long-time consultant and teacher of color technology, died August 25, 2007 at his Flemington NJ residence.



Born in Philadelphia, Ralph received his B.S. degree in Chemistry and Dyeing from the Philadelphia Textile Institute, now Philadelphia University. He resided in Bridgewater, NJ and then Branchburg, NJ before moving to Flemington two years ago.

Color technology was always the center of Ralph's interest. Ralph joined the ISCC in 1962 and was an active member for the rest of his life. He co-chaired several ISCC meetings: the Annual Meeting in Princeton in 1992 that celebrated the 25th anniversary of the International Association of Colour (AIC); the 1994 joint meeting with the Detroit Colour Council; and the 2003 Williamsburg Conference on Industrial Color Problems held at his alma mater, Philadelphia University. He was instrumental in setting up the Education Interest Group, and was the first to chair the Industrial & Applied Color Interest Group. In recognition of these contributions, Ralph received the 2004 Nickerson Service Award, and in 2005 became an Honorary Member of the ISCC.

In his early years, at the Research and Technical Service for the Dyes Department of the American Cyanamid Company, Ralph learned color technology from such pioneers as Orrin W. Pineo and Edward I. Stearns. He next served for nine years as Technical Representative and General Sales Manager for the Davidson & Hemmendinger Company, and later became a sales manager for the Kollmorgen Corporation Color Systems division, which had acquired Davidson and Hemmendinger.

In l970, Ralph co-founded Applied Color Systems, Inc. where he eventually became the Executive Vice-President and Technical Director. In May, l985 Ralph founded Industrial Color Technology, a consulting company under whose auspices he solved many industrial problems involving color control. For the rest of his life, Ralph remained a consultant for ACS (later Datacolor), instructed their Color Technology seminars, and helped to create the first video training series on color technology. Upon Ralph's passing, Datacolor President Terry Downes wrote: "Ralph […] developed much of the know-how used in Datacolor's software today […] We will miss his

presence in the company but his spirit will live on in everything we do."

Ralph held five U.S. patents and authored a large number of technical papers and presentations. His Color Curve System for color communication will be familiar to ISCC members. Similarly, Ralph consulted with the Glad Products Company and helped them develop the now famous "Glad Difference," *Yellow and Blue Make Green*® seal. Less familiar will be his development (with Bob Swain of Chroma Corp.) of a method of using a colored sample to test the wear of a metal piece. The test consists of extruding a molded plastic piece made of component materials of two different colors, and monitoring the color of the mixture. Earlier, Ralph developed the first colorant-dispenser system driven by computer color matching (1979) and patented a Maxwell-disk-based color simulator (1980). He also co-developed an asymmetrical color-tolerancing system using artificial intelligence algorithms (1991), a photonic visual color simulator using LEDs (late 1990s), and a new version of the Color Rule for testing observers and light booths for metamerism (2006).

In 1995, the Technical Association of the Pulp and Paper Industry presented Ralph with their Finest Faculty Award. As a member of the Federation of Societies for Coatings Technology, he received the Armin J. Bruning Award for his outstanding contribution to the science of color in the field of coatings technology. He was also a member of the American Association of Textile Chemists and Colorists, and the Detroit Colour Council.

Ralph always embodied the ISCC goals of advancing color education. His numerous lectures included computer color matching seminars at the Rensselaer Color Measurement Laboratory (Rensselaer Polytechnic Institute) and at the Munsell Color Science Laboratory (Rochester Institute of Technology). More fundamentally, Ralph was a fine human being— willing to talk with and listen to anyone on any subject, full of gentle humor that highlighted his optimism and affirmation of others. The many personal anecdotes he told in his color courses showed a wealth of experience not available in any book. Some urged him to write a book, but he preferred the humbler route of interacting directly with the world and with other people.

Surviving Ralph are Elsie Perantoni Stanziola, his wife of 53 years, his sister Rose Curley, and several children and grandchildren. Memorial contributions may be made in Ralph's memory to Hunterdon Hospice c/o Hunterdon Medical Center, 2100 Wescott Drive, Flemington, NJ, 08877.

Compiled by Michael H. Brill
Datacolor

Final Tributes -- Ralph Stanziola

Ralph Stanziola, one of the founders of Applied Color Systems (ACS) died on August 25, 2007. I feel compelled to share some things I remember about him.

I worked with Ralph from 1987 – 1991 as the project manager for the Industrial Color Technology Videos based on his lectures. I used a video of Ralph teaching the color theory course at ACS to demonstrate the content of the project to potential video producers. As soon as I began playing the video for one of the producers he exclaimed "What a mensch!" Everyone who came in contact with Ralph was touched by his charisma and genuine character.

One of my associates related to me that Ralph had recommended him for a job. When my friend contacted the potential employer to schedule the interview he was told: "No need to interview. If Ralph recommended you, you've got the job. When can you start?"

