

# Inter-Society Color Council *News*

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## FROM THE PRESIDENT'S DESK

### ELLEN CARTER

The period between this and the last newsletter has been a busy time for the ISCC. Our annual meeting was held for the first time ever in the Fall. Just before the annual meeting, we also held our third and final board meeting of 1997. Let me report on several of the activities.

First, I want to thank Gary Beebe for all his untiring efforts as Chair of the Annual Meeting. The ISCC 66th Annual Meeting was a great success from Sunday's opening registration complete with sports bags to take to the Oriole's baseball game to Wednesday's the closing lectures of the Color and Appearance Division RETEC. The presentations were lively, the fellowship merry, and many special moments for all. Thank you for a job well done, Gary.

The annual meeting marks the time for the changing of the guard. I want to thank the three outgoing directors: Michael A. Hammel of Hammel and Company, Richard W. Riffel of Hunter Associates Laboratory, and William S. Vogel of C. H. Patrick Company. Each one has made major contributions of the ISCC, and we are all indebted to them. Please welcome our new directors, who will serve terms from 1997 to the new millennium; they are Shashi B. Caan of Gensler Associates & Architects, David Spooner of rhoMetrics, Inc., and Joanne Swinkels of National Research Council of Canada. You can get to know them better in other articles in this newsletter.

I also want to congratulate and thank the two award winners; Ann Laidlaw, who received the Nickerson Award, and Henry Hemmendinger, who received the Godlove Award. They have both been inspirations to me personally. I was very pleased that four members of the Godlove family could be present at the ISCC luncheon. The presence of Terry Godlove and his wife Dorothy and two children Terry Jr. and Karen made the ceremony even more special.

At the Board of Directors meeting there were several items of importance to report. First, is that after three years of holding the dues even at \$45/yr. it will be necessary to increase the annual dues \$50 for the 1998 year. The dues are the primary source of funds for the newsletter and we want to continue its production without any decrease in quality.

The second item is that a Long Range Planning Weekend will be held in May of 1998 to examine the goals, organization, and direction of the ISCC for the new millennium. Between

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now and May every member will receive a survey that we hope you will take time to fill out and return. It will be organized and run by the Individual Member Group. Also, you will hear more specifically about the meeting in upcoming issues of the newsletter, so please watch your mail.

Let me close by reminding you of some important dates. Join us at the Williamsburg Conference on Color and Design February 22,24, 1998. Your registration form is on the poster enclosed with this newsletter. Also, mark your calendars for the 1998 Annual Meeting to be held at the same hotel in Baltimore as this year's meeting October 2-4, 1998. On the Sunday of that meeting in the Convention Center, there will be a joint symposium with the Color and Vision Section of the Optical Society of America, who is also meeting in Baltimore the following week.

*Ellen Carter*

## GODLOVE AWARD CITATION

**ISCC Annual Meeting,  
Baltimore, MD, Sept. 15, 1997**

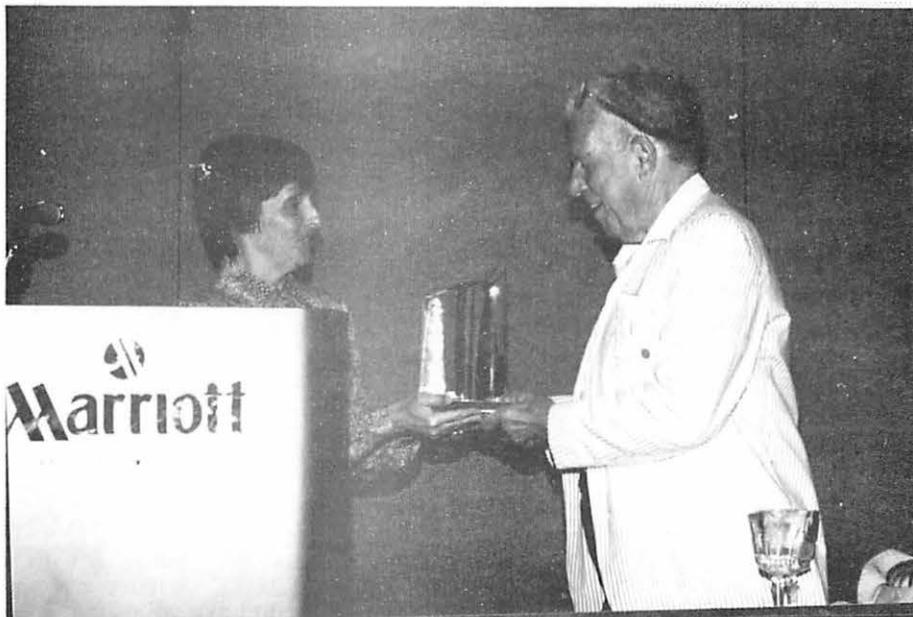
ROY S. BERNS

When I was nearing the completion of my doctoral degree in color science, I had a recurring day dream. My dream was that Henry Hemmendinger would hire me to write up all of the research that was running around in his head. I never told anybody about my day dream, especially since with every rewrite of my dissertation, I was losing confidence as a writer. It seemed that with every research idea I had, or computation I had performed, Henry had been there, done it, and so on.

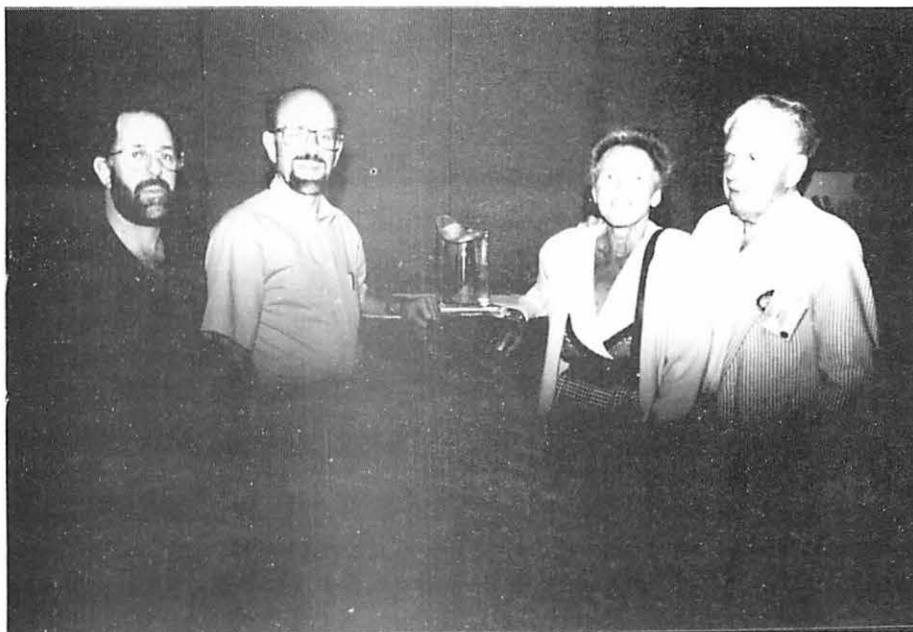
The first time I heard of Henry Hemmendinger was when I overheard a conversation in the Rensselaer Color Measurement Laboratory between several of Fred Billmeyer's graduate students. Apparently, pronouncing Hemmendinger with a South American accent was rather challenging and

amusing. In time, I found out that this was an important skill to have, equal to matrix algebra. There were so many occasions to invoke the word Hemmendinger. At the Munsell Color

contributions of I. H. Godlove. Interestingly, Dr. Hemmendinger relates quite closely. I looked at the Journal of the Optical Society of America's cumulative index between



*Dr. Hemmendinger receiving the Godlove Award from Dr. E. Carter*



*Henry Hemmendinger with the Godlove Award; from left, Mark Hemmendinger, David Hemmendinger, Sylvia Crane, and Henry Hemmendinger.*

Science Laboratory, one only has to be able to spell Hemmendinger to graduate; pronunciation is optional.

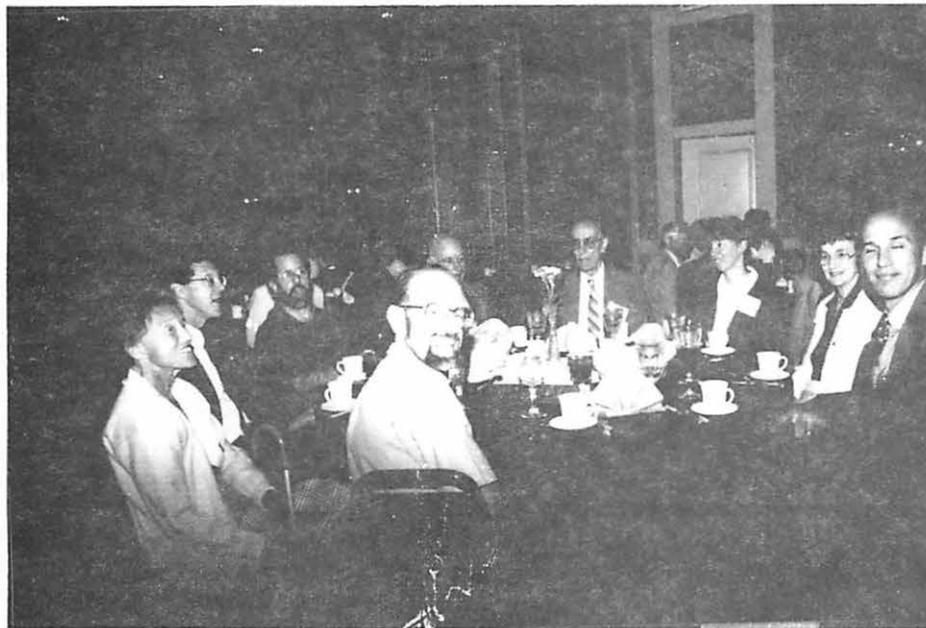
The Godlove award is given for outstanding lifetime contribution to the field of color. It is not necessary that the recipient relate to the scientific

1917 and 1950 for some evidence. During the late 1920's and early 1930's, Dr. Godlove co-authored a number of papers describing the development of the 1929 Munsell Book of Color. Henry, along with Hugh Davidson, produced the glossy edition of the Munsell Book

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*Dr. Henry Hemmendinger with the Godlove family; from Left, Terry Godlove, Dorothy Godlove, Henry Hemmendinger, Karen Godlove and Terry Godlove Jr.*



*During the awards' luncheon; from front clockwise, David Hemmendinger, Sylvia Crane, Tom Crane, Mark Hemmendinger, Ralph Stanziola, Terry Godlove, Karen Godlove, Dorothy Godlove and Terry Godlove Jr.*

of Color during the 1950's. During the 1940's, Dr. Godlove presented papers at the Annual OSA meetings about spectrophotometry and comparisons between it and the human observer. Accurate spectrophotometry is, and has always been a passion for Henry. Also during the 1940's Godlove was very interested in color difference equations. During the 1970's Henry was similarly

smitten. Clearly, both scientists have contributed enormously to color science and technology. It's fitting that Drs. Hemmendinger and Godlove be linked, formally, through the Godlove Award.

