



# Inter-Society Color Council *News*

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## Jan/Feb 2005

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### In Memoriam Fred W. Billmeyer, Jr.



(August 24, 1919 – December 12, 2004)

Fred Wallace Billmeyer, Jr., world renowned color educator and researcher, died peacefully on December 12, 2004, at a nursing home in Clifton Park, New York. Born on August 24, 1919 in Chattanooga, TN, Fred studied chemistry at the California Institute of Technology, receiving a B.Sc. in 1941. He completed his Ph.D. at Cornell University in 1945, studying light scattering in synthetic rubbers, under the direction of Nobel Laureate, Peter Debye.

That educational background set the stage for Fred's celebrated career in two major fields; polymer science and color science. From 1945 to 1964, he was associated with the Plastics Department of E. I.

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du Pont de Nemours & Co., Wilmington, Delaware. It was here that he distinguished himself further in the field of polymers and was given a challenge; namely, to figure out innovative ways to apply color to plastic materials. This is where the seeds of Fred's color science path were sown. He used to always say that, in those days, there was not a lot of fundamental color information available. So, he locked himself in a room with stacks of material, studied a lot, broke it down into simpler concepts, and then figured out how to apply it. It was not a straightforward task. In that time, he also began his career as a university educator and from 1951 to 1964 he was Lecturer in High Polymers in the Department of Chemistry at the University of Delaware, and from 1960-1961 served as a Visiting Professor in Chemical Engineering at the Massachusetts Institute of Technology. The publication of the first edition of his landmark *Textbook of Polymer Science* followed in 1962.

Fred made the decision in 1964 to pursue a full-time teaching career at Rensselaer Polytechnic Institute in Troy, NY. As Professor of Analytical Chemistry at RPI, one might think that he would leave industry behind. Nothing was further from the truth. The move presented him with the opportunity to establish The Rensselaer Color Measurement Laboratory (TRCML) within the Department of Chemistry, as well as to teach and direct research in polymer science. Harkening back to his early days of learning to apply color to industrial problems, this was a chance to create a learning environment in which color topics could be studied and researched, the science of color advanced, and those advancements brought to a wide range of industries. The program would go on to produce more than 30 M.S. and Ph.D. students. Fred was committed to addressing the needs of industry and, as part of the program, he established a series of highly successful industrial courses that were held during the summers at TRCML. Over the years, these courses brought color theory and measurement practices to approximately 1000 students from a host of companies. At the same time, the courses provided his students with the opportunity to interact with professionals throughout the industry and to learn of their needs, first hand.

It was during the early days at TRCML that Fred teamed with Max Saltzman to write a "...truly elementary book serving as an introduction to the field of color and the use of color in industry." This first edition of Billmeyer and Saltzman's *Principles of Color Technology* was published in 1966. Through a follow-on edition in 1981 and an expanded collaborative edition with Roy Berns in 2000, it remains a seminal text for color professionals around the world.

His days at Rensselaer also saw Fred committed to a variety of professional societies and activities. In the early 1960's, Fred's continuing interest in color led him to join the Inter-Society Color Council. (ISCC) A tireless advocate for the Council, he would go on to serve as a Director, Vice President, President, and from 1970-1982 perform the duties of Secretary. He received the Council's Macbeth Award in 1978,

the Nickerson Service Award in 1983, and the Godlove Award in 1993. He was named an Honorary Member of the Council in 1987. Fred was also an active member of the American Society for Testing and Materials (ASTM) since 1971 and contributed more than a dozen important and widely used consensus standards. He worked extensively with numerous committees on color areas ranging from, paint, terminology, labeling of artists pigments, to plastics, just to name a few. He was a recipient of the organization's coveted Award of Merit in 1990 and the Frank W. Rheinhardt Award for outstanding contribution to terminology standardization in 1998. Fred also served as a Trustee to the Munsell Color Foundation, was a Life Member of the U. S. National Committee of the International Commission on Illumination (CIE) and active with the International Color Association (AIC). In 1999, Fred received the Deane B. Judd Award from the AIC, recognizing his lifetime of significant contributions to the field of color.

Another of Fred's lasting legacies to the color world was the journal, *Color Research and Application*. Fred was instrumental in establishing the journal in 1976 and served as its Editor-in-Chief for ten years. He continued in the role of Founding Editor, providing guidance and support to subsequent editors. Fred was known for always contributing an extra measure of time and attention to ensure that the journal represented the best in scholarship and, at the same time, strived to encourage articles from all color fields and from all over the world. It was his leadership and policy that was instrumental in the journal being sponsored by national organizations from seven countries in addition to the ISCC in the United States.

