



# Inter-Society Color Council *News*

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## Nov/Dec 2004

### President's Column

The beautiful fall colors have faded and the frosty nip in the air and the shorter daylight hours, are all telltale signs that winter is just around the corner. Unless you are an avid winter enthusiast, this can be a season of SAD reflection. To get you out of the winter doldrums and get you excited about the spring, the ISCC is holding its 2005 Annual Meeting in Cleveland, April 24-27.<sup>th</sup> This meeting features a special Symposium on "Automotive Color and Appearance Issues," chaired by Mike Henry, President of the Detroit Colour Council. The First Call for Papers for the Annual Meeting and Symposium has already gone out and we are pleased to report that early response has been great and several vendors have already signed up to exhibit at this topical event.

This issue of the Newsletter provides highlights from our recent Special Topics Conference on Color and Design held October 22-24 at the Fashion Institute of Technology, SUNY, New York City. I was among one of the seventy fortunate attendees at this highly entertaining and enlightening meeting, which hosted an impressive list of speakers and talks delving into the aesthetic and psychological aspects of color. The conference attendees also benefited from the opportunities to interact with poster presenters and vendors to establish valuable contacts and gain a deeper appreciation and understanding of the complex world of art and design.

This meeting was highly successful, in large part due to the tireless efforts of the Program Chair, Professor Margaret (Meg) Miele, and her outstanding organizing committee, which included the ISCC Student Chapter at FIT. This Student Chapter, which was formed in May 2000, is very active and we welcome eleven FIT students as new ISCC members. The infectious enthusiasm and professionalism displayed by these students at the FIT conference is certain to inspire other educators attending this meeting to organize new student chapters. Currently, there are two other active ISCC Student Chapters at RIT and at the University of Chicago.

As mentioned in my previous President's column, the ISCC is planning several other exciting events over the next two years. The ISCC will be hosting a Special Topics Conference on "Precision and Accuracy in the Determination of Color in Imaging", November 11-12, 2005 in Scottsdale, AZ, following the annual IS&T-SID Color Imaging Conference. This will be a wonderful opportunity to meet colleagues around the world working in different fields of color imaging. The Co-Chairs for this event are Danny Rich of Sun Chemical

**Wishing each and  
everyone a  
Happy New Year!**

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Corp., and Past-President of the ISCC, and John McCann of McCann Imaging, and ISCC Secretary. Make sure to register early to avoid disappointment.

Further progress has also been made on the preparations for our Diamond Jubilee Meeting in 2006 celebrating our 75<sup>th</sup> Anniversary as an organization. The CIE Division 1 on Vision and Colour has accepted the invitation from the ISCC and the Canadian National Committee of the CIE to hold their 2006 meeting in conjunction with our annual meeting. To mark this momentous occasion, the CIE is also organizing a Special Symposium on the 1931 Standard Colorimetric Observer. The meeting is tentatively set for Ottawa, Canada, the week of May 14<sup>th</sup>. Millions of colorful tulips will be blooming in Ottawa at this time, as Canada's scenic capital city, celebrates its world-famous Tulip Festival. We are planning several special offerings to mark this 75<sup>th</sup> Anniversary of the ISCC – including a special proceedings volume and an archival record of the history of the ISCC and the contributions made by its members to the field of color. If you have any photos to contribute to this special publication, please contact the ISCC Office.

Since this is the last Newsletter before the New Year, I would also like to take this opportunity to wish our wonderful community of ISCC members a joyful holiday season and New Years celebrations with family and friends and I hope to see many of you at our Cleveland meeting in the Spring.

*Joanne Zwinkels, National Research Council*

## **AATCC Jet/Yarn Dyeing Symposium: Leading with Innovative Technology January 20-21, 2005**

This symposium, to be held in Charlotte, NC, will address the needs of the jet and yarn dyeing industries with a focus on innovative technology. Skip Gordon of Cotton Incorporated and Mike Carter of Spectrum Dyed Yarns Inc. will co-chair this program.

Fiber innovations will be a featured session Thursday morning. The presentations will provide updates on new fiber technology and end uses. Participants will also have an opportunity to learn what's new in machinery and equipment from company representatives.

For more information contact Kim Nicholson, AATCC; tel 919-549-3535; fax 919-549-8933; e-mail [nicholk@aatcc.org](mailto:nicholk@aatcc.org) or [www.aatcc.org](http://www.aatcc.org).

## **Call for Papers, 2005 AATCC International Conference & Exhibition**

Abstracts for oral presentations for the 2005 AATCC International Conference & Exhibition to be held October 25-27 in Boston, MA must be received at the AATCC Technical Center on, or before, February 18. Abstracts for posters can be accepted until May 6. Suitable topics are listed on the web site, [http://www.aatcc.org/ice/call\\_for\\_papers\\_2005.pdf](http://www.aatcc.org/ice/call_for_papers_2005.pdf). Final abstracts are due June 3, and the full text by July 29. See the AATCC web site for additional information and forms.