I would like to summarize some of Henry Hemmendinger's many accomplishments:

In one word, metamerism. Recall

that metamerisms are stimuli with different spectral properties that match for a given observer. The stimuli can be lights or illuminated objects. Henry has made significant use of metameric stimuli for two applications. The first is to demonstrate the enormously wide range of color vision among observers with so-called normal color vision. Perhaps you have heard of the Davidson and Hemmendinger Color Rule. It is composed of two scales of paint mixtures that are adjusted to make an individual color match. By evaluating the match points, it is easy to demonstrate differences among individuals. These devices are not trivial to produce. A deep understanding of pigments, curve shapes, lighting, and metamerism is required to produce color rules with sufficient sensitivity. My first visit to a CIE technical meeting was in Paris during 1985. The observer metamerism technical committee was close to completing their terms of references. I remember the heated discussions about the D&H rule and quantifying observer metamerism. I recall that Henry was at odds with the majority view concerning the CIE proposed test method to assess the extent of observer metamerism. Given that the method has been in place since 1989 and have never seen it in commercial software implies that Henry's opinions were probably correct.

Henry recognized that a spectrophotometer that has wavelength error is similar to observer metamerism where the color matching functions are shifted in wavelength. From this concept, Henry introduced metameric pairs into the Collaborative Testing Service's color samples. Metameric pairs with sufficient spectral dissimilarity are powerful tools to evaluate wavelength in color measuring instruments.

Those of you that have spent at least ten minutes with Henry know that he has a passion for accuracy in spectrophotometry. This includes methods of evaluating accuracy, developing standard reference

*(Continued on Pg 16)*

## HENRY'S NEW FACE



### A Poem By Michael H. Brill

Henry's new face is similar to his old one.  
 Midst his ninth decade he saw his family's health fail,  
 Yet still he moved slate table tops and tilled his back yard.  
 Scientist ever, he prepared his career award speech,  
 But still he grieved for his family,  
 Acutely recalling the last days of his first wife.

Suddenly Henry found himself in the hospital,  
 He ordered a basin of water and a straight razor.  
 With clinical care he shaved off his beard of 25 years,  
 Maybe, to survey the stroke's damage,  
 Maybe just to see his own face again before he died.

Henry left the hospital after five days,  
 Cooked me dinner at his house to celebrate,  
 And argued a scientific detail I'd forgotten...  
 His strength continues to rally; there is hope in the darkest corner.  
 Henry has a new face, but it is similar to his old one.

## RESPONSE OF HENRY HEMMENDINGER UPON THE GRANTING OF THE GODLOVE AWARD, 15 SEPTEMBER 1997

It is with great pleasure and gratitude that I appear before you as recipient of the Godlove award. I take particular pleasure in recalling my association in colorimetry with Dr. Godlove, as well as with Margaret Godlove. I. H. Godlove was my first mentor in colorimetry, when we met in 1946, and Margaret Godlove played a major role at Davidson and Hemmendinger in the production of the Munsell renotation album. I believe I am the oldest person to have had the opportunity to respond to the Godlove award, and I would accordingly like to share with you one theme which has coursed through a half-century of participation in colorimetry.

Specially, I would like to discuss the relationship between two approaches to color description. One approach concentrates on the three stimuli resulting from

the photochemical responses of the visual pigments in the retinal cones. The second approach concentrates on the perceptions generated by these stimuli. The latter traces to Hering's 1878 speculations on an opponents-color process, whereby red and green perceptions were believed to oppose one another, as were also yellow and blue perceptions. I will denote the first concept as the approach of physicists, or of tristimulists, and the second as the approach of psychologists, or more specially of perceptionists. It has always puzzled me that these two groups exhibited for decades a profound antagonism to one another, an attitude which in my opinion inhibited the development of colorimetry.

The battle, as I envision it, between the tristimulists and the perceptionists is incompletely recorded in the written word, and I have sometimes wondered whether their presumed antagonism is the result of my imagination. My doubts were dispelled last year by the publication of Kaiser and Boynton of a new edition of Boynton's *Human Color Vision*, from which I quote as follows:

"Opponent-color and trichromatic theory competed for along time. What is interesting is that there should have been a competition at all. In his *Outlines of a Theory of the Light Sense* (translated by Hurvich and Jameson, 1964) Hering . . . agreed with Aubert that these two theories co-exist. . . The relevant quotation from Aubert is as follows:

. . . the opponent-colors theory and the Young-Helmholtz three color theory 'could, with some modifications very well exist side by side if one strictly distinguished between the *process of excitation and the process of sensation*', and used the three-color theory for the former . . . (and the opponent-colors theory) for the latter."

In the introduction to the 1953 publication of *The Science of Color* by the Committee on Colorimetry of the Optical Society of America, Loyd A. Jones discusses the implications of excitation and of sensation. However,

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in my experience it was about 1970 before the opinions of Hering and Aubert cited above were accepted by colorimetrists. I would like to discuss the implications of this century-long delay on the quantitative evaluation of color-difference.

As we consider the meaning of any color-difference evaluation, it is clear that it must constitute a description of a "perception", not a stimulus, and according to modern understanding must therefore incorporate the implications of opponency. In the numerous early proposals of equations for color difference, which were largely the work of physicists, we rarely find any mention of opponency. There were exceptions: In 1923, E. Q. Adams of the General Electric Company referred to Hering's hypothesis, as did Judd in his 1932 publication on *Chromaticity Sensibility to Stimulus Differences*. He concluded, however, that his empirical expressions for chromaticity sensibility did not lead to an explicit validation of either a three-components theory of vision or an opponents-color theory (which is not surprising, since they are now seen mutually compatible). In the 1940s, Hunter introduced L, a, b scales which incorporated the concept of opponency, and in the following decade Jameson and Hurvich described details of its role in understanding our perceptions. Nonetheless, many physicists continued their rejection of opponency.

I believe that we can find an explicit introduction of opponency in modern color-difference usage. How did it get there?

In 1942, E. Q. Adams proposed the color-difference equation which is the most important predecessor of modern equations. Adams based his proposal on the Munsell Value scale, which is of course a concept of our perceptions. Adams recognized that the colorimetric stimuli did not provide an appropriate scaling of perceptions. In place of the X, Y, and Z stimuli, he used the corresponding Value functions  $V_x$ ,  $V_y$ , and  $V_z$ , and sought functions of these quantities which describe the perceived

location of a color in the (a,b) plane of chromaticness. In this way he arrived empirically at the difference functions  $(a \mu V_x - V_y)$  and  $(b \mu V_z - V_y)$ . With the introduction of multiplying constants for 'a' and 'b', this leads to the use of (a,b) as chromaticness coordinates for the red-green and yellow-blue directions in color space. I conclude that either Adams had an unusual perspicacity for the implications of numerical color description, or that his approach as an empirical physicist led him to the implicit rediscovery of the concept of opponency. Adams' proposal has survived intact in most widely used modern expressions of color difference. In the 1940's, Dorothy Nickerson assigned values of the constants of the Adams equation which were consistent with prevailing industrial practice in color-difference evaluation; the resulting equations are the Adams-Nickerson, or AN40, equations. Leo Glasser and his colleagues at Dupont showed that a cube-root function provided good agreement with the perceived lightness function. This proposal was accepted as a useful simplification by the CIE in the definition of the 1976 CIELAB color difference. In the meantime, *Color Vision* by Hurvich and *The Measurement of Appearance* by Hunter had provided detailed discussions of the role of opponency. Throughout this century the industrial applications of colorimetry have been dominated by the trichromatic theory advanced by Thomas Young, James Clark Maxwell, and Hermann von Helmholtz. Perceptionists have remained mindful of Hering's speculations regarding opponency, but it was only in 1958 that those speculations found a quantitative basis in the electrophysiological studies of MacNickol and Svaetichin.

At the same time, the physicists' empirical approach, using transforms of tristimulus values to define the Munsell coordinates Hue, Value, and Chroma in terms of tristimulus values, had become firmly established as the basis of the understanding of color order and of large color differences. It was in

1970 that I first clearly encountered a recognition of the fact that such a dispute is irrelevant. The occasion was a seminar, with twenty-five participants, convened by Dick Hunter in honor of the visit of Dr. L. F. C. Friele, of the Fiber Research Institute of Delft, Holland, "to review the course of development of scales for color measurement". Although Hering's opponency concept was not a major subject under discussion. Friele, Hunter, and Judd all emphasized that there was no incompatibility between trichromacy and opponency. This view is now fully accepted.

Where, then do we stand today? I offer the following outline today's color difference concepts in

relation to trichromacy and opponency:

Munsell quantized color perceptions by defining his perception of the uniformity of color-differences perceived along coordinate scales of Hue, Value, and Chroma. The OSA 1943 proposal for a Munsell Renotation provided the relation between these perceptions and the three retinal stimuli. It is noteworthy that I. H. Godlove's proposal for the relation between Munsell Value and Tristimulus Y was a critical part this relationship. Adams' definition of chromaticness coordinates 'a' and 'b', based on differences in the Value-transforms of stimuli, introduced the role of opponency into a set of L, a, b coordinates, where L is a scale of perceived lightness. Adams' coordinates were rescaled by Nickerson and Stultz to fit prevailing industrial practice. The proposal by Glasser, Reilly *et al* led the CIE to accept the cube-root of tristimuli in place of the Munsell Value scaling. These steps completed the definition of the CIE 1976  $L^*$ ,  $a^*$ ,  $b^*$ , or CIELAB color difference equation. CIELAB, and its modification, the CMC color difference, provide the most important color difference tools in major modern industries. Thus the shotgun marriage of trichromacy and opponency has been legitimized.

## NICKERSON AWARD CITATION

The ISCC Service Award was established in 1980 to recognize outstanding long-term contributions toward the advancement of the ISCC and its aims and purposes. The contributions may be in the form of organizational, clerical, technical, or other services that benefit the ISCC and its members. The first recipient was Fred W. Billmeyer, Jr., then Dorothy Nickerson, and S. Leonard Davidson. In 1986 the award was renamed the ISCC Nickerson Award to honor the late Dorothy M.

Nickerson, who died the previous year. Dorothy Nickerson was a founding member of the Inter-Society Color Council, its Secretary from 1938 to 1950, and its President from 1954 to 1956. Perhaps she set a record attending 52 annual meetings.

The other recipients are George B. Gardner, Harry K. Hammond III, Ruth Johnston-Feller, Walter Granville, Joyce Davenport, Bonnie Swenholt, Terry Commerford, Allan B. J. Rodrigues. Today we add Ann Campbell Laidlaw to that list.

Ann has served the ISCC in many ways. She was the first Membership Secretary, serving from 1990 through 1995. She served on Board of Directors

(1990-1993), and chaired the Annual Meeting in 1995 in Greensboro, NC. When the ISCC opened its Reston office last year, Ann offered continuing support by transferring membership information and advice, including the many protocols that she had found essential to the smooth running of the Society. At a number of annual meetings, you may have seen her tirelessly working at the registration desk, encouraging new members and solving problems as they arose. And she did all this with a smile.

It gives me great pleasure to present the Nickerson Service Award to Ann Laidlaw.

*Ellen C. Carter*



*Ann Laidlaw receiving the Nickerson Award from Dr. Ellen Carter*

## COLOR RESEARCH AND APPLICATION

**IN THIS ISSUE, December  
1997 (Vol. 22, Issue 6)**

The first two articles of this issue are in the area of color reproduction. When making a color reproduction, many factors come into account. Since one generally wants the reproduction to look like the original, it is important that the reproduction device have the capability of inducing the same color sensations to the viewer as the

original. However, almost by definition a reproduction is in a different medium than the original, whether it be phosphors in a CRT display, the dyes of a photographic print, or the inks in a printing device. Each has its own characteristics and limitation in the gamut of colors that it can produce. Therefore, one of the primary considerations in color reproduction is the gamut of the printing device. There are two approaches to determining the color gamut of a device. The first is to produce a large set of samples spanning the range of the device and then to measure these samples and estimate the gamut boundaries of the device. The second is to

develop an analytical model of the printer that relates the color to the amounts of colorants. Dr. Marc Mahy chooses the second approach in "Calculations of Color Gamuts Based on the Neugebauer Model." He examined the natural and hybrid boundaries of color gamuts as well as the physical boundaries, then describes the calculation of color gamuts of "well behaved" processes based on the Neugebauer model.