Little did I know that joining ACS would be a pivotal event in my life. Ralph was the "heart" of ACS and the "heart" of color technology education. He was so approachable and so very generous with his knowledge. Ralph was strong in theory and applications. His depth of knowledge and experience gave him a unique perspective. We could always count on him to come up with an approach to solving any color problem. As I see it now, my career as a color technology educator is a gift to me from Ralph Stanziola.

Ralph's enthusiasm lives on in my life and in the lives of the many people who experienced him as a coach, a mentor, a teacher and a friend. Ralph has left a large hole in the fabric of the color technology community. We all feel the loss of his great spirit.

Margaret Stanish
Manager, Instrumental Color Technology

When you enter "Ralph Stanziola" into Google, it returns pages of web links that chronicle his professional accomplishments in industrial color technology. However, what you might not know is that color technology was actually Ralph's second career. As a young adult, Ralph had a brief stint as a professional baseball player, playing first base for a minor league team in the Philadelphia area.

It didn't take Ralph long to realize it would be more lucrative for him to pursue a different career path. So he cut his baseball career short and went on to study chemistry at Philadelphia College of Textiles and Science, leading him to a distinguished career in color technology. The result as we say, "is history". You can use the web links from your Google search to put together the chronology of that career. But what that search does not capture is his integrity, his humility and his passion.

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A baseball anecdote Ralph shared with me is incredibly revealing of his character. One of the regular opponents, Ralph told me, was a team fielded by a local prison. Following the game Ralph's team dined in the prison cafeteria, and that day they happened to serve one of Ralph's favorite desserts, rice pudding. When Ralph finished his pudding he exclaimed, "That was the best rice pudding I've ever had!" When his team returned to the prison for their next game, Ralph said that while no individual greetings were exchanged when his team moved through the cafeteria line, mysteriously ***two*** dishes of rice pudding were placed on Ralph's tray.

Ralph often told the rice pudding story. I got the feeling that he saw it as an example of the humanity—the decency— that he believed resides in each of us, regardless of our individual shortcomings.

As I've reflected on Ralph's life over the past couple of weeks, I've decided that story is also a testimonial regarding the response of others to Ralph's humanity. He treated both friends and strangers with dignity and respect, and all human beings respond positively to that. Ralph assumed that each of us had a particular talent—a legitimate contribution to make to the community—and he always looked for the talent in every individual he encountered. Once he discovered it he acknowledged it publicly, and continued to encourage and cultivate it on every subsequent encounter. I wouldn't be surprised to learn that he did this for his baseball teammates—and in doing so raised the game of each player.

As a founder of Applied Color Systems, Ralph used his natural leadership skills to raise the game of each employee. He clearly viewed that as the primary responsibility of an employer, and constantly worked toward that end. He personalized his relationship with each of us, identifying our individual strengths and cultivating them. The genuine interest he displayed motivated each of us to feel proud about ourselves. Ralph helped us to stand a little straighter, to try a little harder, to reach a little higher. Through his encouragement each of us enjoyed greater individual achievement than we thought possible. And the collective achievement of the group yielded an extraordinarily successful company, Applied Color Systems, which set the standard of excellence for the field of industrial color technology. It was a privilege and a pleasure to know such an extraordinary man, and to be a part of such an extraordinary organization.

I'll miss you, Ralph…

Kim Galloway
Friend, former employee and lifelong student

Therese Commerford

1929-2007

Ms. Therese R. Commerford was elected as an Honorary Member of the ISCC in 2002. She served as an ISCC Director from 1977 until 1980 and ISCC Secretary from 1982 until 1990. After she completed her tenure as Secretary, that position was split into two positions – Recording Secretary and Membership Secretary. She also served as a delegate from the American Association of Textile Chemists and Colorists (AATCC) to the ISCC Individual Member Group. Ms. Commerford contributed to the work of several ISCC Problems Committees, notably Problem Committee 16 "Standard Methods for Mounting Textile Samples for Colorimetric Measurements," which completed its work in 1968, and Problem Committee 25D "Determination of the Strength of Colorants (Dyes Section) for which she contributed a paper "Difficulties in Preparing Dye Solutions for Accurate Strength Measurements," which appeared in *Textile Chemist and Colorists* ***6***: 14 (1974).

Ms. Commerford worked as a research chemist with the Chemical Technology Team of the Individual Protection Directorate at the U. S. Army Natick Soldier Center, Soldier Biological, Chemical Command (SBCCOM) where she worked on a Joint Service program to provide chemical/biological protective clothing for aircrew personnel. After earning her B. S. degree in chemistry from Lowell Technological Institute (now University of Massachusetts-Lowell), Ms. Commerford began her professional career with the Derby Company in Lawrence, Massachusetts where she spent 27 years. For the majority of those years she served as Supervisor of the Color Laboratory.