## The 2005 Nickerson Service Award Nominations

The Inter-Society Color Council's Nickerson Service Award was established in 1980 to recognize outstanding long-term contributions toward the advancement of the Council and its aims and purposes. The contributions may be in the form of organizational, clerical, technical, or other services that benefit the Council and its members. Candidates for the award must be members of the Council and must have been active in the affairs of the Council.

If you would like to nominate a person for this award please contact Ellen Carter, Editor, Color Research and Applications at 1001 North Vermont St., Suite 809, Arlington, VA 22201, tel (703)527-2963, fax (703)527-0174, email [ellen.carter@alum.rpi.edu](mailto:ellen.carter@alum.rpi.edu). Nominations must be received before December 31, 2004.

## The 2005 ISCC Godlove Award Nominations

The Godlove Award is the most prestigious award bestowed by the Inter-Society Color Council (ISCC) to honor long-term contributions in the field of color. The Godlove Award was established in 1955 in memory of Dr. I. H. Godlove, and is presented biannually, in odd numbered years, with the next award scheduled for presentation of the 2005 ISCC Annual Meeting.

Candidates will be judged by their contribution to any field of interest related to color, whether or not it is represented by an ISCC Member-Body. The candidate's contribution may be direct, it may be in the active practical stimulation of the application of color, or it may be an outstanding dissemination of knowledge of color by writing or lecturing, based on original contributions of the nominee. Candidates need not have been active in the affairs of the ISCC, but they must be either current or former members of the ISCC. All candidates must have at least five (5) years of experience in their particular field of color.

A Godlove Award Nomination Form is enclosed with this mailing of the ISCC Newsletter. The past and present membership of the ISCC boasts a number of individuals deserving of such recognition but such an award requires your participation in the process. Please take the time to consider and to nominate a worthy candidate for this honor.

Feel free to copy the enclosed (or page 13 of the electronic version) nomination form, if necessary.

Nominations must be received before December 31, 2004.

Requests for additional nomination forms may be directed to:

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## Last Call for Papers -- Symposium "Automotive Color and Appearance Issues"

ISCC Annual Meeting, Cleveland, Ohio, 24-27 April 2005

The Symposium Chairman, Mr. Mike Henry, invites you to submit papers for a special symposium titled "Automotive Color and Appearance Issues" at the 2005 ISCC Annual conference. Presentations that address color and appearance related issues in the following areas are requested:

- Automotive Design
- Marketing
- Interior & Exterior Color Harmony
- Manufacturing
- Application Processes
- Supply Chain.

The symposium will also include an Instrument Exhibit and a Poster Session and we invite papers that relate to new developments in color measurement and determination of color quality in the Automotive OEM and aftermarket segments.

Please submit abstracts to Symposium Chairman, Mike Henry, via email at [mhenry@ppg.com](mailto:mhenry@ppg.com) or by fax at 216-671-7678. Further general conference information and registration will be available at [www.iscc.org](http://www.iscc.org).

## AIC 2005 Scientific Program

May 8-13, Granada, Spain

The scientific program of AIC Colour 05 will be arranged around 12 symposia, oral and poster contributions grouped into particular subjects, guest lectures, discussion groups and an exhibition of scientific and technical equipment and instruments related to all aspects of colour science. Four of the symposia will be dedicated to the four AIC study groups: Colour perception of the elderly; Colour education, Environmental colour design, and Visual illusions and effects. Because the AIC Colour 05 Congress includes the 7th International Symposium on Multispectral Colour Science, four special sessions will also be devoted to different aspects of this topic.

The remaining symposia will cover the following topics: Colour vision with natural images: physics and psychophysics; Colour appearance: ordinal, interval and ratio scales; Evaluation of image quality; Computational colour constancy; Photoreceptors and colour vision mechanisms; Art and colour; and Colour image capture, devices and media. Special lectures are also planned for the opening and closing sessions.

Specific program information and other meeting details can be found at <http://www.ugr.es/~aic05/>.

# ISCC Welcomes New Members

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**Meeting Report: The ISCC/FIT Color and Design Conference**  
**Fashion Institute of Technology Campus**  
**New York City, New York**  
**October 22-24, 2004**

Dr. Valerie Steele gave the first talk of the conference on Friday evening titled "Red." She described how various cultures view red. In India and China, for instance, brides often wear red as it is a symbol of happiness. In western culture however, red is more associated with sensuality and even such negative connotations as the "Scarlet Woman." In the past red clothing and textiles were reserved for the rich in part because of the cost but also by law in some cultures. One of the demands of the 16<sup>th</sup> century peasant revolt was the right to wear red. High officials in the Church to this day wear scarlet and crimson. Red is also a marshal color and the color of revolution (The Red Flag). Male cardinals and robins use red for attraction and also as a warning to other males to stay away. In an experiment, life-like replicas of robins were made and colored grey and brown and left on display. Other male robins ignored them. When a red rag doll was used to replace these the robins attacked it fiercely. If you are feeling blue wear red, if you can't wear a red dress wear red shoes!

There were poster sessions throughout the conference on three different themes: Color in Education, Color in Industry and Color Exhibition of Student Work. The poster sessions were all well presented and interesting.