The second article of this issue examines another problem of color reproduction arising from the fact that different devices have different color gamuts. Unless the original is specially selected, it seems inevitable that at least sometimes there will be some colors in an original that do not fall within the color gamut of the reproduction device. What do you do in that case? Do you print it black, some special colors to indicate it is an out-of-gamut point, or the closest or most "acceptable" color that can be produced with that particular device? For most situations one wants to select an appropriate color that remind the viewer that this is a less than perfect reproduction. But what is the best? Many functions have been proposed for mapping (or shall we say moving) a point outside the color gamut onto or into the volume of reproducible colors. Fritz Ebner and Mark D. Fairchild studied how different observers

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approach the problem of making a match when the target is out of gamut, and also, studied the usefulness of the CIELAB space for color-gamut mapping. In "Gamut Mapping from Below: Finding Minimum Perceptual Distances for Colors Outside the Gamut Volume," Fritz Ebner and Mark D. Fairchild report on an experiment designed to find the perceptually smallest distance from a point in color space to a closed surface such as a color gamut boundary. While their experiment focused on business-graphic images, the results may be generally applied to all image types.

An interesting property of our eyes is the ability to maintain approximately the same picture even when the light energy hitting our eyes changes. The process of adjustment is called adaptation; when it is applied to light levels, it is called dark or light adaptation, and when it is applied to changes in the quality of light, it is called chromatic adaptation. The most common example of chromatic adaptation is the change that occurs when room lighting is changed by turning on lamps. There is an immediate change in perceived color, but gradually

our visual mechanism becomes accustomed (or adapts) to the new illumination and the objects are perceived to have roughly the same color as before the light was switched on. Chromatic adaptation was studied over a century ago by von Kries, and still studied today. In the next article, we read about a new chromatic adaptation model, Kuo96. In "Predicting Corresponding Colours Using a New Chromatic-Adaptation model", Wen-Guey Kuo presents his model and compares it to earlier models using four independent data sets.

For the last few years, Yoshinobu Nayatani has been writing about the Helmholtz-Kohlrausch effect and his experiments to quantify the effect. In "Simple Estimation Methods for the Helmholtz-Kohlrausch Effect", he describes four kinds of simple estimation equations for quantifying the Helmholtz-Kohlrausch effect. Two of the equations are for luminous colors and the other are for object colors. The equations can be applied to predict the Helmholtz-Kohlrausch effect throughout the whole chromaticity gamut including spectral colors,

photopic to scotopic spectral luminosity functions as specified by the CIE, and equivalent lightness values of the Natural Color System colors.

In the Communications and Comments section of this issue, we have a note from M. Ronnier Luo and Peter A. Rhodes announcing the availability of the psychophysical experimental data for describing color appearance, known as the LUTCHI data set. In "Using the LUTCHI Colour Appearance Data," they describe the experimental groups and the data files and viewing conditions used in each phase of experimentation as well as how to access the files on the internet web.

Finally we conclude this issue and the yearly volume with the annual index, with items listed both by author and main subject.

*Ellen C. Carter*  
Editor CR&A

## C. JAMES BARTLESON SYMPOSIUM

WEDNESDAY, 1 OCTOBER  
1997  
AT CITY UNIVERSITY,  
LONDON

### Presentation of Bartleson Award - Trudy Bartleson

I am very grateful to the Colour Group for kindly organizing this fine Symposium, and agreeing to include the Bartleson presentation and lecture in its program. My husband, Jim, had many valuable contacts with the Colour Group and greatly enjoyed the friendship of many of its members. I also appreciate very much the excellent facilities kindly provided by the City University which we are enjoying today. Jim had a very high regard for this University, and greatly enjoyed the time he spent here engaged in the research that led to the award of his Ph.D. I also continue to be grateful to the Bartleson Trustees for

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## INTER-SOCIETY COLOR COUNCIL 1998 Williamsburg Conference

The Lodge, Colonial Williamsburg, VA  
February 22-24, 1998

### Call for Poster Papers

The organizing committee invites you to submit poster papers on aspects of color, design and technology relating to the conference theme. Technology and the creative process, education and visions for the future will be explored.

Please send title and abstract to Anna Campbell Bliss,  
27 University Street, Salt Lake City, UT 84102 or  
email: acbliss@xmission.com

administering the Award; the Trusteeship of the Award is in the hands of the Colour Group and the City University.

It is very appropriate to present the fifth Award to Dr. Adrian Ford, since his outstanding work in Colour science concerns a topic that was of particular interest to Jim. Another reason why it is appropriate to make this award to Dr. Ford is that he has only recently started his career in Colour science, and Jim was always especially keen to encourage young people in their work.

An early interest in photography led Adrian to part-time employment in a photographic laboratory, and this provided a useful background for his degree course at the University of Westminster, where he obtained a first class honours degree in Photographic and Electronic Imaging Science. In 1994 he became a Research Assistant and Ph.D. student, working on a project concerned with quantifying the effects of image compression on image quality. This included the application of various image quality measures, including a colour reproduction index, and the determination of quality metrics that were used to predict subjectively assessed quality. In July 1997, Adrian was awarded his Ph.D., the title of his thesis being *"Relationships Between Image Quality and Still Image Compression"*. He is continuing his research into digital imaging systems at the University of Westminster funded by a post-doctoral award from the Leverhulme Trust.

Dr. Ford is awarded the Bartleson Award for his important contributions to the science of digital colour imaging.

It is with great pleasure today that I present this award, consisting of a medal and a cheque for £1000 to you, Dr. Adrian Ford.

Portion of Letter of 27 March 1997,  
from Bartleson Award Winner

Adrian Ford to Mrs. C. James  
Bartleson

I recently learnt from Drs. Robert Hunt and Mike Pointer that I will be awarded the fifth C. James Bartleson

Award in October. This came as a big, and very pleasant surprise and I am writing to you to thank you, both for setting up the Trust from which the awards have been made and to tell you a little about myself.

- I am (literally) just finished with my Ph.D. thesis at the University of Westminster in London. I've been working, for the past three years, on a project looking into the effects of image compression on the quality of digital images when displayed on a computer monitor. It has been very interesting work, concentrating mainly on implementing conventional photographic measures of quality in a digital system - and solving all the associated problems. In February I went to San Jose, my first visit to the United States, to present some of my work at a joint SPIE/IS&T conference on Human Vision and Digital Imaging. The conference was extremely interesting, and I managed to get to see some of San Francisco too. In April, I will be speaking at a meeting of the Colour Group at City University in London about some of the colour aspects of my work. In particular I will be discussing the way we have used a Colour Reproduction Index, developed by Mike Pointer and based on Dr. Hunt's model of the colour vision system, to the problem of image compression. The experimental work that I've done over the last three years has led to several publications and presentations and, hopefully, I will be staying at the University of Westminster to continue my work.

One of the things I am working on currently, in collaboration with Sophie Triantaphillidou, one of my colleagues at Westminster, is the optimisation of tone reproduction in a digital archive of photographs. The goal of the project is to store collections of old photographic images; negatives, prints and glass plates; in a permanent digital format. One of the problems is deciding how to record the tonal information in the best and most efficient manner. This relates closely to Dr. Bartleson's work in the 1960s on the brightness reproduction in photography and we're

having a lot of fun trying to apply the same concepts to digital systems. A big problem is that the researchers who would like to use the system all work under different lighting conditions and, in addition, some galleries would like to display parts of the archive to the general public on a large computer screen. This means that we would like to develop a method of changing the representation of tonal information, depending on the viewing conditions.

Harry K. Hammond III

## ABSTRACT FOR C. JAMES BARTLESON LECTURE

1ST. OCTOBER 1977, CITY  
UNIVERSITY, LONDON,  
ENGLAND

### Digital Images in Imaging Science - Adrian Ford

Over recent years there have been large changes in the field of imaging, both for users of imaging products and applications and for the field of imaging science. This technological revolution has been analogue methods of image capture, manipulation and display overtaken by new digital techniques implemented using relatively inexpensive computers. Whilst many of the concepts from conventional imaging science, developed over the last 100 years or so, can be successfully applied in the digital domain, digital images present new and varied problems for both the imaging practitioner and the imaging scientist.

This paper was inspired by work performed over several years, investigating the effect of image compression on image quality. It begins with a review of digital images and the implications of the new technology from which they derive. Several important digital characteristics are highlighted and described in relation to traditional photographic and television systems. The results of a number of experiments, performed to

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characterize the tone and colour properties of digital images, are presented. These include problems related to quantisation effects in tone reproduction and gamma correction, and the effect of viewing colour images on CRT displays. Additionally, the use of linear systems analysis (Modulation Transfer Functions and Noise Power Spectra), which is commonly applied to photographic systems, is described in relation to a digital imaging system. The success of linear systems based quality metrics in predicting perceived image quality for compressed digital images is also evaluated.

*Harry K. Hammond III*

## NEW BOARD MEMBERS

**D**uring the last Board of Directors Meeting at Baltimore, MD, Sept. 13, 1997, three new board members, Shashi Caan, David L. Spooner and Joanne C. Zwinkels were elected to serve a three- year term from 1997 to 2000. Their biographies are published below. They will replace Mike Hammel, Rich Riffel and Bill Vogel.

**Shashi Caan**—Shashi Caan is currently an Associate and Senior Designer with Gensler Architects, and has held similar positions with Knoll International and Swanke Hayden Connell Architects. She holds a BA (with honors) from Edinburgh College of Art, and Masters degrees in Industrial Design and Architecture from Pratt Institute. Ms. Caan has been on the faculty of Pratt Institute; School of Visual Arts, where she presently serves on the Board of Trustees. Other civic and professional activities include, Board of Directors of the United Nations Association of New York and the chair of a subcommittee on Interior Design for the American Institute of Architects. Ms. Caan has presented her research and work at conferences in New York, Newport, Budapest, and Helsinki. Her work has also been widely quoted and published, most recently in John Pile's

"Color in Interior Design" (New York, McGraw-Hill, 1997). Other research was conducted under a grant from Pittsburgh Corning Glass. Recently, Ms. Caan curated an exhibit, "Virtual Color: Light, Hue and Form Integrated" at the New York School of Interior Design. A catalogue of the same title was published to accompany the exhibit. Also, in the fall of 1997 a new line of upholstery fabrics for both the commercial and the residential market will be launched under the name of "Shashi Caan."

**David L. Spooner**—David L. Spooner received a B.S.E.E. from Washington University, St. Louis in 1953 and was registered as a Professional Engineer in Ohio in 1957. He has worked extensively in the development of governmental and industrial electronic and optical instrumentation and data analysis. Early in his career he participated in the ARPA Vela-Uniform program where he investigated the use of spectral remote sensing to detect underground nuclear tests. At Lockheed, Houston, he was associated with the NASA Apollo program where he used the Orbiter photography and did exact lighting simulations for lunar-landing training. He joined DuPont Pigment Department in 1973 to work on the development of computer color matching techniques and the evaluation of pigmented products. During the four years prior to his retirement by DuPont in 1994, he was engaged in the measurement and modeling of the color of prepress proofing and printed products. He is presently associated with rhoMetric Associates, Ltd., where he consults in the measurement and application of color and appearance data.