Ms. Commerford served as Vice-President of the AATCC, a member of its Executive Committee on Research, a member of AATCC's Technical Committee on Research and a member of its Long-Range Objectives Committee. She was active on AATCC Research Committee RA 50 (Colorfastness to Light) and RA 36 (Color Measurement). She chaired the AATCC 1979 Symposium on Color Science in the Textile Industry held in Charlotte, North Carolina. In addition to the ISCC and AATCC, Ms. Commerford has been a member of the Sigma Xi Honor Society and the Optical Society of America (OSA). She has lectured on color at the color courses sponsored by Clemson University and during workshops on color given by AATCC.

Ellen Carter

CIE Beijing Meeting Report

The 26th Session of the International Commission on Illumination (CIE) was held this past July in Beijing, China. The meeting had two main parts: the conference and the divisional meetings. There were over 770 attendees. The conference opened on July 4 and continued with presentations, poster sessions, and workshops until July 7. The divisional meetings included many technical committee meetings, and meetings of all 7 divisions spread through the days of July 9-11. The fun, cultural activities and networking continued throughout the two weeks, with a culture night, banquet, city bus tour and other activities.

The Opening Ceremony was followed by an invited presentation "A Brighter China and a More Colorful Life" by Zhan Qingxuan. This excellent paper gave an introduction to the significant advances China has made in urban and architectural lighting in recent years, as well as treating the participants to many beautiful images of the China they had come to visit. This also set the trend of starting each day with an invited lecture, then breaking into three parallel sessions for presentations, grouped by Divisions. Thursday's presentations were from Divisions 2, 4 and 8.

Friday's invited lecture was "100 Years of Solid State Electroluminescence, A Challenge for the CIE" by the new Technical Vice President of the CIE, Janos Schanda. Lunch, breaks, and poster periods allowed much time for more personal scientific discussions and workshops brought people from different divisions back to together for unified discussions. Friday's presentations were from Divisions 1, 3, and 5.

Saturday the invited paper, presented by Ken Sagawa, was "Lighting for the Elderly and Visually Impaired." It set the stage for the Division 1, 5, and 6 presentations of that day. One division presentation that I must mention was Prof. Brainard's "Light and Health: Photorecption for biologically, behavioral and therapeutic responses in humans." There were workshops on Color Rendering, Office Lighting and Applications of Photobiology.

After a refreshing tour of the Summer Palace and the Temple of the Sleeping Buddha in the botanical gardens on Sunday, the participants got back to the technical work of the divisions. Division 1 on Color and Vision had 10 technical committees meetings on Monday. Division 2 on Measurement had 12 split between Monday and Tuesday.

Several new technical committees (TCs) and reporterships of the Divisions 1, 2, and 8 meetings were proposed at this session. They are:

R 1.41 (C) Adaptation Transforms Reporter: Boris Oicherman IS. Terms of Reference(TOR): To investigate and report, in one year, on the state-of-the-art of adaptation transforms.

R 1.42 Extensions to CIECAM02 Reporter: Changjun Li. TOR: To evaluate potential additions to CIECAM02 to include: those published in the literature; extension to include unrelated colors, extension of the visual range down to scotopic levels and to liaise with Division 8.

TC 1.70 (C) Metameric samples for indoor daylight evaluation, Chair: Balázs Kranizs (HU). TOR: To investigate the derivation of a set of metameric samples to enable the evaluation of indoor daylight simulators.

TC 1.72 (C) Measurement of Appearance Network - MAp Net, Chair: Pointer GB. TOR: 1)To establish a network of those interested in the measurement of visual appearance The network shall be under the direction and guidance of a group of at least four Technical Leaders (color, gloss, texture each responsible for a particular aspect of the subject). 2) A second Expert Symposium on appearance shall be organized at an appropriate time within the next 4 years. 3) A database of relevant published work shall be maintained. 4) Consideration shall be given to the establishment of separate Technical committees when appropriate.

R 1.43 (V) Standard deviate observer Reporter: Oicherman IS. TOR: To document available databases that could yield a definition of a standard deviate observers.

R 1.44 (V) Limits of normal color vision Reporter: Sharon McFadden (CA). TOR: To review the literature to see what information is available to establish the limits of normal color vision.

R 1.45 (V) Luminous Efficiency Functions Reporter: Nakano JP TOR: To provide definitions and tables of the existing functions $V_{b,point}(l)$, $V_{b,s}(l)$, and Vb,10(l).

TC 1.71 (C) Tristimulus Integration, Chair: Li CN. TOR: To investigate methods for computing weighting tables for the calculation of tristimulus values from abridged data.

R2.xx Measurement of Spectral Properties of Photometers and Colorimeters Reporter: Jiagen Pan CN. TOR: To investigate the measurement conditions for spectral responsivity of colorimeters and photometers with special account for determination of f_1'.