The morning session on Saturday started with "Color in Clothing and Textile Design." The first talk was given by Dr. Desiree Koslin on "Color in Medieval Culture and Society." The colors from medieval times have mostly faded except for those in manuscript illustrations. Hard metals and precious stones have lasting color whereas pigments made from minerals or organic dyes did not last and so were regarded as suspicious. In the symbolism of the medieval period, red was associated with humanity, blue with heaven, purple with royalty, and stripes were evil. Liturgical colors were white, red, green, purple and black. Church clerics wore plain undyed or brown or gray clothes. Heraldic colors were red, blue, black, green, purple, silver and gold. Jews were forced to wear yellow, prostitutes red and lepers black.

Dr. Ruth Rubinstein gave the next presentation, "Color: Children's Clothes." Why blue for boys and pink for girls. This was started in the 1950's when boys were given a blue tag and a blue blanket and girls a pink tag and a pink blanket. In the 1950's women stayed at home and men went to work. These gender expectations were reinforced with the choice of colors. Blue is cold, signaling keep away. Pink is warm, encouraging a care giver to hold a girl close. Boys are expected to be active, risk-takers, self-interested and self-reliant. Girls are expected to be dependent and nurturing. In 2004 the gender expectations are less rigid. This can be seen in the congratulatory cards, which are more general and non-committal. Until 1990 women wore clothes to hide their pregnancy now pregnancy is regarded as an achievement and so

is more visible.

The next session was "Cultural Influences on Color and Design." Prof. Harumi Hotta presented "Contemporary Dutch Design and Its Influence on Colors of Consumer Products." When one thinks of the Netherlands, tulips, Delft Blue Pottery and Vermeer's paintings spring to mind. The modern Dutch design philosophy is to move away from the "Throw away Culture." Why new color? Why do you need the latest thing? Slides were used to illustrate this movement. Clothing designs using undyed wool even going so far as to leave the dye on the wool that identified the sheep the wool came from. Artistic burnt furniture was shown. Many examples of art made with found objects (and or trash). One particular example of this was a chandelier made from colorless transparent clothes hangers.

The second paper, given by Dr. Yuniya Kawamura, was "The Socio-Cultural Symbolism of Colors of Japan." Most of the color names used in Japan come from nature and the seasons. Of the few names from other sources, one comes from precious stones (amber) and two from animal furs (fox and mouse). In the 7<sup>th</sup> and 8<sup>th</sup> centuries colors had a hierarchy: Purple, Yellowish-Brown or Orange, Red, Blue, Yellow, White and Black. The Japanese indigo plant is plentiful and produces a blue color dye. Blue is available for anyone to use and is often used with white for kimonos.

The last paper, "NYC: A Microcosm of Change & Breeding Ground for Seminal Futuristic Color Concepts," was presented by Ms Margaret Walch of the Color Association of the United States. In slides of New York, she showed taxi cabs to illustrate that yellow is the color of movement, examples of enamel pieces showing color action with shimmer and shine and in one of the more interesting slides an illustration of art that deconstructs itself. The example shown was of a puppy made of flowers.

The final session of the day was "Color, Art and Visual Effects." Professor Marcia Cohen talked about "More Interactions of Color." Marcia showed slides of how she teaches color to her students. One showed the spinning disks of Goethe and how black and white patterns can induce a color sensation. In a series of slides she showed some of the work her students had done on disguise and patterns. The students were asked to make a small model of a corner of a room. They were then asked to pick a style of a chair and make a model of this. Finally they had to place the model chair into the corner of the model of the room and having painted both room and chair make the chair as invisible as possible no matter where the chair was placed. The student designs were very effective. A final example of her teaching was a time study. Here Marcia asked her students to paint a white rose.

*Continued on page 5*

*Continued from page 5*

The point here is that over time with the heat in the studio the rose fades and turns brown.

Mr. Calvin McCamy gave an invited talk on "What is the Difference between Dots and Spots?" Cal started his talk by illustrating and explaining simultaneous contrast, induction and assimilation. He then showed the strong optical effects of TIPs and PITs. These are squares two pixels on a side of either white or black surrounded by the black or white. When they are displayed on a blue background the white appears yellow and when displayed on a yellow background the black appears blue. The effect also works for PIT and TIP lines (two pixels of black surrounded on both sides by two pixels of white and visa versa). Size is critical for this effect to work. In answer to the question in the title spots shift away from the ground whereas dots shift towards the ground.

Ms. Joy Luke followed this talk with one on a similar theme "Color and Visual Effects." Joy showed physical examples of dramatic simultaneous contrast effects. She then explained that you could judge by the hardness of the edge the size of the difference. You can use the color wheel to predict the shift direction. To make a color brighter put it against a complementary color. To make it grayer put it against a similarly colored background. She finished her demonstrations with examples of color assimilation.

The final paper of the day, "Visions Shared: A Firsthand Look into Synesthesia and Art," was given by Ms. Carol Steen. Carol started by explaining that synesthesia is the overlapping of senses. Examples of synesthesia are alphabets or numbers having a color, smelling a scent and hearing a chord. Carol uses her synesthesia in her art work. Music invokes color images for her which she then converts to images on canvas. The same piece of music always evokes the same image. Other connections that Carol makes are that the sound of a piano is pink whereas that of a banjo is blue. The background noise of a room full of people is brown. Orange is the color of pain.