**Joanne C. Zwinkels**— Joanne C. Zwinkels is a Senior Research Officer and the Head of the Photometry and Radiometry Group at the Institute for National Measurement Standards, National Research Council of Canada (NRC). She obtained her Ph.D. in Chemistry from the University of Alberta (1983) with specialization in the

infrared optical properties of solids. She is an active member of CIE Division 2; chair of the CIE technical committee on calibration methods and standards for photoluminescence measurements; member of CIE and ISO committees on the characterization of spectrophotometers, geometric tolerances for colorimetry, practical daylight simulators, and optical properties of paper; and is a former chair of the SIC Interest Group on Fundamental and Applied Color Research. Dr. Zwinkels' research involves the development of instrumentation and reference materials for high accuracy spectrophotometry, spectrofluorimetry and gloss. She has designed, constructed and tested a high-accuracy spectrophotometer which defines the NRC scale of regular transmittance and two-monochromator reference spectrofluorimeter which is used for high-accuracy total radiance factor measurements of fluorescent materials. Currently, she is developing a new goniospectrophotometer to improve the accuracy and range of NRC specular gloss calibration services.

## FEDERATION OF SOCIETIES FOR COATINGS TECHNOLOGY

**T**he Federation is pleased to announce that James A. McCormick, Managing Director of Enhansco, Point Verdra Beach, FL, will be the 1997 recipient of the George Baugh Heckel Award, the organization's highest honor.

Mr. McCormick, a Past-President of FSCT, will receive the award at the Opening Session of the Federation's Annual Meeting in Atlanta, GA on November 3.

The Heckel Award recognizes the outstanding contributions that an individual has made to the Federation's interest and prestige. Established in 1951, the Award is dedicated to the

*(Continued→)*

memory of George Baugh Heckel, who served as temporary Chairman when the Federation was organized in 1922, and as Secretary for many years thereafter.

After beginning his career in 1951 as a coatings laboratory technician, with the H.B. Davis Company in Baltimore, Mr. McCormick served in the US Air Force from 1951-1960. He returned to H.B. Davis in 1960. From 1965 to 1975, he was employed by ConChem in Baltimore. He continued his career as Sales Development Manager for Inland Leidy from 1975 to 1988. From that time until the present, he has served in the position of Managing Director for Enhansco.

Mr. McCormick attended McCov College and Johns Hopkins University.

President of the FSCT from 1978-1979, Mr. McCormick's contributions include involvement on many Federation committees, as Chairman for the Finance, Nominating, Bylaws, Planning, Joint Education, Public Relations and Membership Services Committees. Mr. McCormick was a member of the site selection and building for the FSCT headquarters in Blue Bell, PA.

Mr. McCormick is currently a member of the Southern Society for Coatings Technology.

Mr. F. Louis Floyd, Vice President for Technology, at Huron Paints and Wallcoverings will present the Joseph J. Mattiello Memorial Lecture during the organization's 75th Annual Meeting, to be held at the Georgia World Congress Center in Atlanta, GA, from November 3-5. The FSCT Annual Meeting will be offered in conjunction with the International Coatings Expo and Technology Conference. Mr. Floyd's lecture, entitled, "Reducing Product Development Cycle Times Without Increasing Risk", will be given on Wednesday, November 5.

The lecture commemorates the contributions of Dr. Mattiello, former President of the FSCT (1943-44). Dr. Mattiello was instrumental in expanding the application of the sciences in the decorative and protective coatings fields. He was Vice President and

Technical Director of Hilo Varnish Corp., Brooklyn, NY, when he died in 1948.

The lecturer, chosen from among those who have made outstanding contributions to science, is selected to present a paper on a phase of chemistry, engineering, human relationships, or other sciences fundamental to paint, varnish, lacquer, or related protective coatings.

The Federation of Societies for Coatings Technology (FSCT), Blue Bell, PA, has announced the nominations for Federation Officer positions for 1997-1998. Nominated to serve as President Elect is Forest Fleming (Piedmont Society), Technical Director of Industrial Wood Building Products Group, Akzo Nobel Coatings Inc., High Point, NC.

## PUZZLE: HOW TO PAINT THE DIGITAL WORLD

Submitted by Michael H. Brill

Here's a puzzle that will bring colorists and display engineers together. Let the "real world" be a set of objects whose surfaces are smooth on a sufficiently small scale. Let the "digital world" be a three-dimensional mosaic of tiny identical cubes (called *voxels*) analogous to a two-dimensional digital image of square *pixels*. The *voxels* are tiny on any chosen scale. Each "digital-world" object B' is the maximal subset of these *voxels* that lies inside the corresponding "real-world" object B. (As a two-dimensional example, if B is a circle on a display screen, then B' comprises all the *pixels* inside the circle.)

Back to three dimensions. Given an object B, I want to know what fraction more paint I need to cover B' than I need to cover B. In other words, I want to know the ratio of the surface area of B' to that of B—call it the *area surplus*. (Clearly the area surplus depends on

the shape of B and on its orientation with respect to the edges of the *voxels*, but not on the size of B.) In particular, (a) What is the area surplus of a sphere? (b) What are the minimum and maximum possible area surpluses? Give examples of objects that produce these extremes.

(THE ANSWER IS IN THE NEXT ISSUE)

## SID 98 INTERNATIONAL SYMPOSIUM, SEMINAR & EXHIBITION MAY 17-22, 1998

ANAHEIM CONVENTION  
CENTER, ANAHEIM,  
CALIFORNIA

### CALL FOR PAPERS

The Society for Information Display encourages the submission of original papers on all aspects of research, engineering, application, evaluation, and utilization of displays. SID 98 will feature topical sessions which focus specifically on selected issues or key developments. Paper submissions are welcome for any of the specific topical sessions listed below.

1. **Active-Matrix LCDs:** All types of active elements that are applied to LCDs. Also liquid-crystals and electronic driver developments specifically for AMLCDs are included.

2. **Applications:** Practical aspects of display technology, such as design, materials and testing of displays and display-related products, encompassing innovative and unusual display applications.

3. **Applied Vision/Human Factors:** Display perception and legibility, visual performance and human interface issues, including new methods of displaying information and the effects of environmental illumination on both

(Continued→)

display and observer performance.

**4. CRTs:** Displays for military, industrial, consumer, and specialized applications.

**5. Display Manufacturing:** Materials, designs, and processes for large-scale cost-effective manufacturing of displays.

**6. Display Measurement:** Instruments, analysis, models, and methods for determining all relevant display parameters.

**7. Display Systems:** All systems implementation of displays

**8. Emissive Displays:** New developments in emissive displays other than CRTs, including advances in materials, structures, fabrication processes, characterization, and addressing and driving techniques.

**9. Large-Area Displays:** Large-area displays, including components, system considerations, and new devices.

**10. Liquid-Crystal Technology:** New developments in the field of LCDs.

**Student Travel Grant:** A limited number of travel grants up to \$1000 each will be available to student authors of accepted papers. For further information please call Jay Morreale at 212-620-3371.

#### Technical Courses/Seminars

SID once again offers a comprehensive series of technical seminars given by experts in the field of information displays. Speakers have expertise in the technical area as well as an established track record in presenting quality seminars. Extensive seminar notes will be provided. These are valuable sources of reference materials. The seminars and courses will complement the technology tracks of the three-day Symposium, and, in addition to giving overviews of information displays, CRTs, display systems, image processing, applied vision and human factors, as well as display measurement and manufacturing.

The courses and seminars will fall into three categories:

**Sunday, May 17.** Four 4-hour Short Courses on Fundamentals. These give

a clear and thorough introduction to the principal display technologies.

**Monday, May 18, and Friday, May 22.** A series of 90-minute Seminars covering a broad range of technical subjects.

**Tuesday, May 19, through Thursday May 21.** Practical 90-minute "Applications" Seminars targeted at design and application engineers. The seminars are held each morning before the Symposium Sessions.

SID seminars/short courses have established themselves as a cost-competitive source of comprehensive coverage of key technical issues and of recent progress in information display. Seminars and short courses planned for SID 98 will maintain or exceed these standards.

For further information contact:

Mary Tilton (North America)  
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## CALL FOR PAPERS AND BOOK CHAPTERS

### CIM98-COLOUR IMAGING IN MULTIMEDIA

An international two-day meeting on Colour Imaging in Multimedia, preceded by two days of tutorials, will be held on 16-20th March 1998, at the Colour Research Institute of the University of Derby, England. A book based upon, but not restricted to, papers presented at the event will be published after the meeting. Other electronic channels will also be considered (Web, CD-ROM, journals, etc.). This event will be CO-sponsored by the British Computer Society, through the BCS Computer Graphics & Displays Group and the BCS Electronic & Multimedia Publishing Group.

Multimedia imaging has become an integral part of mainstream computing, with every new desktop computer now equipped with CD-ROM and high quality colour displays and sound capabilities. With the explosive growth of the Internet and World Wide Web, the pressure on developers to produce applications that make effective use of multimedia imaging facilities is now intense. The key enabling technologies for such applications are those of digital colour imaging, spanning the capture, processing, encoding, transmission and reproduction of realistic colour images. Yet from the user's viewpoint much still needs to be done to enhance the quality of presentation, in terms of response times, fidelity, continuity and feeling of 'being there'.

This meeting will bring together leading researchers and developers of new approaches and tools for producing, accessing and analysing imagery in multimedia systems. Contributions are invited on the following themes:

(Continued→)

**Applications**—What requirements do applications place on imaging systems?

- Computer graphics, animation, visualisation and image synthesis
- Collaborative working, video conferencing and telepresence
- Colour image reproduction, publishing and printing via the Internet.
- Home shopping, interactive television and video editing
- All multimedia applications in which imagery plays a significant part

**Technology**—What sort of imagery can multimedia deliver?

- Image capture through digital cameras
- Digital colour printing to paper, textiles and other substrates
- Colour management systems and cross-media colour matching
- Virtual environments and augmented reality technologies
- Colour display technologies, measurement and calibration
- Image coding, compression and transformation techniques

**Design and Evaluation**—How to measure, assess and standardize image quality?

- Visual psychology and human factors in colour image quality
- Effective use of colour imagery in Internet and WWW applications
- Multimedia systems design and authoring tools
- Design of image-rich human-computer interfaces
- Usability assessment techniques
- Ethical, legal and social issues in multimedia

A number of distinguished researchers and developers from Europe and the USA have already expressed their interest in contributing to the event and to the book, so the project is assured of a high quality and an international profile. Selection of papers for presentation at the meeting will be by invitation or by review of abstracts by the Programme Committee. Chapters for the book will be selected by review of full papers and will be subject to

stringent refereeing procedures. Initial interest should be expressed by contacting Prof. Ronnier Luo at the address below, preferably by email. If a paper is accepted for the meeting, one or more of the authors will be expected to attend to present it. In this case the registration fee will be waived for the presenter. Further information can be found at the Conference Web site on:

<http://colour.derby.as.ok/colour/courses/cim98/>

Schedule of dates:

- \* Receipt of abstracts 5 December 1997
- \* Notification of draft programme 5 January 1998
- \* Receipt of papers for meeting 27 February 1998
- \* Meeting 19-20 March 1998
- \* Receipt of final book chapters 1 June 1998
- \* Publication of book December 1998

This meeting will be preceded by two days of tutorials in colour science and colour image reproduction and quality assessment, and a 'cybercafe' for multimedia imaging will be constructed to run concurrently with the event. The venue in Derby is modern and well equipped with full multimedia presentation facilities and offers easy access to the beautiful countryside of the Peak District. A full social programme will be organised to complement the meeting.