Fred retired from Rensselaer in 1984 after which he held the title of Professor Emeritus. The Institute ended the program with his retirement and Fred had the lab's instruments and visual materials transferred to RIT as they established their new program at the Munsell Color Science Laboratory.

In addition to the many previously mentioned associations, Professor Billmeyer was also a member of the Phi Kappa Phi and Sigma Xi honor societies; a member of the Council for Optical Radiation Measurements (CORM) in which he served as both a Director and as Secretary-Treasurer, a Fellow of the American Association for the Advancement of Science, a Fellow of the American Physical Society, a Fellow of the Optical Society of America (OSA), a member of the Society of Plastics Engineers (SPE) of which he was a former Director, a member of the New York Society for Coatings Technology and the Federation of Societies for Coatings Technology (FSCT), and was recognized in 1992 as a 50 year lifetime member of the American Chemical Society (ACS). He was an Honorary Member of the Colour Group (Bulgaria) and a former member of the American Association of Textile Chemists and Colorists (AATCC), the Colour Group (Great Britain), and the Society of Dyers and Colourists (Great Britain).

Fred was the author of 275 papers in the fields of polymer chemistry and color science, and of the books *Textbook*

*of Polymer Chemistry, Textbook of Polymer Science*, (3 editions), *Synthetic Polymers, Experiments in Polymer Science* (with E. A. Collins and J. Bares), *Principles of Color Technology* with M. Saltzman, (2 editions), *Entering Industry, A Guide for Young Professionals* (with R. N. Kelly), and the *AIC Annotated Bibliography on Color Order Systems*. He also served as Section Editor for *Chemical Abstracts*.

In addition to the awards previously mentioned Fred also received the following honors from professional societies: the Roon Award (1962) for best publication in the *Paint Journal*; the Mattiello Memorial Lectureship (1968), and the Armin J. Bruning Award (1977) all from the FSCT; the Committee on Terminology Award of the ASTM Standing Committee, and recognition of work on ANSI Committee Z535 on Safety Signs and Colors. In the year 2000, he was presented with the first ASTM Committee E-12 on Color and Appearance Award of Appreciation, fittingly named the Fred W. Billmeyer, Jr. Award.

Professor Billmeyer is survived by his wife, Annette, (Trzcinski), formerly of Wilkes-Barre, Pennsylvania and the following children: a daughter, (Elli) Eleanor Ann Puffe of Austin, Texas; a son, Dean W. Billmeyer of Minneapolis, Minn. and a son, David M. Billmeyer of Schenectady; and from a previous marriage, a son, Fred S. Billmeyer of Colorado; four grandsons, Alex, Dan and Tim Puffe of Austin, Texas and Stanley Billmeyer of Schenectady. Interment of Fred's cremains will be in the Forest Hill Cemetery in Chattanooga, Tenn.

Contributed by "old-timers"

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### Photograph Notes

The photograph of Fred features him with some of his awards. Clockwise from 1 o'clock, the awards are:

ISCC-Godlove,

AIC-Judd,

ISCC-Macbeth,

ISCC-Nickerson, and

Recognition of the Dedication of the RIT Imaging Center.

Joann M. Taylor, *Color Technology Solutions*

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### Memory Book Contributions

Dr. Joann M. Taylor is compiling a memory book, on behalf of the ISCC, to be given to Fred's family. If you would like to share a special memory or tribute, you may write or email your contributions to: Dr. Joann M. Taylor, Color Technology Solutions, 2894 NW 127th Avenue, Portland, OR 97229-8386. Tel: 503-690-0798 E-mail: [joannt@teleport.com](mailto:joannt@teleport.com) Please note, if you need to contact Joann by phone, Oregon is in the Pacific Standard Time zone (3 hours earlier than Eastern Standard Time). Pictures are also welcome, either digital or prints (which will be scanned and returned to you). We look forward to further honoring Fred with your memories.



## 2005 ISCC Nominees for Board of Directors (Listed Alphabetically)

Following are biographies of the candidates for the Board of Directors of the ISCC. According to the procedure begun last year, all members of the ISCC will have an opportunity to vote for up to three directors. You have thirty days in which to return your vote to the ISCC Office, by mail, fax or email, whichever method is easiest for you. February 28, 2005 is the deadline. See pages 13 and 14 for ballot information and ballot.