The first session on Sunday was "Color and Design for the Consumer." Ms. Puja Gangwal of m&m Division of Master Foods Inc. gave the first talk, "Chocolate is better in Color." m&m is the #1 chocolate brand in the world. It started in 1941 with four colors, brown, yellow, red and green. In 1943 violet and orange were added. In 1945 tan was added. Peanut m&m's were added in 1954. By 1995 there were 21 colors available in the "Color Works." Recent advertising removed the colored m&m's. In the discussions after the talk a Math professor complained that this played havoc with his statistics class. The percentages of the different colors found in m&m's packets are given on their web site. The recent changes to the color mix reduced the percentage of brown, increased the percentage of orange and blue and changed brightness of the blue and yellow. The combined effect is to make a brighter more colorful mix. The change was to focus on the brand and not necessarily to increase sales and market share.

The next paper was "Color Work Place Design" presented by Dr. Anat Lechner and Ms. Leslie Harrington. In the past

most office spaces were totally designed by management and then the employee was allowed to pick the color! Anat and Leslie are trying to find answers to such questions as: What color makes you more productive?, What color helps leadership?, What color helps creativity? These are difficult questions. Most people can say what a color "is not". For instance black is not optimistic. People respond to their environment on an emotional level rather than a cerebral level. An office designed for efficiency may not on an emotional level be a productive environment.

Professor Odeda Rosenthal gave the last paper of this session. The title was "Coping with Color Blindness." Ten percent of the male population has color blindness or as Odeda prefers to call it Color Vision Confusion. Odeda cited many cases of children being regarded as troublemakers or seriously depressed when in fact they were only color blind. To the colorblind person bright red, bright green and brown, black and olive can all appear the same. The selection of colors by a person with CVC for a bright cheery drawing may to a non-CVC person look depressing. CVC children have told Odeda that they did not like going to the cinema when they were young as they could not find the exit. The reason for this is that exit signs are red on black. To a CVC person it's the same as black on black! She has been campaigning for years to have more exit signs in green and orange. The trend to put amber lights on trucks is good for people with CVC.

The next session was a panel discussion "Color & Design Allies or Enemies." There were three brief presentations by the panelists. The first was given by Carol Bowman of the Target Corporation. She is their Corporate Colorist. She acts as the liaison between the designers and the analysts. All stores have the same lighting, which is UL3000. This is the primary light source used to evaluate colors. The secondary light source used daylight specified as D65. Suppliers need to be certified by Target and are expected to purchase color standards for the products they supply. Craig Lowry then talked about color in television. He talked about the major problem red was to the television industry in the past as the red phosphors used had less luminance and chrominance than the blue or green ones. He then talked about a growing trend to move to Black and White to get peoples attention. Valerie Meyers was the third panelist and is the Art and Production Director for MSDN Magazine and TechNet Magazine, both Microsoft publications. She described the difficulties of taking advantage of dramatic color to capture people's attention on a newsstand and to conform to branding requirements of a major corporation.

The final session was "Technology and the Future of Color and Design." I missed this session but I believe Dr. Bob Marcus of Datacolor talked about "Trends and Success in Digital Color Assessment." Professor Holly Henderson was due to talk about "Digital Color Development and CAD for Textile Design. The third speaker scheduled was Mr. Jack Ladson and he was to talk about "Removing the Bottleneck in Computer Color Formulation."

*Frank O'Donnell  
The Sherwin-Williams Company*

**LAST CALL FOR INTEREST-GROUP PAPERS!!!****ISCC Annual Meeting, Cleveland, Ohio, 24-27 April 2005**

December 31, 2004 is the deadline to submit one-page abstracts and brief author bios to one of the three Interest-Group chairs:

- I. Basic and Applied Research: Milt Hardt, [milhar@ccicolor.com](mailto:milhar@ccicolor.com)
- II. Industrial Applications of Color: Gary Regulski, [gary.j.regulski@usa.dupont.com](mailto:gary.j.regulski@usa.dupont.com)
- III. Art, Design, & Psychology: Marcia Cohen, [marcia.cohen@woodruffcenter.org](mailto:marcia.cohen@woodruffcenter.org)

To support the co-located Symposium theme, "Automotive Color Issues," here are some suggested general topics:

- Color formulation
- Color difference evaluation and determination of tolerances
- Color trends (predicting popular color choices)
- Color design in marketing
- Color design psychology
- Metamerism issues
- Color-order systems
- Color matching
- Color terminology
- Best color measurement practices
- Achieving color harmony in a product line
- Observer testing

Here are some specialized topics:

- Production and characterization of multicolor graphics (e.g. automotive detailing)
- Production of special effect pigments
- Measurement of gonio-apparent materials, e.g. metallic and pearlescent paints

See the Call For Papers in Issue #411 for even more ideas.