**Conference Chairs:**

- General Chair: Prof. Lindsay MacDonald, University of Derby
- Co-Chairs: Prof. Stephen Scrivener, University of Derby
- Prof. Ronnier Luo, University of Derby
- Co-Chair: Prof. Rae Earnshaw, University of Bradford

For further information or to submit an abstract, please contact:  
Prof. Ronnier Luo  
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## THE COLOR ASSOCIATION OF THE UNITED STATES (CAUS)

### CAUS Interior Colors or the year 2000

The CAUS Interiors Forecasting Committee held its annual meeting at Steelcase's Office overlooking Columbus Circle in New York City.

Evolutionary, not revolutionary, is the underlying concept for the CAUS 1999-2000 Interior/Environmental Color Forecast. On the chart, colors hover at midtone levels. The casual lifestyle enjoyed by Americans indicate that soft contrasts of gentle, complex, midtones - grays, reddish hues, golden yellows, yellowed greens and reddened blues - will be favored.

CAUS Selects Some of NYC's Most Stylish Stores

Devin's List of New York's Most Rocking Stores

*Club Monaco: 21st Street & 5th Avenue*

Great stuff for men and women at reasonable prices - it has been compared with Banana Republic but has much more stylish, funky apparel and way more variety. They have their own makeup line with great see through packaging as well.

*Big Drop: 174 Spring Street*

My personal favorite for new, up-and-coming, young designer pieces at medium to expensive prices. Great original stuff from Jussara Lee, Rebecca Dannanberg, Daryl K, etc. Big Drop is not for couch potatoes - this stuff is bare, sheer, and as fitted as anything  
(Continued→)

you've seen on the runway.

*Steven Allen: 60 Wooster Street, near Broome*

Also a wonderful little shop for new designers. Their selection of original jewelry and funky separates makes this tiny store worth checking out.

*Vivienne Tam: 99 Green Street, between Spring and Prince*

Great embroidery and sheer dresses with lingerie detailing as well as wonderful purses.

*Dom: 382 West Broadway, at Broome*

The cutest funkiest selection of affordable stuff for your home, lots of frosty plastics, blow up couches, kitschy items, fun gifts, and some really gorgeous furniture too!

—Devin McKenna, Director of Membership

*An Intern's Picks*

*Calypso St. Barth: 280 Mott Street*

A great store in up-and-coming NoHo; for beautiful clothing and, of course, their eponymous fragrance - Calypso

*Le Petite Coquette: University Place between 11th and 12th Streets*

Some consider it the best lingerie store in New York City, a store where all the models & model types get their undies.

*Exit 9: Ave A between 5th & 6th Streets*

A terrific store for funky, original home accessories, great for gifts or for your own space.

—Mercedes Cristiani, CAUS Spring intern and designer from Argentina

*Margaret's Choices*

*Jill Anderson: 331 East 9th Street, between First and Second Avenues*

Endlessly wearable and comfortable (especially in the new breathable rayons, polyesters combined with

Lycra®), stylish and affordable outfits. This young designer from North Dakota has worked in Athens, Greece and understands that women want to look simultaneously glamorous and smart.

*Swell: 240 Lafayette, between Spring and Prince*

Fifties revived (the owner is credited with having brought back Hush Puppies), looking much better than the first time around. Hawaiian skirts with lace trims; marvelously dorky silhouetted shirts in the new sheens of modern synthetics; plenty of coordinated' mismatches that our mothers would have disapproved of. Reliving this uptight decade with Swell, I feel liberated at last. My Purchase: an upholstery fabric purse.

*Olive and Bette's: 252 Columbus Avenue, at 72nd Street*

Supposedly for juniors and those given over to the latest, this nifty store carries cosmetics like the Hard Candy lipsticks and nail polishes and wonderful juvenile graphics on T-shirts and elegant embroideries by such designers as Vivienne Tam. Olive & Bette's understands that fashion is about change and moving on, and those who work there know exactly where you're ready to go.

—Margaret Walch, Associate Director

**Bugs Bunny & Blue:** Could it be that it was the use of two blues that made the Bugs Bunny stamps such a hit? The US Postal Service has ordered an additional 100 million stamps to fill demand for the "wascally wabbit." The long-eared cartoon legend made his stamp debut in late May with an initial print of 265 million.

#### **Intern Projects**

*Sixties Designs:* I used colors and designs from the sixties that I consider to be fashionable today.

Design and style in the sixties reflected the collective moods and needs of materialistic ambitions. What started then as a process of consumerism

has become today the characteristic temperament of the end of the century. Design plays a key role in the momentum of the market place and great achievements in style and design inevitably tend to be associated with growth economics.

—Mercedes Cristiani, CAUS Spring intern

*Mario Fortuny (1871-1949):* Working largely in the early 20th Century, Mario Fortuny used lush fabrics such as pleated silk and velvet. His colors were equally lush, reflecting the light and surroundings of his home in Venice. His designs also reflect the sensibilities of the Renaissance era. Although Mario Fortuny believed himself not to be party to fashion trends, the colors he chose reflect the subdued twenties palette. The colors of the garments are warm and rich, often with metallic printing. These colors translate easily to current trends in womenswear. This supports Fortuny's original intention to create timeless garments.

—Rosemary Harley, MS, Philadelphia College of Textiles and Science

*Byzantine art: design source for handbags and menswear:* The Byzantine art and craft tradition of the Second Golden Age (AD 843-1261) contributes to modern design. The idea that a piece of art, apart from its function, carries some kind of spiritual meaning to the person using it, appeals to us. Other elements that are important today are the craftsmanship, the aged look and rich, sophisticated colors. Mosaics easily transform into handbags and prints. The reliefs and the borders of the icons are a good source of inspiration for apparel patterns.

—Mathilda Tham., CAUS Spring intern and designer from Sweden

**CAUS Website:** CAUS Website will be active in November! An initial benefit to CAUS members will be access to a color name bank of twenty categories, including color standards, colloquial color names, designer colors and geographical names. By  
(Continued→)

establishing a Website, CAUS will attract a diverse, global audience interested in color forecasting and its impact on business in the 21st century. This will enable CAUS members to access color information all over the world.

Our Website address:  
[www.colorassociation.com](http://www.colorassociation.com)

CAUS NEWS

## DETROIT COLOUR COUNCIL

**J**erry Droll, Marketing Manager, Flex Products, Inc., was the guest speaker for the September meeting. His presentation was entitled "Color by Physics Technology—A revolutionary Advance in Color Generation with Light Interference Pigments."

He described the pigments in detail, including how they have significantly raised the color styling possibilities for automotive paint and trim. Data was presented for the manufacturing process, color characterization methods, as well as new dynamic color space measurement technology developed to aid research & development for future new products.

Jerry's presentation also included pictures from the Frankfurt auto show where several vehicles were displayed using these products. The ChromaFlair products are available in specialty refinish coatings from several major paint companies in the US and Europe.

The audience of some 85 were most enthusiastic and a lively round of questions and answers concluded his talk.

*James Grady*

The next meeting of the Colour Council is on November 19, 1997 at Novi, Michigan Hilton. The speaker will be Bill Longley, Retired Ford Design Manager. His topic is Automotive Color Reflections. Contact Jim King at 248-583-8276.

*Jim Keiser*

## DETROIT COLOUR COUNCIL AND EASTERN MICHIGAN UNIVERSITY

**C**olor Education at Eastern Michigan University takes a new turn for '98. Recognizing the wide variety of student backgrounds and interests, two separate classes will be offered, replacing the single one-week class which was given in '95, '96 and '97.

COLOR MEASUREMENT AND PIGMENT TECHNOLOGY will be offered February 24-26, 1998 at Sill Hall on the EMU campus. This is an intensive lecture-laboratory course, limited to 24 students, in which 3-member teams assigned laboratory projects to prove out lecture issues and make projects presentations. The laboratory is equipped with several spectrophotometers and an automotive-certified dual-Macbeth light. An extensive review of pigment properties will be discussed and demonstrated. Proper laboratory sample preparation is emphasized.

VISUAL COLOR ANALYSIS AND COLOR DESIGN will be offered April 28-30, 1998 also at Sill Hall. Recognizing that many color match determinations are made visually and communicated between customer and supplier, this course will thoroughly cover basic formulating rules, proper use of lighting, testing of observers, uniform technology for expressing color difference, and determination of tolerances. Terms will work on a variety of projects designed to demonstrate the issues.

Student teams will also develop design projects which demonstrate the effectiveness of good color design in the marketing of products. Designing for a specific customer profile, determining observer response to the

color scheme, and the achievement of color harmony in the product mix are the keys to this instruction.

Principal instructor at EMU is Bill Longley, COLOR MATCH CONSULTING, 313-420-4920. He is assisted by an experienced staff, knowledgeable in all aspects of color technology and design. EMU color education is supported in part by the Detroit Colour Council.

Past student in EMU color education have included designers, technicians, chemists, engineers, production supervisors, sales representatives and product planners. For registration information contact Dr. James Woo, Professor of Polymers and Coatings, Eastern Michigan University, 201 Sill Hall, Ypsilanti, MI 48197; Tel: 313-487-1235.

## COLOR MARKETING GROUP (CMG) TO FORECAST CONTRACT PRODUCT COLORS FOR THE NEW MILLENNIUM

**Alexandria, VA.**—Over 600 Color Designers from around the world will meet in San Francisco, CA from Nov. 8-11, as CMG members collectively forecast colors for manufactured products for Contract/Commercial markets in the year 2000—for everything from Hospitality to Retail, from Office to Health Care. Members will also participate in Design Workshops emphasizing the importance of design in both consumer and commercial products, and in sessions dedicated to developing marketing strategies and nurturing

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creativity. Preparing for the next millennium's consumers by learning to incorporate technology with product design will also be addressed.

During the Conference, 2000 Contract Color Directions® Workshops will focus on forecasting colors that will appear in the year 2000, while the 1997-98 Contract Colors Current® Workshops concentrate on color trends already appearing in Contract markets or committed in the next 12 to 18 months.

Σ **Melanie Wood, CMG\***, Corporate Vice President, Design, of Mannington Mills, Salem NJ, and President of Color Marketing Group has announced the results of the election of five members to CMG's Board of Directors, for a three year term, beginning January 1, 1998. They are: **George Gehringer, CMG**, Formica Corp., Cincinnati, OH; **Jerry W. Henderson, CMG**, Carnegie Commercial Carpets, Chatsworth, GA; **Leslie Harrington, ASID, CMG**, Benjamin Moore & Co., Montvale, NJ; **Jim King, CMG**, DuPont Automotive, Troy, MI; and **Michelle Lamb, CMG**, Marketing Directions, Inc., Minneapolis, MN.

### 1998—A Colorful Year for Consumer Products

Σ

According to CMG, there will be a wide variety of color choices in Consumer markets because of four major emerging trends:

Σ The '70s have turned with earth tones, but with a '90s twist, especially in Transportation, Fashion and Home markets.