R2.xx Reportership to replace TC2.42 Colorimetric Measurements for visual displays Reporter: Ken Vassie. TOR: To investigate the possibility of joint work on the VESA revision.

TC 8.11 CIECAM02 Mathematics Chair: Li GB. TOR: To investigate the improvements to the CAT02 model to avoid mathematical inconsistencies.

In summary, I want to congratulate Professor Wang Jinsui, Chairman of the Organizing Committee of the 26th Session of CIE and President of China National Committee of CIE on the wonderful event. As he has said, "Beijing, chosen as the Session's venue, is the capital of China with a history of over 3400 years and famous for the Great Wall, the Forbidden City, the Temple of Heaven and many other historical sites and places of interests. Beijing is also the Nation's political and cultural center and international communication hub. Thanks to the nearly 5 years' strenuous efforts in construction and renovation to greet the 2008 Beijing Olympic Games, the ancient capital has emerged as a completely new and dynamic city. We are sure you will be deeply impressed by her beauty, peaceful environment and hospitality and find your short stay in Beijing a very pleasant and memorable one." And I must say he was certainly right.

Ellen C. Carter

HUE ANGLES

(Send contributions to Michael H. Brill, mbrill@datacolor.com)

Colors in the random patterns of autumn leaves are far different from the colors of translucent objects seen through each other—or even paintings of such objects. Here Osvaldo da Pos (a loyal ISCC member from Italy) brings home the puzzles of context versus constancy, and of illusion versus reality.

Colors and Contextual Effects

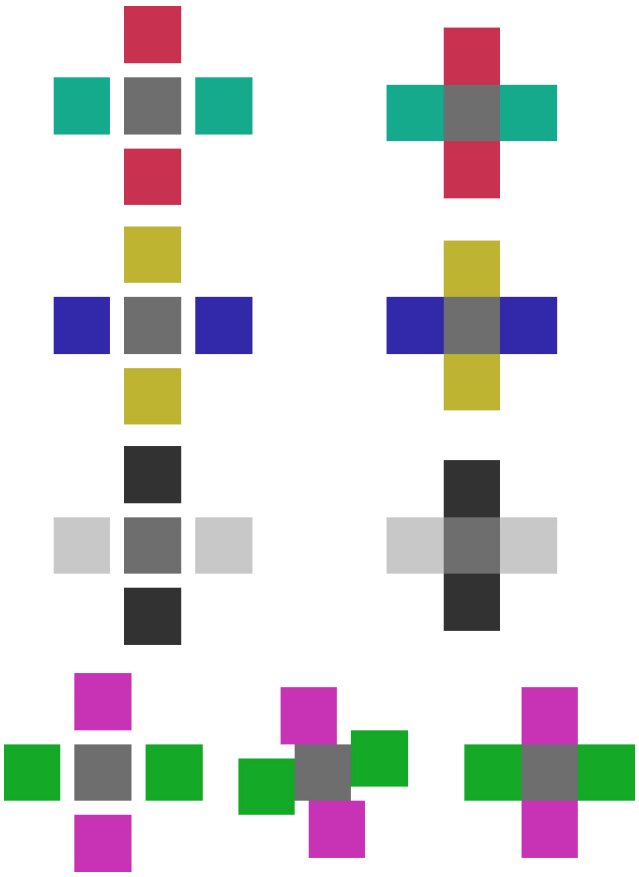
There are two basic convictions about colors: (1) they carry information about the objects they belong to; and (2) their appearance depends on the context of the light, the spatial disposition of nearby objects, and their temporal changes. The two features sometimes strongly conflict. Constancy, whereby the color of an object tends to appear unchanged although environmental factors vary, vies with dependence on context. It is not rare for contextual effects to be considered illusory, although their occurrence obeys established rules.

The figures here exemplify how a visual illusion can be analyzed. Why does the central square, always the same, appear different when the surroundings are varied?

Striking changes occur when the lateral squares start in contact with the central one, and then a small misalignment or gap between them produces a completely different appearance. When there is no gap or misalignment, a cross is seen, composed of one strip transparent over the other: Two superimposed colors are seen in the grey square at the same time and in the same direction of sight, one in front and the other behind and through the first.

The two colors seen in the central grey square depend on the colors of the two adjacent squares. Already Helmholtz [1] tried to explain why those specific two colors were seen: it depended on the knowledge of the laws governing additive color mixtures, which, in the case of complementary colors, give an achromatic result. Therefore the colors of the adjacent squares are perceived in the central grey because their fusion precisely gives rise to that particular grey. Hering gave a radically different explanation involving no cognitive activity, but only physiological interactions. The two adjacent colors induce their complements in the grey area, so both the colors are visible in that grey square, although in different parts. Nevertheless those two weak colors can spread inside the square and completely characterize it, as only the sides can limit their spreading. Accordingly the central square appears transparent because in it both the colors of the back strip and of the front one are simultaneously perceivable (this would ultimately be the basic definition of transparency/translucency).