**A. Nurhan Becidyan** United Mineral & Chemical Corp.  
President and COO

Nurhan Becidyan has been in the color business for close to 30 years. Before joining the color industry he was involved in the Paper Industry, starting early by working summers at his father's printing plant. During his undergraduate years he spent two summers in Norway working in paper mills. In 1969 he came to the US to earn a graduate degree and then returned to Turkey to start his "professional" career. His first job was at a folding cardboard company, as technical service representative to the printers. He also worked as the interim mill supervisor and was involved in the design stage of the mill's expansion. After serving in the Turkish Armored Corps as a 2<sup>nd</sup> Lt, he joined the only tissue mill in Turkey as their Technical Director. He became a sales engineer in 1976 at SANDOZ LTD (now Clariant) of Switzerland and was transferred to the US in 1982. In 1986 he joined United Mineral & Chemical Corporation and has been the President and COO of the company since 1996. Nurhan has been involved in selling, marketing and providing technical service to a multitude of color-using industries. Currently he is the Chairman of the Cadmium Pigments Subcommittee CPMA, an active member of the ASTM D12 Committee on Color and Appearance in the fields of fluorescence and phosphorescence. He also acts as a technical consultant to some of United Mineral & Chemical's principals.

He has an undergraduate degree in Chemical Engineering from Robert College, School of Engineering, Istanbul, Turkey and a graduate degree in Pulp and Paper Engineering from the Institute of Paper Chemistry (currently called IPST) of Appleton, Wisconsin. His main color interests are in phosphorescence and fluorescence (both visible and UV/IR activated) and applications of color for security industries.

**Jerald A. Dimas** Color Communications Inc.  
Vice President, Technical

Jerald Dimas has had 27 years experience in the Applied Color Science Field. Since joining Color Communications, Inc. (CCI) 21 years ago, Jerald has made consistent contributions helping to make CCI a world-class leader in the production of Color Cards, Color Tools, Color Systems and Color Control Programs for the paint, coatings and fabrication industries. His direct responsibilities include Technical Support, Research and New Product Development. An active member of the ISCC since 1987, the FSCT since 1993 and the Detroit Colour Coun-

cil since 1994. Jerald looks forward to making a contribution to the ISCC in appreciation for what he's received through his membership these many years. Currently, he is the vice-chair of the ISCC's Interest Group II, Industrial Applications of Color.

Jerald's education includes University of Missouri Rolla (UMR), Rochester Institute of Technology (RIT), College of DuPage (COD), specializing in Coatings Formulations, Color Science and Graphic Arts. His professional affiliations include, Inter-Society Color Council, Detroit Colour, Federation of Societies for Coatings Technology, Society of Plastics Engineers, American Society for Testing and Materials (E12), and the Council of Optical Radiation Measurements.

**Stephen D. Glasscock** Hallmark Cards, Inc.  
Senior Scientist

Stephen D. Glasscock is a Senior Scientist at Hallmark Cards, Inc. in Kansas City, MO where for over 30 years he has worked in Technical Research and Development on such products as greeting cards, envelopes, giftwrap, tissue, ribbon, candles, markers, ornaments and partyware. Steve has wide-ranging experience in many types of printing and coating, ink formulation, color specification and matching, appearance measurements and novel decorating techniques. He has presented and published papers on transfer metallizing, transfer printing and polymer rheology. His current interests include the visualization and enhancement of printing system color gamuts, the measurement of fluorescent colors and digital color technology. Steve earned B.S. and M.S. degrees in Chemical Engineering from Northwestern University. Before joining Hallmark, he did R&D for Gulf Oil's Plastics Division for five years. In addition to the ISCC, he is a member of the American Institute of Chemical Engineers and the Society of Rheology.

**Jim Roberts** BYK Gardner USA  
POS Technical Manager

Jim graduated from Worcester Polytechnic Institute in 1975 with a BS in Interdisciplinary Studies (Chemical Engineering/ Life Sciences co-major). He started his professional career with Cabot Stains in Chelsea, MA as a paint formulator. In 1983, he continued on in the coatings world as Chief Chemist for a company in Baltimore, MD called Sportec, working with tennis court coatings and urethane running track systems. In 1989 he moved over to Duron Paints in Beltsville, MD. There he worked as a paint formulator until 1994 when he was promoted to Director of Color Systems, giving him great exposure to industrial color matching issues and solutions. He continues with that same work today as the POS Technical Manager for BYK-Gardner USA. At BGU he is responsible for building and supporting color matching databases and software with such companies as Sears, Wal Mart, and a number of other paint and hardware chains. He is very active with the Color Marketing Group, where he currently serves as the Chairman of the TechKnow Committee. TechKnow deals with special effects pigments and films and the measurement of multi-hued materials.