Σ There is an interest in whiter and brighter hues.

Σ Deeper, more saturated colors will become established.

Σ More and more colors will be enhanced by special effects.

"Since the economy is strong, consumers are more daring and willing to experiment and embrace new Color directions," says **Susan Iverson, CMG\***, Consumer Color Directions® Co-Chair from Fingerhut Companies, Inc.,

Minnetonka, MN.

**Deb Baker, CMG**, Consumer Colors Current® Co-Chair with Butler/NERCO, Dallas, TX, adds, "People are becoming more adventurous with color partially due to the telecommunications explosion. With the vast amount of information available, consumers are exposed to, and accepting of, numerous new color trends."

According to CMG, look for the following colors on your favorite consumer products for 1998:

**Dragonfly** — A bright, medium green with a hint of yellow, similar to a dragonfly's iridescent wing.

**Beignet** — The color of a new penny evolves to become a flatter, yellower brown.

**Zephyr** — A gray that has become a warm, versatile neutral.

**Blue Sky** — This new lighter blue has a Swedish feeling.

**Grape Expectations** — A mid-tone purple that is clean, bright and very usable.

**Cajun Spice**—This more saturated, deeper red has been widely accepted

**Red Zen** — A clean, bright red.

**Garden Green** — A fresh, dark green from nature.

**Tarpon Green** — A clean, crisp, environmental green with a citrus flair.

**Lime Light**— Tarpon Green goes lighter and brighter.

### Color Explodes With Special Effects for Consumer Products in 1999

Just as the special effects of *Star Wars* first captivated our imaginations 20 years ago, special effects will catapult

consumers into a new millennium of color.

The special effects on color that consumers will be seeing in 1999 will be exciting. Colors will become more complex, layering upon each other—creating a multidimensional effect. Ironically, as many people are on a quest for simplicity in their daily lives, drawing them closer to a Minimalist point of view, the texture of color is growing more complicated.

According to Co-Chairs, CMG Consumer Color Directions® Committee, **Michelle Lamb, CMG\***, and **Susan Iverson, CMG**, "Technology is a driving force behind the movement of color teaming up with special effects. Computers are increasingly being used in the design and coloring products, and there are no longer limits on what can be created."

Five examples of the special effects on color that consumers will see in 1999 are:

**Refractures** — A distinct, multisurface patterning that is translucent and contrasts with the color underneath it. If the patterning is textured, all the better.

**Multiplicity** — A thin film containing holographic chips may be layered over any color for a glittering special effect.

**Unobtainium**— A liquid silver that you can't catch. The idea is to capture the brilliant appearance of leafing metallic.

**Sheer Layering** — Veiling color with multiple layers of sheer, each with its own color.

**Optic Shift** — The ultimate high-tech, chameleon surface that displays a multiplicity of color.

Color, however, and the direction it is taking, has always been the big story, and special effects will only be an influence on those colors. CMG members forecast two separate trends in color for 1999. For Home, Communications/Graphics and Fashion products, the mantra is "lighter, brighter, cleaner." For Action/Recreation and Transportation products, the words are "deeper, darker, richer." "These two seemingly opposing

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trends can coexist peacefully," says **Michelle Lamb**, "and these Forecast choices can be tinted to whitened values that represent the new direction toward lighter color."

**Susan Iverson**, adds, "The Forecast Colors also confirm that, by 1999, the baton will have passed from green to blue as the dominant influence of color. As blue becomes the dominant influence on color, there remains an interest in red. This creates a lot of blues and purples for Consumer product markets in 1999 because purple is the natural transition for colors moving toward blue with a red influence."

The 1999 Consumer Color Directions Palette includes the 12 Forecast Colors listed, which are projected to appear in Consumer product markets in 1999.

**Spa Blue** — We acknowledge water as the source of life in this clean, clear, serene blue that reminds us of the need for cleansing our body, mind and soul.

**Mystical Purple** — An ethereal and soothing walk toward blue, Mystical Purple is part of the purple range that will expand in the coming two years.

**Par Four Green** — Par Four Green shows us the first hint of blue entering green once again.

**Seagrass Yellow** — This color represents the importance of green on yellows. It is a complex color that can act as a neutral, a new yellow or a new green.

**Blue Planet** — Three quarters of our planet is covered by water. This hue shows the blue of our planet as seen from space.

**Freesia Purple** — Freesia Purple is one of a group of new purples that will play a key role in the Palette. It's a warmer purple, with a touch of red. Now we have a new hue that evokes images of flowers in nature.

**Mineral Gray** — This is a light, cool gray with a touch of green.

**Clearwater Blue** — A transitional color to take us from turquoise and teal into a more water-inspired blue

**Pure Purple**—A true gender-neutral color that unifies not only male and female elements within us, but categories of product.

**Regal Purple**—There is still more to be said about purple. This time, it acts as a bridge to blue.

**Cherry Fudge**—A rich, full-bodied red that is touched with brown. This color is inspired by ethnic influences from around the world.

**Alexis Blue**—Alexis Blue is a revisited classic for Transportation markets that is blue with a slight green cast.

These Forecast Colors are part of CMG's 1999 Consumer Color Directions Palette, which was developed during CMG's April 1997 International Conference held in Tarpon Spring, FL. Over 600 CMG members from around the world attended. In formulating the 1999 Consumer Palette, CMG members draw on their own experience, but at the same time, interpret trends they see in consumer behavior and in economic and political climates.

For information on membership in CMG, contact: Color Marketing Group, 5904 Richmond Hwy, Suite 408, Alexandria, VA 22303 USA. Tel: 703-329-8500; Fax: 703-329-0155

email: [cmg@colormarketing.org](mailto:cmg@colormarketing.org).  
Web Site: [www.colormarketing.org](http://www.colormarketing.org).

## WAS MY FACE RED!

In my enthusiasm to finish the ISCC *News* in time before our national meeting in Sept. 15, we skipped a line in the article that Dr. Fred Billmeyer wrote about our newest Sustaining Member "Chromatics Color Sciences International, Inc.)

Here is the complete paragraph as Dr. Billmeyer has submitted to the ISCC *News*. This is how it should have appeared on Page 16 of ISCC *News* #369.

Chromatics, like most others in the field, soon found out that the results of visually based beauty consultations were far too dependent on the skills of the practitioners, a group subject to strong disagreements and almost impossible to train. The application of color science and measurement offered the possibility of a solution to this problem, which Chromatics ultimately achieved. The Chromatics color measuring instrument and system allows the operator, without any visual estimates or judgments, to determine the color of a consumer's skin and assign it unambiguously and accurately to one of over 200 categories of skin tones. The system also includes data bases of the colors of cosmetics of all sorts and hair coloring, clothing, and accessories, allowing the selection of compatible choices for an overall harmonious result.

*Gultekin Celikiz*  
Editor, ISCC *News*

### Godlove Award Citation

(Continued from Page 3)

materials, and training. In fact, we still use a Hardy Recording Spectrophotometer along with a D&H tristimulus integrator as a teaching tool. Hemmendinger Color Laboratories has always been synonymous with excellence in color measurement. Many large corporations trace their scales of spectral reflectance factor and transmittance for integrating sphere geometries through Hemmendinger Color Laboratories.

In thinking about all of Henry's  
(Continued→)

contributions to spectrophotometry, I'll focus on his human side. One of my favorite articles about color measurement was written by Fred Billmeyer and Henry Hemmendinger for the Golden Jubilee of Colour in the CIE, held in London, during 1981. They used the term "uniform operators" as a source of error. Users told to report colorimetric coordinates for Illuminant C and the 1931 standard observer often reported data for Illuminants D65 and A, and the 1964 standard observer. The article implied that this was a very dumb way to add uncertainty to one's measurements. From a well-known source, I understand Henry wanted to use the term "dumb operator" to reflect his opinions. This data would never have arisen were it not for Henry's passion for accuracy.

Once one has an accurate and precise color measuring instrument, it can be used to aid in colorant formulation. The first commercial color matching computer was the COMIC, built by Davidson and Hemmendinger. It was an amazing analog computer that could both perform spectral and tristimulus matching. Because of Henry's deep understanding of the importance of curve shapes, this system contained an oscilloscope that enabled one to evaluate spectral goodness and aim for a spectral match. Every year, The Munsell Color Science Laboratory hosts a one-day short course on color matching taught by Ralph Stanziola. In Ralph's course, he spends about 25% of the total class time discussing curve shape analysis and its importance in color matching. This is not a coincidence. Ralph was the main salesman for the COMIC. I feel that there is a direct link from Henry to Ralph about this issue. In fact, if color technologists were more knowledgeable about spectral information, the quality of color matches would doubtless be much improved.

Curve shape analysis led Henry into the world of color constancy. Color constant stimuli are stimuli that have the same color regardless of lighting. This is an important property when

making visual standards. During my graduate days, my dissertation was concerned with developing a Munsell Book of Color that would be color constant when viewed under all daylight conditions including horizon light. I had many discussions with Henry about my research and learned quite a bit about the topic through Henry's practical experiences. Recall that he produced the glossy Munsell Book of Color during the 1950's. He was extremely careful about his choice of pigments so that the curve shapes would vary smoothly for chips on a given page. His practical knowledge eventually was coupled with more theoretical research with our president-elect Dr. Michael Brill. Their relationship has evolved to that perfect blend of friendship and collegiality, a clear indication of Henry's quest for knowledge and understanding.

Many scientists in our field have performed significant research; obviously not all have received the Godlove Award. Perhaps the key ingredient for Henry's success over other talented nominees is his willingness to share his ideas. This goes far beyond publications. Henry will spend as much time as it takes to discuss aspects of color science and educate you. This is easier said than done since some of Henry's ideas are very complex. When he has an audience, it is clear that his goal is for you to understand and think about his ideas. It is never to show off to the world his depth of knowledge and expertise.

In closing, it is my great pleasure and honor to have nominated Dr. Henry Hemmendinger and to be part of today's presentation of the 1997 Godlove Award.

*Roy S. Berns*

*Richard S. Hunter Professor  
Munsell Color Science Laboratory  
Rochester Institute of Technology*

*54 Lomb Drive  
Rochester, NY 14623-5604 USA*

*Tel: 716-475-2230*

*Fax: 716-475-5988*

*email: rsbph@rit.edu*

## RICHARD S. HUNTER COLOR INSTITUTE (RSHCI)

National Coil Coaters Association (NCCA) is excited to be working with the Richard S. Hunter Color Institute (RSHCI). The RSHCI was established to meet the expanding needs for quality color education worldwide, and along with NCCA is promoting the coil coating process. The RSHCI, named to honor the memory of Richard S. Hunter, is located in Reston, VA, and will further his life's work of providing practical color education. Mr. Hunter, well known as a prominent scientist, was creator of the Hunter L,a,b color system.

To provide you with the latest in color processing information, NCCA is cosponsoring its first-ever Color Seminar with the Richard S. Hunter Color Institute.

Consistent color and appearance for coil coated products is essential in today's competitive marketplace. Attend this seminar to:

- Gain a better understanding of how to measure color and appearance on coil coated products;
- Learn how to specify and communicate product color and appearance with your customers and suppliers;
- Manage your color quality program more effectively and efficiently from prepaint to post paint..

Color Seminar highlights include. . .