Although cognitive science still follows Helmholtz, the current understanding of the colored transparency (or translucency) effect does not resort to higher level "knowledge," but rather to physiological processes (based on cone excitation ratios [2], physical principles (based on Kubelka-Munk rules [3]; or on spectral filtration [4]), psycho-physical models (based on color convergence [5], [6]), phenomenological models (based on color similarity [7], [8]), X junctions [9],[10]).



(These figures can be seen in color on the ISCC web site at www.iscc.org.)

Even today we do not share a unique explanation of why the central grey square appears so different in different situations, so most people still speak of perceived translucency as an illusion, implicitly assuming that when a good explanation is achieved no illusion will exist anymore. A reasonable objection would be that, even when we reach a convincing explanation, still we would remain amused in seeing that the same grey square appears so different in different contextual conditions; the illusory aspect would remain intact, despite the scientific explanation.

[1] Helmholtz H. von, 1866 *Handbuch der Physiologischen Optik*, Leipzig: Voss
[2] Ripamonti C., Westland S., da Pos O. 2004 Conditions for perceptual transparency. *Journal of Electronic Imaging*. **13**, pp. 29-35
[3] Brill M. H. 1976 Physical foundation of the perception of achromatic translucency. *MIT Research Laboratory of Electronics Progress Reports No. **117*** January, pp. 315-320
[4] Beck J. 1978 Additive and subtractive color mixture in color transparency, *Perception & Psychophysics*, **23,** 256 - 267.
[5] Metelli F. 1974, The Perception of Transparency, *Scientific American*, **230**, (16), pp. 90-96
[6] Chen, V. J., & D'Zmura, M. 1998 Test of a convergence model for color transparency perception. *Perception*, **27**, 595-608.
[7] Hering E., Über die Theorie des simultanen Contrastes von Helmholtz. Vierte Mitteilung. Die subjective "Trennung der Lichtes in zwei complementare Portionen" In: *Wissenschaftliche Abhandlungen*; hrsg. von der Sachsischen Akademie der Wissenschaften zu Leipzig, Leipzig : G. Thieme, n. [57], pp. 1- 11)
[8] Da Pos O. 1989-1991 *Trasparenze. Transparency*. Icone: Milano
[9] Watanabe T., Cavanagh P. 1993 Transparent surfaces defined by implicit X- junctions. Vision Research 33, 2339-2346
[10] Masin S.C. 2006 Test of models of achromatic transparency. Perception 35(12), 1611-1624.

Osvaldo da Pos,
University of Padua, Italy

Call for Contributions: AIC Competition for Best Color Illusion

Visual illusions are so attractive that nowadays many people spend a lot of time studying them and inventing new ones. The International Association of Colour (AIC) has within its scopes the task of spreading and promoting the study of color in all its multi-facet aspects. Among the visual illusions in general, color illusions play a specific role as color is the core of all vision.

In the light of these considerations the AIC has organized the first competition for the best color illusion of the year. Contributions, either unpublished or published in 2007, along with a text about their rationale, are to be sent to info@aic2008.org, before February 29th, 2008. The contributed illusions will be judged based on originality, charm, conspicuousness, and scientific relevance.

Contributors are also encouraged to submit a paper/poster for the AIC Meeting by November 1, 2007. See www.aic2008.org for abstract form and details.

At the June 15-18, 2008 AIC Interim Meeting in Stockholm, authors of the winning three illusions will be presented gifts and invited to give a presentation about their work (if it is not included in the meeting program).

Inter-Society Color Council 2008 Annual Meeting Initial Announcement September 14 – 16, 2008 Baltimore, Maryland

The Inter-Society Color Council (ISCC) will hold its 2008 Annual Meeting in Baltimore, Maryland from Sunday, September 14 through Tuesday, September 16, 2008. Baltimore is a historic city known for its Inner Harbor, National Aquarium, and the resting place of Edgar Allen Poe. General Chairs Carl Andersen with the Federal Highway Administration and Cameron Miller with the National Institute of Standard and Technology will be organizing the meeting.

Papers are being accepted for Interest Group I on Basic and Applied Color Research, Interest Group II on Industrial Applications of Color, and Interest Group III on Art, Design, and Psychology to be presented on Sunday and Monday. On Tuesday September 16, ISCC will sponsor a "Safety Color Expert Symposium." This one day event will cover all facets of safety colors including the perception, measurement, and standardization of regular, fluorescent and photoluminescent materials, and safety light signaling. Authors are invited to submit abstracts to either the Interest Group Chairs or the General Chairs. Paper submission contact information and author instructions will be available on the 2008 Annual Meeting page of the ISCC website at www.iscc.org. Submissions are due by May 31, 2008.