**Send your abstracts now and avoid the holiday rush!!!**

**Student Awards at FIT Conference**

Among the many poster presentations, three students were selected to receive awards at the ISCC's recent Conference hosted by FIT. Two FIT students, Shanif Ladha and Christopher Caro won for their poster presentations and the Atlanta School of Art student, Jennifer Burton also won for her poster presentation. Shanif Ladha also designed the ISCC/FIT Logo for this conference and created the programs which were given to the attendees. The judges for the student awards were Dr. Frank O'Donnell, Dr. Joanne Zwinkels, and Dr. Ellen Carter. The ISCC thanks the FIT for all their contributions to making this conference a success.

**ISCC 2005 Annual Meeting  
Details**

Watch the ISCC web site, [www.ISCC.org](http://www.ISCC.org), for registration, program and other annual meeting details. The information will be placed on the web site as it becomes available.

You may also contact Mike Henry, [mhenry@ppg.com](mailto:mhenry@ppg.com), the Interest Group Chairs Milt Hardt, [milhar@ccicolor.com](mailto:milhar@ccicolor.com), Gary Regulski, [gary.j.regulski@usa.dupont.com](mailto:gary.j.regulski@usa.dupont.com), and Marcia Cohen, [marcia.cohen@woodruffcenter.org](mailto:marcia.cohen@woodruffcenter.org), or the ISCC Office Manager, Cynthia Sturke, [ISCC@compuserve.com](mailto:ISCC@compuserve.com).

## Color Research and Application In This Issue, December 2004

We're always looking for new and better instrumentation, for faster ways to obtain data, for answers to more complex questions. Our first article strives for better instrumentation and our second article strives for a better physical model. Because researchers are increasingly involved with the measurement of colorimetric properties of complex images, and also because of the increased availability of digital cameras, there is a temptation to try to adapt digital cameras to become analytical color measurement instruments. For this application to be workable, it is important to have an accurate reading of the photometric level. So Vien Cheung, Stephen Westland, and Mitch Thompson investigated the techniques for accounting for the non-linearity of the input-output response of a camera system. In "Accurate Estimation of the Non-linearity of Input-output Response for Color Cameras" they suggest that a spectral-sensitivities-based method is preferred for any computational process that requires linearization of the camera responses. This includes, but is not limited to, characterization.

For our next article we look for a better approach to modeling reflectance of colored materials. The most commonly used models for formulation and prediction work are based on the approach used by Kubelka and Munk or modifications of that approach. However, in 1964 Melamed developed a model that expresses reflectance as a function of several properties of the material including refractive index, absorption coefficient, size, shape and arrangement of the particles in the material. This model is quite different from the Kubelka-Munk type approach. In "Predicting Changes in the Color of Powders: Does Melamed's Model Fit to Real Industrial Powders?" H el ene Garay, Olivier Eterradosi and Ali Benhassaine use the example of industrial quartz to show how this model has been adapted to fit industrial powders.

Since the Commission Internationale de l' clairage (CIE) issued Publication 142: Improvement to Industrial Colour-difference Evaluation" in 2001, information concerning the effectiveness of the new CIEDE2000 color difference metric has been collected. In our next article, Manuel Melgosa, Rafael Huertas, Ana Yebra, and Mar a del Mar P erez ask the question, "Are Chroma Tolerances Dependent on Hue-angle?" Encouraged by recent suggestions in the literature by Kuehni that the uniformity of the chroma-weighting function around the hue circle be examined, the authors studied the dependence of chroma tolerances with hue-angle to find out if it was a second order effect, which had been masked in previous studies.

Division 1 of the CIE has a technical committee working on Improved Color Matching Functions. Their goals are to compare results based on the current CIE color matching functions, and other color matching functions; to initiate experiments to obtain data for such comparison in different laboratories; and to make an eventual recommendation for the use of the new color matching functions in specifying

color spaces and color-difference formulas. Our next two articles relate to these goals.

First, Kevin W. Houser and Xin Hu report on "Visually Matching Daylight Fluorescent Lamplight with Two Primary Sets." Their research explored the findings of Thornton as reported in this journal during the 1990s and also the work of  brah m *et al.* (also in this journal) and investigated individual differences in color matching. Thirty-nine subjects made matches using 2 sets of narrow band lights to a broadband reference light. They examined the factors of age, gender and subject knowledge of light. Of those factors the only one found to be statistically significant was age.

In an earlier article this year [Vol 29], David Oulton used error analysis with an optimization model to confirm that Dr. Thornton's data represent a significant challenge to the standard colorimetric model and he described a methodology for confirming, measuring, and classifying any spectrally distinct super- and sub-additive effects. In this issue, he continues reporting on his work. He presents "The Properties of Multiple CMF Determinations Using Alternative Primary Sets Part II: A Data Unification Methodology." In this part he compares various observer data sets and finds that the differences depend on both the wavelength of the stimulus being matched and the power of the primaries being used. While this shows a systematic variation in proportionality, he identifies two other possible alternative explanations that cannot be eliminated definitively. These other explanations are observer metamerism and systematic experimental or measurement differences between Thornton's and Stiles-Burch color-matching function determinations.