- How to Measure Color and Appearance
- The Best Measurement Methods for Coil Coated Products
- How to Communicate Specifications and Tolerances
- Trouble Shooting Color Quality Problems
- Plus, You Receive Full Course Notes, Spectrum, Exercises and Reference Materials

**Venue:** 1997 Color Seminar, The Westin Hotel O'Hare, Rosemont, IL, Nov., 20, 1997

**Registration Information:** Call or write to NCCA, P.O. Box 809230, Chicago, IL 60680-9230; Attn.: 1997 Color Seminar; Tel: 312-321-6894; Fax: 312-527-6640

## NEWS FROM MEMBERS:

Jean Bourges has published a book on color, called "COLOR BYTES". Here is the impression of another member, Magenta Yglesias, about Color Bytes.

Color Bytes, blending the art and science of color, was published by Chromatics Press, Forest Hills, New York, 1997. Ms. Bourges' book is soft-bound and consists of 160 pages of text and outstandingly beautiful color images.

COLOR BYTES is a unique journey through the world of color and its many dimensions. The 160 pages include an Introduction and a Postscript and six chapters that discuss, describe and illustrate the Basic Bourges colors of reds, yellows, greens and blues; black as another color dimension; warm and cool colors; color complements; and color harmony. The book is in itself, what it talks about, in that each printed page is process color perfect. COLOR BYTES will be reviewed in Color Research and Application in Spring 1998.

Again, Congratulations to Jean Bourges for her remarkable contribution to the study and understanding of color

Magenta Yglesias

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Rosenthal, Odeda & Robert H. Phillips. **Coping with Color-Blindness: Sound Helpful Information for Those Who Must Deal with Inherited or Acquired Color Vision Confusion**, Avery,

July 1997, c.192p. bibliog. index. ISBN 0-89529-733-7. pap. \$10.95

Odeda Rosenthal has recently joined the Inter-Society Color Council and she has written a book on color blindness called "COPING with COLOR-BLINDNESS," sound, helpful information for those who must deal with inherited or acquired color vision confusion. The review below appeared

in July 1997, Library Journal.

Color vision confusion (CVC), or color blindness, is thought to affect about 10 percent of the world's population (both male and female). It can be a genetic disorder or a side effect of various pollutants, diseases, and medications. Whatever the cause, CVC undermines the visual communication and information networks for those afflicted and affects both the individual and all who come into contact with him or her. Rosenthal, a member of the Optical Society of America and a CVC advocate, and psychologist Phillips raise public awareness about CVC by providing encyclopedic information on this serious visual handicap and by giving numerous personal case studies of the issues faced by the CVC-impaired. Their book is intended for both the general reader and the specialist and is recommended for all health collections.

*James Swanton, Harlem Hospital Lib., New York*

## TAGA PRESENTS 1997 HONORS AWARDS

ROCHESTER, NY—At its recent 49th Annual Technical Conference, the Technical Association of the Graphics Arts presented its prestigious TAGA Honors Award to Dr. Edward M. Granger of LightSource Computer Images and to Raymond J. Prince of the Graphic Arts Technical Foundation.

The TAGA Honors Awards are presented annually to graphic arts professionals who have made major contributions to the advancement of graphic arts technology, are widely known and respected throughout the industry, are involved in one or more graphic arts organizations, and have made extensive contributions to TAGA technical programs.

Dr. Granger received the TAGA Honors Award for his 43 years of dedicated services to the imaging

sciences and graphic arts including 34 years at Kodak; for his wide range of optical, image quality, color, and graphic arts projects and accomplishments including an AM stochastic screen system, a new spectroradiometer, and new linear color spaces to simplify color reproduction, for his 33 technical paper including two at TAGA Conferences, 17 patents, and 46 theses supervised at RIT CIS and the School of Printing, TAGA honors Dr. Edward M. Granger.

Dr. E. M. Granger has been a Principal Scientist at LightSource Computer Images in Larkspur, CA since his retiring from Eastman Kodak Company in 1991. He attended the University of Rochester where he earned three degrees BS. - Optics 1957, MS - Mathematics 1969, and Ph.D. - Optics 1975. He joined Kodak in 1957 as a Research Associate. From 1977 to 1989 he taught a number of courses at Kodak and RIT School of Photography (now CIS), and from 1989 to 1992 he was a member of the graduate faculty at RIT's School of Printing.

A TAGA Honors Award was also presented to Raymond J. Prince for his 39 years of dedicated service to the graphic arts as a technical consultant, lecturer, trainer, author for GATF, conducting many GATF seminars, for his services as a TAGA Board Member, Executive Vice President, and President, for his skill in obtaining corporate contributions for TAGA and for his dedicated service to education, TAGA honors Raymond J. Prince.

Raymond J. Prince is a senior technical consultant in the Technical Service Group at GATF. His 39 years in printing started at the age of 14 when he found an old second-hand press in his attic with which he started his own printing business. He sold the business when he went to RIT to get a BS in printing management which he followed with an MS in printing management at South Dakota State University. He joined GATF in 1966 as a technical specialist in the Special Programs Department where he coordinated continuing education programs, seminars, workshops, and

(Continued→)

conferences. He left GATF in 1970 to join Azoplate, a division of American Hoersch Corp., as an applications manager, directing the design, development and manufacture of graphic arts equipment.

Ray rejoined GATF in 1978 as a technical consultant conducting Technical Plant Assessments (TPA's) which offer in-plant analysis of printers' production facilities and capabilities.

Ray is a member of the Board of Directors of the National Scholarship Trust Fund (NSTF) and chairs its Marketing/Fund-Raising Committee. He was elected to the TAGA Board in 1986 and served as Executive Vice President in 1989 and as President in 1991. In 1992 NAPL named him Craftsman of the Year. The same year he assumed the post of senior technical consultant at GATF. In 1994, GATF honored him with its Industry Education Award. In 1996, TAGA named a graduate fellowship in his honor, and in 1997 Ray Prince received the TAGA Honors Award.

TAGA was founded in 1949 to provide a worldwide forum for the advancement of the graphic arts industry through the dissemination of information on the latest research and development regarding emerging graphic arts technologies.

For membership and conference information, contact TAGA, 68 Lomb Memorial Drive, Rochester, NY 14623-5604; Tel: 716-475-7470; fax: 716-475-2250; email: tagaofc@aol.com.

*Karen Lawrence*

## FLOOD DESTROYS A UNIVERSITY LIBRARY

As some of you may have heard, the campus of Colorado State University was damaged in a flash flood on 28 July. CSU's Library was especially hard hit. The library is nearing the end of a major expansion and a large portion of

its holdings was housed in the basement in anticipation of the completion of the expansion later this year. The basement suffered extensive damage, and the Library lost ALL of its bound journals, some 18,000 subscriptions, plus a large number of books. An effort is underway to rebuild the collection, but it will be years before this task is completed. The library staff tells me that to their knowledge no other major research library has ever suffered such losses.

I am writing to ask for your help. If any of you is nearing retirement and is interested in donating back issues of journals or scholarly books to a worthy cause, I'd like to ask you to consider making the donation to CSU's Library. If you know of colleagues who might be in a similar situation, I would appreciate it if you could bring this

message to their attention.

If you have suggestions on how those of us at CSU might assist in the effort to rebuild our library's collection, please send them along. I do not need to point out what it will mean to CSU faculty and students to be without back issues of journals for some undefined (and extended) period of time. If you have questions, please contact me.

If I cannot help, I will put you in touch with those who can.

Many thanks. Kathy Packard

(Mary J.) Kathy Packard  
Department of Biology  
Colorado State University  
Fort Collins, CO 80523-1878  
Tel: 970-491-7182  
Fax: 970-491-0649  
kpackard@lamar.colostate.edu

## (ASPRS) FOCUSES ON A NEW VISION FOR THE FUTURE

### American Society for Photogrammetry and Remote Sensing

After 20 years of service, William D. (Bill) French, CAE, left the ASPRS on Sept. 8, 1997. "Bill French's long service to the Society is appreciated by the membership," said ASPRS President Roger Crystal. "A national search will soon begin for a new Executive Director to lead ASPRS into the next century."

With its focus on the future, ASPRS will restructure to better serve its membership and maintain its preeminence as a leading scientific and professional organization in the rapidly changing world of geospatial information. Currently in mid-stream of a major reassessment, the Society is reviewing its mission, focus, structure, and level of service to its members and to the public at large. This new vision for the Society is being fashioned in

close cooperation with its members and will likely result in several other changes in the not too distant future. In fact, "A New Vision" has been adopted as the theme for the Society's upcoming Annual Conference to be held with Resource Technology Institute March 30-April 4, 1998 in Tampa, Florida.

Founded in 1934, ASPRS is the largest free-standing organization in the world with a focus on remote sensing, geographic information systems, photogrammetry, and related geospatial information technology and its applications. It has both individual and corporate members and a balance among professionals and scientists from the private, government, and academic sectors. In addition to technical conferences, it maintains major programs in technical publications, professional certification, and has an active scholarship program for students interested in the field of geospatial information management. The Society publishes the monthly journal Photogrammetric Engineering and Remote Sensing (PE&RS). ASPRS has headquarters in Bethesda, MD ([www.asprs.org/asprs](http://www.asprs.org/asprs)).

*Michael Brill*

# NOMINATION FOR THE 1998 MACBETH AWARD

It is time to nominate candidates for the 1998 Macbeth Award, a meritorious award offered by the Inter-Society Color Council (ISCC). This award is usually presented biannually in even numbered years. The Macbeth Award was established in 1970 in memory of Norman Macbeth. It is presented to a member or former member of the ISCC for recent important contributions in the field of color. The following information is required, additional supporting material may be appended.

1. Nominee's Name/Title \_\_\_\_\_  
 Company \_\_\_\_\_  
 Street Address \_\_\_\_\_  
 City \_\_\_\_\_ State/Country \_\_\_\_\_ Zip/Postal Code \_\_\_\_\_  
 Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

2. Citation: Please indicate below in a sentence or two the specific reason for the award's bestowal. This will normally form the basis for the citation presented to the nominee.

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3. Please attach a narrative (up to one-page) of the nominee's contribution and its significance.

4. Please attach a resume or vita and a publication list for the nominee, as well as any other material you deem useful.

## 5. Source of Nomination

Give name of person in a). Member Body or b). Award Committee who prepared the nomination along with address and appropriate contact information. Remember, the Individual Member Group is considered a Member-Body.

Sponsor's Name: \_\_\_\_\_  
 Member-Body / Award Committee: \_\_\_\_\_  
 Street Address \_\_\_\_\_  
 City \_\_\_\_\_ State/Country \_\_\_\_\_ Zip/Postal Code \_\_\_\_\_  
 Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

*Note : Confidentiality of the nomination is of the utmost importance. The nominating individual/Group must ensure that the nomination is not disclosed to the proposed Nominee. If any of the above information cannot be obtained without risking disclosure, the information should be omitted from the nominating letter.*

Candidates will be judged by their recent contribution to any field of interest related to color whether or not it is represented by a Member-Body, preferably within 5 or 10 years preceding the Award. The candidate's contribution may be direct, i.e., it may be in the active practical stimulation of the application of color. It may be an outstanding dissemination of knowledge of color by writing or lecturing, based on original contributions by the nominee. Candidates need not have been active in the affairs of the ISCC.

The deadline for receipt of nominations is January 1, 1998.