A poster session will be held covering general Interest Group topics and state-of-the-art safety color research. The poster session provides an excellent opportunity to meet and discuss innovative safety color work with other colleagues attending the ISCC Annual Meeting. During the poster session exhibitor space will be available for product and instrument manufacturers on a first come, first served basis. For details and reservations contact Cameron Miller, c.miller@nist.gov or 301-975-4713.

The ISCC Education Committee is providing a limited number of Student Travel Grants to assist students traveling to the ISCC 2008 Annual Meeting. Students should contact the ISCC office for information.

If you have questions, please contact Cynthia Sturke at the ISCC Office, 11491 Sunset Hills Road, Reston, VA 20190, 703-318-0263; fax 703-318-0514; email: isccoffice@cs.com.

Please monitor the ISCC web site for the latest information with regard to the 2008 annual meeting. The site will be updated as soon as new information becomes available.

Color Research and Application In This Issue, October 2007

The concept and theory of low-dimensional spectral imaging has been established for some time. Our first two articles are additions to this field of work. In recent years Prof. Roy Berns' group at Munsell Color Science Laboratory (MCSL) at Rochester Institute of Technology built systems and methods to capture spectral images using trichromatic cameras. In "Image-Based Spectral Reflectance Reconstruction Using the Matrix R Method" Yonghui Zhou and Roy S. Berns propose a new method for reconstruction of the spectra of each pixel in the image. These spectra are constructed from information of lower dimension than the number of measurement intervals in the spectrum. The authors transform from RGB to CIE tristimulus values by conventional means with explicit control over the linearization of the digital counts along the way. Then they calculate the fundamental stimulus from that data by matrix R methods. By using the camera on a multi-target image checker with known reflectances, the authors are able to establish the spectra transformation between digital count and percent reflectance. By adding the metameric black of the digital count to the fundamental stimulus of the linearized digital count, the authors obtain a spectrum of higher fidelity with the measured spectrum than would have been obtained using conventional means.

The MCSL systems were applied primarily to the documentation of cultural heritage including artist's pigment spectral estimation where the universe of spectral properties is well defined and imaging performed under very controlled museum photographic studio environment. In the next article Eva M. Valero, Juan L. Nievas, Sérgio Nascimento, Kinjiro Amano, and David Foster present a different application of low-dimensional spectral estimation. "Recovering Spectral Data from Natural Scenes with an RGB Digital Camera" describes the use of least squares to recover the spectra of natural scenes using an RGB camera with added filters. In this simulation work of spectral imaging, the authors use a RGB camera with few broad band colored filters to capture spectral images. By introducing a "direct mapping method" they were able to reach quite good spectral accuracy in the simulations. It is interesting to see this type of spectral estimation techniques applied to more general natural scenes.

"On a clear day you can see for ever" or so the song goes. One is likely to agree that on certain occasions, there is a special clarity about the objects in a scene or painting that strikes us as something special. The impression of visual clarity probably results from a contrast between objects resulting from the illumination of the scene. This is an important characteristic of the light source. However, the current color rendering index does not adequately predict visual clarity. Kenjiro Hashimoto, Tadashi Yano, Masanori Shimizu, and Yoshinobu Nayatani present "A New Method for Specifying Color Rendering of Light Sources" in the next article in this issue. For those sources examined so far, the new FCI or "feeling of contrast" index that is derived from a transformation of a gamut area of a specially selected four color set, correlates well with the luminance ratio for sources which produce equal visual clarity.

In scenes with mixed illumination, an observer can note that inversions can occur. For example, the brightness of an object color with low lightness under high illuminance level may be perceived higher than that of another object color with high lightness under low illuminance level. Similarly the colorfulness of object color with low chroma under high illuminance level is perceived higher than that of another object color with high chroma under low illuminance level. Our next article contains two color figures that should help the reader understand the differences in concept between brightness and lightness, and also between colorfulness and chroma. In particular, the concept of colorfulness is important, but difficult to understand. Do not miss "On Color Appearance of Object Colors under Non-uniform Illumination and Its Complexity" by Yoshinobu Nayatani and Hideki Sakai.

Our next article is on the "Prediction of Spectral Reflectance Factor Distribution of Color-Shift Paint." For many products we measure color at one specific geometry. However, we are all familiar with gonioapparent materials that change color with changes in the illumination or viewing angles. Standardizing groups such as ASTM International have struggled to write procedures that will successfully describe or measure for control purposes the color of these materials. For example ASTM E-2194 recommends the use of three geometries for metallic-flake pigmented materials. Materials that include interference pigments, require even more measurement geometries. Atsushi Takagi and Shinsuke Sato from Toyota Motor Corporation teamed with Gorow Baba from Murakami Color Research Laboratory to look at what they call "a jewel beetle" (a car) to determine how many measurement points would be necessary to characterize its color. Readers will be pleased to find that they were able to reduce the measurements from over 48,000 (requiring 16 days to measure) to less than 1500 (requiring only 4 hours of measurements).