Our final two articles report on a "Cross-regional Comparison of Colour Emotions." J. H. Xin, K. M. Cheng, G. Taylor, T. Sato, and A. Hansuebaai teamed up to show the influence of the regional differences resulting from culture and geography that affect the way people respond to color. They studied groups from Hong Kong, Japan, and Thailand using work pairs to represent the fundamental emotional response toward color.

Part I is the Quantitative Analysis of the experiments. Part II- Qualitative Analysis used color planners to show the effect of the lightness and chroma of the colors. The color planners can help designers to understand the taste and feelings of the targeted group of customers, and to facilitate selection of suitable colors for products that are intended to be supplied to different regions.

We also include reviews of two books: *Color in Food: Improving Quality* ed. by MacDougall and the 2<sup>nd</sup> Edition of *Color and Appearance* by Pierce and Marcus. Gordon Leggett reviews the former and Georgia Kalivas the latter. Two other publications are briefly discussed, "Lighting and Colour for Hospital Design" and *Psychometric Scaling: A Toolkit for Imaging Systems Development* by Peter G. Engeldrum. Then, because this is the last issue of the year, we close with the Annual Index.

Ellen Carter

Editor, *Color Research and Application*

## Meeting Report: Detroit Colour Council

The DCC held its 25th annual Panel Discussion Conference on September 9, 2004 at the MSU Management Education Center in Troy, Michigan. This year's topic was "Correlation of Numeric and Visual Readings in Plastics and Textiles."

Today's advanced color measurement instrumentation and software programs can provide users with a powerful tool to aid in the evaluation and control of color quality. But the question remains, do the results agree with what we see? The objective of the conference was to explore this question in some detail.

Christine Utter of GE Plastics, President of the DCC, opened the conference with welcoming remarks, introduced the current officers and Board of Directors and turned the meeting over to Larry DePaoli, Program Moderator.

The topics, speakers, and panelists were: "Verification of Color Difference Equations," Bruce Mulholland, Ticon Corp; "Setting Up Color Tolerances," David Dabney, Americhem; and "Spectral vs. Physical Standards," Michael Bradbury, Color Solutions International. Additional panelists were: Doug Czop, Daimler-Chrysler; Chris Mangas, GE ColorXpress and Bob Marcus, Datacolor.

Mr. Mulholland reviewed the variables encountered in both visual and instrumental processes for evaluation of color difference. He discussed an experiment conducted in 1994 comparing instrumental evaluations of plastic parts color acceptability using HunterLab, CIELab, and CMC equations with visual evaluations. The study showed CMC with a 1:c ratio of 1.3:1 to be optimum for high gloss parts, although it was not perfect, with a 14% wrong prediction rate. He went on to discuss a current study comparing CIELab, CMC (1.3:1) and CIE DE2000, which confirmed that CMC (1.3:1) showed better correlation than CIELab, and showed that CIE DE2000 offered no improvement (both with an 18% wrong prediction rate). Sphere geometry with specular component included showed slightly better correlation than specular excluded. However, correlation was still not 100% so we should not yet rely completely on instrumental pass/fail measurements.

Mr. Dabney reviewed an experiment comparing multiple samples of three colors evaluated both visually and instrumentally (CMC DE) which used a six-step process to set up a tolerance value. He emphasized the need to do the visual assessments with multiple observers having good color discrimination ability. Depending on the color, the inconsistent prediction rate varied from 20% to 47%. He concluded that although correlation was not perfect, a usable tolerance specification can be developed using modern color difference formulas which can streamline and expedite color approval.

Mr. Bradbury discussed the need for standard viewing and measurement conditions (including temperature and humidity) and the instability of certain colorants to light during measurement, and described setting up spectrophotometers (including correlating multiple instruments and using reference materials for calibration). He also addressed some

of the issues involved in making good measurements, including presentation of the sample (directionality, potential influence of the sample clamp) and the relevant color physics (assumption of sample opacity, linearity of color space over the area involved in a set of measurements, the various color difference equations in use). He concluded that without intervention the potential uncertainty is a CMC (2:1) DE of 0.6 to 1.6, but that if care is taken to minimize sources of error throughout the measurement chain this can be reduced to a DE of 0.2 to 0.3, allowing the establishment of more meaningful tolerances.

After a break during which attendees were able to examine color measurement instruments and systems, the conference reconvened for a panel discussion of issues raised during the presentations, moderated by Mr. DePaoli.

*James King Past-President, Detroit Colour Council*

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## "Is Science a Single Country Divided by a Language?"

It's said that America and Britain are two countries divided by a language. Science gets to be divided by a language even in one country. Take color temperature: physicists say the reds are cool, but psychologists say reds are warm. Color rendering is another example: The ICC defines it as mapping color from a source to a destination device, but the illuminating engineers use the term to define what changing a light does to object colors. Color management also has different shades of meaning: spectrum replication in the AATCC and appearance management in the ICC. And I've said enough elsewhere about principal component analysis.