Please send to :

Roy S. Berns  
 RIT Munsell Color Science Laboratory  
 54 Lomb Memorial Drive  
 Rochester, NY 14623-5604 USA

Tel: 716- 475-2230  
 Fax: 716-475-5988  
 Email: rsbph@rit.edu

## GENTLE REMINDER!

All appropriate information submitted to this *NEWS* publication is the full and complete responsibility of the sender.

This publication and the ISCC assumes no responsibility for information changes and inaccuracies.

Thanks,  
The Editor

## C A L E N D A R

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

Cynthia Sturke  
ISCC Office Manager  
11491 Sunset Hills Rd.  
Reston, VA 20190  
tel: 703-318-0263  
fax: 703-318-0514  
email: iscc@compuserve.com

## 1997

**IS&T/SID FIFTH COLOR IMAGING CONFERENCE** *Society for Imaging Science and Technology / Society for Information Display*, Nov. 16 - 19, Transforms and Transportability of Color, Radisson Resort, Scottsdale, AZ, info: IS&T Conference Manager, 7003 Kilworth Lane, Springfield, VA 22151, tel: 703-642-9090, fax: 703-642-9094, email: info@imaging.org  
internet: <http://www.imaging.org>

**THE RICHARD S. HUNTER INSTITUTE & THE NATIONAL COIL COATERS ASSOC. 1997 COLOR SEMINAR**, Nov. 20, 1997, Westin Hotel O'Hare, Rosemont, IL, info: Call NCCA tel: 312-321-6894 Fax: 312-527-6640

**2nd CIE Expert Symposium on Colour Standards for Imaging Technology**, Nov. 20-21, Scottsdale, AZ, USA, Info: CIE Central Bureau: email: ciec@ping.at or mail Kegelgasse 27, A-1030 Vienna, Austria

## 1998

**ISCC WILLIAMSBURG CONFERENCE** (Feb. 22-24), Color and Design: 21st Century Technology and Creativity, *Inter-Society Color Council*, info: Wade Thompson, tel: 417-882-2553

**COLOR MARKETING GROUP (CMG)**, Spring International Conf., Apr. 19-21, The Braodmoor, Colorado Spring, CO. Info: 5904 Richmond Hwy, Suite 408, Alexandria, VA. Tel: 703-329-8500, fax: 703-329-0155, email: colorcmg@erols.com.

### TAGA98-50TH ANNIVERSARY CELEBRATION!

Apr. 26 - 29, 1998, *Technical Association of the Graphic Arts*, Marriot Lincolnshire Resort, Chicago IL info: Karen Lawrence, tel: 716-475-7470

**SID 98**, *Society for Information Display*, May 17 - 22, Anaheim, CA, info: Lauren Kinsey, SID, 1526 Brookhollow Drive, Suite 82, Santa Ana, CA 92705  
tel: 714-545-1526; fax: 714-545-1547  
email: socforinfodisplay@mcimail.com

**ASTM, COMMITTEE D-1**, Paint, and Related Coatings, Materials and Applications, Omni Inner Harbour, Baltimore, MD, info: Bode Bradley, tel: 610-382-9740; fax: 610-832-1547

**ASTM COMMITTEE E-12 ON APPEARANCE**, June 17-19. Atlanta Hilton, Atlanta, GA, info: Bode Bradley, tel: 610-832-9740 fax: 610-832-1547

**AATCC INTERNATIONAL CONFERENCE AND EXHIBITION** Sept. 22-25, *American Association of Textile Chemists and Colorists* Marriott, Philadelphia, PA Info: AATCC tel: 919-549-8141

**ISCC ANNUAL MEETING** (Oct. 2-4) *Inter-Society Color Council* and **OSA ANNUAL MEETING** (Oct. 3 - 8), *Optical Society of America* Baltimore Convention Center, Baltimore, MD  
Info: OSA, tel: 202-223-0920, fax: 202-416-6100

**COLOR MARKETING GROUP (CMG) FALL INTERNATIONAL CONFERENCE**, Oct. 4 -6, Le Centre Sheraton Hotel Montreal, Montreal, Quebec, Canada, Info. CMG 5904 Richmond Hwy., Suite 408, Alexandria, VA 22303  
tel: 703-329-8500, fax: 703-329-0155  
email: colorcmg@erols.com

## 1999

**ASTM COMMITTEE D-1 ON PAINT, and RELATED COATINGS MATERIALS AND APPLICATIONS**, Jan. 24-27; Peabody Hotel, Memphis, TN; info. Bode Bradley, tel: 610-832-9740; fax: 610-832-1547

**ISCC WILLIAMSBURG CONFERENCE**, Feb. 20, 2nd Panchromatic Conference, Color in its Surround; info: Dr. Cynthia Brewer; tel: 814-865-5072

**ISCC ANNUAL MEETING** (MAY 5-7) *Inter-Society Color Council* and **TAGA ANNUAL CONFERENCE**, May 2 -5, *Technical Association of the Graphic Arts* Technical Conf., Westin Bayshore Hotel, Vancouver, British Columbia, Canada: Info: Prof. Bob Chung; tel: 716-475-2722

**ASTM COMMITTEE D-1 PAINT AND RELATED COATINGS, MATERIALS AND APPLICATIONS**, June 13-16 Omni Rosen Hotel, Orlando FL.; Info: Bode Bradley, tel: 610-832-9740; fax: 610-832-1547

**OSA, ANNUAL MEETING** Optical Society of America , Santa Clara, CA. Inf.: OSA, tel: 202-223-0920, fax: 202-416-6100.

**AATCC, INTERNATIONAL CONFERENCE AND EXHIBITION**, October 12-15, American Association of Textile Chemists and Colorists, Convention Center, Charlotte, NC, info: AATCC, tel: 919-549-8141

## 2000

**ASTM COMMITTEE D-1 PAINT AND RELATED COATINGS, MATERIALS AND APPLICATIONS**, Jan. 23-26 , Hyatt Regency Hotel, New Orleans, LA; Info: Bode Bradley; tel: 610-832-9740; fax: 610-832-1547.

**ISCC & CPMA ANNUAL MEETING**: April Inter-Society Color Council and Color Pigments Manufacturers Association, Charlotte, NC

**SID 2000**, Society for Information Display, Toronto, Canada, Inf: Lauren Kinsey, SID, 1526 Brookhollow Dr., Suite 82, Santa Ana, CA 92705; tel: 714-545-1526; Fax: 714-545-1547  
email: socforinfodisplay@mcimail.com.

**OSA 2000**, Optical Society of America, Annual Meeting, Oct 1-6., Hyatt Regency, Chicago, Ill; info: osa, tel: 202-223-0920; fax: 202-416-6100

**AATCC, INTERNATIONAL CONFERENCE AND EXHIBITION**; Oct. 15-18, American Association of Textile Chemists and Colorists Benton Convention Center, Winston Salem, NC, inf: AATCC, tel: 919-549-8141

## 2001

**ISCC / AIC MEETING** ; June 24-June 29; Inter-Society Color Council and Association Internationale de la Colour , Rochester Riverside Convention Center Rochester, NY; Inf: Paula Alessi, Tel: 716-477-7673; Fax: 716-722-1116

**AATCC INTERNATIONAL CONFERENCE AND EXHIBITION**; Oct. 21-24, American Association of Textile Chemists and Colorists, Palmetto Expo Center, Greenville, SC, Inf: tel: 919-549-8141

(Continued→)

# J O B S W A N T E D !



This Section is intended to help ISCC members that are in need of, and are looking for employment. Here is an opportunity to use the resources at hand.

There is no charge for this service. However the restrictions are as follows:

1. This service is for ISCC members' use only.
2. No more than 50 words may be used to describe yourself.  
(Not including name address and/or telephone number).
3. If you are using a P.O. Box, you must supply a complete address.
4. No Agency representing member(s) is allowed.
5. Neither the ISCC News nor the editors are responsible for any errors.
6. You must advise us in writing when you have obtained employment.

We hope this new section will be of value to you, the ISCC member. If you have any suggestions/criticisms, please send them to the editor. Let's make this work!

## SEEKING EMPLOYMENT

### SALES/ MARKETING IN COLOR

BS in Chemistry/Math. 20 years experience in instrumentation, sales, sales management, marketing, key account development. Past eight (8) years devoted to the color industry. Member of: ACS, SIC, IFT, ITT, SPE, Paint/Coatings. Cannot relocate away from Northern New Jersey.

William Tuting

507 Shirleen Lane

Mine Hill, NJ 07803

Tel : 973-328-7689

fax: 973-328-8654

email: btuting@worldnet.att.net

## SEEKING EMPLOYMENT IN R&D POSITION IN COLOR

PhD (expected, 1997) Color Vision, MS Biophysics, BS Biomedical Engineering. Highly motivated, adaptable and dependable individual seeking R&D position. Interdisciplinary background and research experience in color, color vision, biomedical instrumentation, colorimetry, photometry and reflectometry. Working knowledge of computer graphics, image analysis/processing, mathematical modelling. Computer and statistics skills include Pascal, C C++, Matlab, Assembly, S, SAS, Steplt.

Jun Xu

The University of Chicago, Visual Science Center

939 E. 57th Street, Chicago IL 60637

Tel: 773-702-1987, Fax: 773-702-4442

email: junxu@midway.uchicago.edu

## SEEKING EMPLOYMENT RELATED TO COLORATION

Noted Bulgarian color and light expert, returning from visiting scholarship in Japan, seeks short or long term employment in the West. Thirty years' extensive and varied experience in visual and instrumental color measurement in many systems. Capable in research, teaching, program development, quality control. Multilingual.

Assoc. Prof. Dr. Todor Kehlbarov

BG-1000 Sofia, P.O. Box 1089

Bulgaria

Phone/Fax 011 359 2 88 05 97

US Contact: Dr. F. W. Billmeyer, Jr.

Phone/Fax 01 518 377 9511

**SUSTAINING MEMBERS**

BYK-Gardner  
Tel: 301-483-6500

Chromatics Color Sciences International, Inc.  
Tel: 202-717-6544

Hunter Associates Laboratory, Inc.  
Tel: 703-471-6870

Labsphere  
Tel: 603-927-4266

**ISCC MEMBER-BODIES**

American Association of Textile Chemists and Colorists (AATCC)  
American Society of Interior Designers (ASID)  
American Society for Testing and Materials (ASTM)  
American Society for Photogrammetry and Remote Sensing (ASPRS)  
The Color Association of the United States, Inc. (CAUS)  
Color Marketing Group (CMG)  
Color Pigments Manufacturers Association (CPMA)  
Council on Optical Radiation Measurements (CORM)  
Detroit Colour Council (DCC)  
Federation of Societies for Coatings Technology (FSCT)  
Gemological Institute of America (GIA)

Graphic Arts Technical Foundation (GATF)  
Human Factors & Ergonomics Society (HFES)  
Illuminating Engineering Society of North 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 Division  
Society for Imaging Science and Technology (IS&T)  
Technical Association of the Graphic Arts (TAGA)  
Technical Association of the Pulp and Paper Industry (TAPPI)

**OFFICERS 1996-1998**

Position	Name	Address	email	Telephone	Fax
President	Dr. Ellen C. Carter	2509 N. Utah Street, Arlington, VA 22207	ecarter@capaccess.org	703-527-6003	
Pres. Elect	Dr. Michael H. Brill	David Sarnoff Research Ctr, CN 5300, Princeton, NJ 08543	mbrill@sarnoff.com	609-734-3037	609-734-2662
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