Our next three articles all deal with color reproduction on output devices. The first article deals with the color gamut of a device. Knowing the color gamut of the output device will help the user determine whether a desired color can be printed or displayed accurately, or whether it will be necessary to do some type of mapping to simulate the color. The color gamut information may be represented in several ways. In "Generic Device Color

Gamut Description" Xinfeng Zhao describes two methods for device color gamut representation: one is a gamut surface description, and the other is for gamut volume description. Both methods are able to combine analytical and geometrical approaches in order to achieve higher accuracy. For printers, total ink coverage is an important parameter that should be considered in future work.

Our next article brings us full circle by using the cameras such as those discussed in the first two articles, and going to displayed images on a CRT. Ali Yoonessi and Frederick A. A. Kingdom discuss the problem of displaying accurately colors from images taken by a calibrated digital camera. In "Faithful Representation of Colours on a CRT Monitor," they compared three approaches: displaying raw data, transforming the image via CIE common frame of reference, and an iterative approach that minimized the difference between the input and output image RGB values. They found that the iterative approach produces the most faithful representation of the colors of the original image.

We often talk about CRTs, LCDs, OLEDs and other displays, however, our next article gives an example of a very different type of display. In "Diffractive CIE 1931 Chromaticity Diagram" Joni Orava, Timo Jaaskelainen, Jussi Parkkinen, and Veli-Pekka Leppanen describe how a unique chromaticity diagram is generated by utilizing surface relief gratings on a plastic sample. When the sample is properly illuminated it will reflect the CIE chromaticity diagram with exact colors and a large gamut.

Our last article looks at the group of pigments identified as verdigris. Verdigris are green or bluish-green pigments (all copper salts), which were used from Antiquity to the late 18th century. They were used both in easel painting, and for murals. José Manuel De La Roja, Margarita San Andrés, Natalia Sancho Cubino, and Sonia Santos Gómez participated in a project in which they reproduced a number of the recipes found in historic literature and characterized the products analytically and morphologically. They also studied the application of these pigments using different binders. These authors report their findings in "Variations in the Colorimetric Characteristics of Verdigris Pictorial Films Depending on the Process Used to Produce the Pigment and the Type of Binding Agent Used in Applying It."

In the Reviews Section, Maria Nadal discusses *Diccionario akal del Color.* In addition, I want to note that Ralph Pridmore has a brief Erratum to his article "Effects of Luminance, Wavelength and Purity on the Color Attributes" which was published in Issue #3 of this year. Also we have an announcement about the Fogra Color Management Symposium.

Ellen Carter, Editor,
Color Research and Application

Call For Papers
The "RGB's" of Color

A Joint ISCC/CMG Conference
Le Centre Sheraton,
Montreal, Canada
March 28-29, 2008

Jim Roberts and Barbara Parker, Co-Chairs of this event, are pleased to announce a special joint meeting between the ISCC and Color Marketing Group. This special one and a half day program will explore the "RGB's" of Color. Of course, having a marketing slant, the RGB we'll be talking about may not be what you're thinking.

"Are you seeing Red?" The first part of the program will explore the emotion of color. We will explore how colors are chosen to cause emotion or feelings, and how color influences everything in your daily life.

"How Green is my color?" The second part of the program will investigate sustainability on developing, specifying and using color. There has been a lot of talk about making environmentally friendly color, but is it more than just talk?

"Is this the Blue you wanted?" will explore the influences of light and media on color reproduction and the way we see color. Speakers will discuss technologies to better reproduce color in various formats: on-screen, printed, complex and flat colors.

Jim and Barbara request abstracts for papers as soon as possible, with a deadline of January 15, 2008. We anticipate a very exciting meeting, but we need your help to pull it all together. Please submit your paper ideas or a one page abstract to Jim.Roberts@altana.com or Barbara.Parker@JDSU.com.

Call for Papers: CGIV 2008

The Society for Imaging Science and Technology (IS&T), an ISCC member body, is pleased to announce that the 4th European Conference on Colour in Graphics, Imaging, and Vision (CGIV2008) will be held June 9-13, 2008, at the Universitat Politècnica de Catalunya in Terrassa, Spain. The 10th International Symposium on Multispectral Colour Science (MCS'08) will be held in conjunction with CGIV2008.

Researchers working in color-related fields are invited to submit abstracts by November 15, 2007 for presentations at the meeting.