Going farther a field, consider luminosity: astronomers count all the radiated energy, but physicists (and color scientists) count only the energy seen by humans. Or the color metric: Mathematicians and most color scientists say the distance from A to C must be less than the distance from A to B plus the distance from B to C; but experts in relativity theory (including one who applied it to color science) disagree. Then there's the Jacobian: a determinant to all but the robotics experts, who say it's a matrix. And don't forget dimensional analysis: used by physicists to answer problems by examining the units of quantities, but used by photogrammetrists to find the real sizes of objects in photographs. Returning finally to color, although I commit the "capital crime" of ignoring the case of the letters, I can't help noting the crazy coincidence of nm being "nanometers" and "nautical miles"—both distances, but on slightly different scales.

This isn't all just nit (or photon) picking. Misunderstandings have arisen, in our very local neighborhood of science, because of the language that divides us. And I haven't even begun on the acronyms.

*Michael H. Brill  
Datacolor*

## CALENDAR

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

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[iscc@compuserve.com](mailto:iscc@compuserve.com) website: <http://www.iscc.org>

### 2005

- Jan 16-20** IS&T/SPIE's **Electronic Imaging Science and Technology**, San Jose Marriott and San Jose Convention Center, San Jose, CA <http://electronicimaging.org/call/05/>.
- Feb 2-3** **Color Vision and Assessment Workshop**, AATCC Technical Center, Research Triangle Park, NC, <http://www.aatcc.org/>.
- Jan 26-28** ASTM E12, Embassy Suites Hotel; Ft. Lauderdale, FL, [www.astm.org](http://www.astm.org).
- Feb 21-24** **SID International Display Manufacturing Conference and Exhibition**, Taipei International Conference Center, Taiwan, <http://www.di.nctu.edu.tw/IDMC05/>.
- Mar 7-11** **ASPRS 2005 Annual Conference**, Baltimore, Maryland, <http://www.asprs.org/baltimore2005/index.html>.
- March 15-17** **Color Technology and Design**, Detroit Colour Council, Detroit, MI, <http://www.detroitcc.org/>.
- April 7-11** **NAPIM Convention** - Hyatt Coconut Point, Bonita Springs, FL, <http://www.napim.org/>.
- April 12-14** **IESNA Trade Show and Conference**, J. Javits Convention Center, New York, NY, [www.LIGHTFAIR.com](http://www.LIGHTFAIR.com).
- April 17-20** **TAGA 2005 Toronto**, Marriott Eaton Centre Hotel, Toronto, Ontario, Canada, [www.taga.org/images/150-7.jpg](http://www.taga.org/images/150-7.jpg).
- April 24-27** **ISCC 2005 Annual Meeting and Symposium**, "Automotive Color and Appearance Issues," Cleveland, OH, [www.iscc.org](http://www.iscc.org).
- April 26-29** **IS&T Archiving Conference**, Radisson Hotel Old Town, Alexandria, VA, <http://www.imaging.org/conferences/archiving2005/>.
- Apr 29-May 3** **CMG's Spring International Conference**, Baltimore, Maryland, USA, [http://www.colormarketing.org/visitors/cmg\\_events/cmg\\_events.htm](http://www.colormarketing.org/visitors/cmg_events/cmg_events.htm).
- May 8-13** **AIC 05 Granada, 10th Congress of the International Colour Association AIC Colour 05**, Conference and Exhibition Centre, [www.ugr.es/local/aic05](http://www.ugr.es/local/aic05)  
email: [eurocongres@eurocongres.es](mailto:eurocongres@eurocongres.es).
- May 10-12** **CORM 2005, Challenges in Radiometry and Photometry: Identifying and Overcoming the Challenges facing Industry in the Measurement of Optical Radiation**, NIST Boulder, Boulder, CO, [www.CORM.org](http://www.CORM.org).
- May 9-11** **Philadelphia Society for Coating Technology, The Eastern Training Conference and Show – 2005**, King of Prussia, PA. Contact Wayne Karus, [wkraus@ptd.net](mailto:wkraus@ptd.net).
- May 12-21** **CIE Divisional and Technical Committees Meetings, Lighting in the XXI Century**, Leon, Spain, email: [leon05@ceisp.com](mailto:leon05@ceisp.com).
- May 18-20** **Research Methods in the 21st Century: A Toolkit for Competitive Advantage**, Federation of Societies for Coatings Technology, New Orleans Marriott, New Orleans, LA, <http://www.coatingstech.org/>.
- May 23-26** **IS&T Beijing International Conference on Imaging: Technology and Applications for the 21st Century**, Fragrant Hill Golden Resources Commerce Hotel, Beijing, China <http://www.imaging.org/conferences/beijing/index.cfm>.
- June 15-17** ASTM E12, Hilton Reno Resort; Reno, NV, [www.astm.org](http://www.astm.org).
- Oct 25-27** **2005 AATCC International Conference & Exhibition**, Hyatt Harborside, Boston, MA, <http://www.aatcc.org/>.
- Nov 11-12** **ISCC/IS&T Special Topics Meeting, "Precision and Accuracy in the Determination of Color in Imaging,"** Scottsdale, Arizona, <http://www.iscc.org>.