CGIV2008 will cover topics related to colour and visual information, while MCS will focus on multispectral colour science. Please see www.imaging.org/conferences/cgiv2008/ for a detailed listing of topics and additional information related to the event.

CALENDAR

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

Ms. Cynthia Sturke
ISCC Office
11491 Sunset Hills Road, Reston, VA 20190
703-318-0263 tel 703-318-0514 fax
isccoffice@cs.com **website:** www.iscc.org

2007

Oct 28-Nov 1	**CRSS/ASPRS 2007 Specialty Conference**, "Our Common Borders - Safety, Security and the Environment through Remote Sensing,"OTTAWA, CANADA, 301-493-0290 www.asprs.org/ottawa07/index.html
Nov 5-9	**IS&T/SID's Fifteenth Color Imaging Conference**, Hotel Albuquerque, Albuquerque, NM, 703-642-9090, www.imaging.org/conferences/cic15/

2008

Jan 23-25	**ASTM E12 Color and Appearance**, Embassy Suites Hotel; Ft. Lauderdale, FL, www.astm.org
Jan 26-31	**19th Annual Electronic Imaging Symposium,** IS&T and SPIE, San Jose, CA, 703-642-9090, electronicimaging.org
Mar 16-10	**Biomedical Optics (BIOMED),** Collocated with: Digital Holography and Three-Dimensional Imaging (DH) and Laser Applications to Chemical, Security and Environmental Analysis (LACSEA), Hilton St. Petersburg Bayfront, St. Petersburg, Florida, USA, 202-416-1907, www.osa.org/meetings/topicalmeetings/biomed/
Mar 16-19	**TAGA 2008,** Technical Association of Graphic Arts, Sheraton Fisherman's Wharf Hotel, San Francisco, California, www.gain.net/eweb/
Mar 28-29	**ISCC/CMG Symposium, "The RGBs of Color,"** Montreal, Quebec, Canada, 703-318-0263, isccoffice@cs.com, www.iscc.org, or jgibson@colormarketing.org, www.colormarketing.org
Apr 27-May 2	**2008 ASPRS Annual Conference,** The Imaging and Geospatial Information Society, Oregon Convention Center, Doubletree Hotel Lloyd Center, Portland, **Oregon, 301-493-0290,** www.asprs.org/
May 4-6	**SPE ANTEC 2008,** Society of Plastic Engineers, Color and Appearance Division, Milwaulkee, WI, www.4spe.org/conf/antec08/
May 12-15	**CPMA's 2008 International Color Pigments Conference,** Lincolnshire Marriott Resort, Lincolnshire, IL, www.pigments.org/
May 18-23	**SID 2008**, Los Angeles, CA, www.sid.org/conf/sid2008/sid2008.html
Jun 9-Jun 13	**CGIV 2008: IS&T's Fourth European Conference on Color in Graphics, Imaging and Vision,** Terassa, Spain, 703-642-9090, www.imaging.org/conferences/
Jun 10-13	**CGIV 2008: IS&T's Fourth European Conference on Color in Graphics**, Imaging and Vision Terassa, Spain, 703-642-9090, www.imaging.org/conferences

2008, Continued

Jun 15-18	**AIC Interim Meeting, Colour – Effects and Affect**, in Stockholm, Sweden, Swedish Colour Centre Foundation, Contact: Berit Bergström, berit.bergstrom@ncscolour.com, www.aic2008.org
Jun 24-27	**Archiving 2008**, Society for Science and Technology, Bern, Switzerland 703-642-9090, www.imaging.org/conferences/
Jun 25-27	**ASTM E12 Color and Appearance Meeting**, Adams Mark; Denver, CO www.astm.org
Sep 14-16	**Inter-Society Color Council 2008 Annual Meeting**, Baltimore, Maryland, 703-318-0263, www.iscc.org

2009

Sept 27-Oct 2	**AIC 11th Congress,** Sydney, Australia, Organizer: Colour Society of Australia, Contact: Nick Harkness, www.aic2009.org

Publications Available from ISCC Office

NEW PUBLICATION AVAILABLE:
ISCC 76th Annual Meeting Program and Abstracts, ISBN 978-1-4243-4273-0 $25.00*

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. Conshohocken, 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

ISCC 75th Anniversary Commemorative CD and Pin $30*

Guide to Material Standards and Their Use in Color Measurement (ISCC TR-2003-1) $50*

*Plus shipping and handling

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All submissions must be in English. Please submit materials by the first of each even numbered month. Materials submitted later may be printed in the following issue.

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Color Marketing Group (CMG)
Color Pigments Manufacturing Association (CPMA)
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Detroit Colour Council (DCC)
Federation of Societies for Coatings Technology (FSCT)
Gemological Institute of America (GIA)
Graphic Arts Technical Foundation (GATF)
Illumination Engineering Society of N. America (IESNA)
International Color Consortium (ICC)
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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