## CORM 2005: Call for Contributed Papers

One-page abstracts are now being accepted for contributed papers for the May 10-12, 2005 Meeting, "Identifying and Overcoming the Challenges facing Industry in the Measurement of Optical Radiation," to be held at NIST Boulder, Boulder, CO. Abstracts are due by Jan 15, 2005. Papers should relate to one of the following areas:

- Opto-Electronics - Emerging Technologies and Measurement Issues
- Measurement and Characterization of Solid State Devices
- Characterization of Visual Displays
- Detector and Source Characterization and Calibration
- Radiometry in Environmental and Climate Change Applications

Submit abstracts by e-mail — with "CORM 2005" in the subject line—to David Burns, Conference Technical Coordinator, at [dmburns@mmm.com](mailto:dmburns@mmm.com).

### Publications Available from ISCC Office

**Color and Light** by Fred W. Billmeyer Jr. & Harry K. Hammond, III. Authorized reprint from: ASTM Manual 17, Copyright 1996, ASTM International, 100 Bar Harbor Dr., W. Conshohocken, PA 19428

..... \$5 ea or 20 copies/\$50.00

**Demystifying Color** by Bob Chung, 11 pages. Discusses and explains ten myths about color.

..... \$5 ea or 20 copies/\$50.00

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

..... \$75\*

**Guide to Material Standards and Their Use in Color Measurement (ISCC TR-2003-1)**. The Guide, developed by ISCC Project Committee 51, provides an introduction to material standards and their use for the standardization of color measuring instruments.

..... \$50\*

\*Plus shipping and handling

### The Arrival of Autumn

Nothing signals the coming of fall better than the changing colors of the leaves.

Why do the colors change at this time ... it is due to the changing local temperatures and the changing of the daylight hours; days become shorter.

The pigment responsible for the green color is the chlorophyll; the pigment responsible for the photosynthesis. The color of the green pigment fades in autumn bringing to light other pigments. These pigments were present on leaves but their colors were masked by chlorophyll. Trees with high sugar content – for example, maples and oaks, change their colors from green to reds and purples.

Temperature of the weather can also affect this change. Sunny days and cool nights will produce intense colors. Cloudy and warm fall days mean duller colors. Rainfall and high winds will cause the change to come more rapidly.

*Gultekin (Tek) Celikiz*  
Editor, ISCC Newsletter

### Advertising Policy

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

The rates are:

\$ 100	business card-size ad
\$ 250	1/4 page ad
\$ 500	1/2 page ad
\$ 1,000	full page ad

The editor reserves the right to determine the acceptability of the advertising. A 20% discount is available for a yearly contract.

### Issue #412

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

## ISCC Sustaining Members

BYK-Gardner USA	<a href="http://www.bykgardner.com">www.bykgardner.com</a>	301-483-6500
Ciba Specialty Chemicals	<a href="http://www.cibasc.com">www.cibasc.com</a>	302-633-2042
Color Communications, Inc.	<a href="http://www.ccicolor.com">www.ccicolor.com</a>	773-638-1400
DuPont Performance Coatings	<a href="http://www.dupont.com">www.dupont.com</a>	248-583-8345
Flex Products, Inc.	<a href="http://www.colorshift.com">www.colorshift.com</a>	707-525-7337
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Pantone, Inc.	<a href="http://www.pantone.com">www.pantone.com</a>	201-935-5500
PPG Industries, Inc.	<a href="http://www.ppg.com">www.ppg.com</a>	724-274-3532
Prime-Color, Inc.	<a href="mailto:watprime@hotmail.com">watprime@hotmail.com</a>	908-272-5759

## ISCC Member Bodies

American Association of Textile Chemists and Colorists (AATCC)  
 American Society for Testing and Materials International (ASTM)  
 American Society for Photogrammetry & Remote Sensing (ASPRS)  
 The Color Association of the United States, Inc. (CAUS)  
 Color Marketing Group (CMG)  
 Color Pigments Manufacturing Association (CPMA)  
 Council on Optical Radiation Measurements (CORM)  
 Detroit Colour Council (DCC)  
 Federation of Societies for Coatings Technology (FSCT)  
 Gemological Institute of America (GIA)  
 Graphic Arts Technical Foundation (GATF)  
 Illumination Engineering Society of N. America (IESNA)  
 National Association of Printing Ink Manufacturers (NAPIM)  
 Optical Society of America (OSA)  
 Society for Information Display (SID)  
 Society of Plastics Engineers, Color & Appearance Div.(SPE)  
 Society for Imaging Science and Technology (IS&T)  
 Technical Association of the Graphic Arts (TAGA)

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### NOMINATION FOR THE 2005 GODLOVE AWARD

It is time to nominate candidates for the 2005 Godlove Award. The Godlove Award is the most prestigious award bestowed by the Inter-Society Color Council (ISCC) to honor long-term contributions in the field of color. . This award is usually presented biannually in odd-numbered years. 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 \_\_\_\_\_  
 Tel \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

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

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

- 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 other material you deem useful.
- 5. Source of Nomination

Give name of person or Member Body or Award Committee who prepared the nomination along with address and appropriate contact information.

Sponsor’s Name: \_\_\_\_\_  
 Member-Body / Award Committee: \_\_\_\_\_  
 Street Address \_\_\_\_\_  
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 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 November 1, 2004.

Please send to :

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