## Twelfth Color Imaging Conference

They came from Europe; they came from Asia; and they came from North America -approximately 230 of them. It was November and the Color Imaging Conference (CIC) in Scottsdale, Arizona. The Society for Imaging Science and Technology and the Society for Information Display have sponsored this meeting annually in Scottsdale since 1993. Many people have attended all twelve meetings, but also every year there are new faces attending their first CIC. This year was no exception.

After twelve consecutive meetings, the organization has been tweaked and adjusted until the program is just about perfect. The conference is formatted as single non-overlapping sessions. Tutorials are the day or two before the official meeting begins, and Keynote Speakers start each meeting day's activities. The Posters at this meeting are special. New sessions have been added and the topics change periodically.

Although, there are too many tutorials and presentations to describe them all, I do want to mention a few. The three keynote presentations covered a broad spectrum of topics. First, Cynthia A. Brewer, Penn. State, discussed "Color Research Applications in Mapping and Visualization." She explained how cartographers apply color science including perceptual color systems, color vision deficiencies, surround induction, color naming to real-world issues of displaying information for a broad group of observers. The second keynote was presented by Kevin J. Parker, who discussed "Color in Medical Imaging." The third keynote was on "Concept and Technology of Natural Vision Systems." This was authored by Nagaaki Ohyama, Masahiro Yamaguchi, and Hideaki Haneishi. The talk was given by Dr. Ohyama.

Topics of the regular presented papers included Psychophysics, Color Constancy and Illuminant Estimation, Multi-spectral/ Multi-primary Systems, Imaging Processing, Computer Vision, Design of Colorants, Display Color Management, Input Color Characterization, High Dynamic Range Imaging, CIE Standards, and Quality Assessment. When I asked people which paper impressed them the most, there was a common reply... "Spatial Color-to Grayscale Transformation Preserving Chrominance Edge Information" by Raja Bala and Reiner Eschbach of Xerox. James A. Worthey should have won a prize for the graphics in his talk, "Color Matching with Amplitude Not Left Out." Also, "Mathematical Discontinuities in CIEDE2000 Color Difference Computations" by Gaurav Sharma, Mehmet Delic, Wencheng Wu and Edul N. Nadal pointed out important information about the new CIE color difference formula and its application.

A relatively new innovation is that authors of posters are given a very brief time to introduce their research and invite attendees to come see them at the Interactive Poster Session prior to the Poster Session. Cactus Awards were presented to the most notable posters. 1<sup>st</sup> Place was "3D Simulation of Prints for Improved Soft Proofing" by Rohit A. Patil, Mark D. Fairchild, and Garrett Johnson. 2<sup>nd</sup> Place was "Spectral Colorimetry Using LabPQR – An Interim Connection Space" by Maxim Derhak and Mitchell Rosen.

Another new innovation is the Late Breaking News Section. Since submissions are proposed months ahead of time, this session provides an opportunity for the newest research to be presented. This year there were four presented papers in this session: "Veridical Imaging of Transmissive and Reflective Artifacts" by Lindssay MacDonald; "Real-Time Video Reproduction Using Six-Band HDTV Camera and Six-primary Display" by Masahiro Yamaguchi, Masanori Mitsuo, Ryo Iwama, Hideaki Haneishi, and Nagonbi Okyama; "Avoiding On-Screen Metamerism in N-Primary Displays" by Michael Brill and James Larimer; and "Hybrid Spatial-Temporal Method of Color Synthesis for Enhanced Display Image Quality" by Lou Silverstein. All were exciting and well worth staying through the last session on Friday.

During the Wednesday evening Conference Reception, a special ceremony was held to recognize Calva Leonard, IS&T's Executive Director since 1986 who is retiring at the end of the year. Many participants have had a chance to work with Calva, at meetings, on special projects, or on publications. Those who have interacted with her over the years shared their memories of her contributions to the life of the Society, and/or well-wishes for her retirement.

Dr. Michelle Minitti from the Center of Meteorite Studies at Arizona State University gave an excellent and enthusiastic talk "Mars Exploration Rover Mission: Two Rovers, 18 Cameras, One Goal" Thursday Evening. It was followed by many questions, but no one in the audience could stump her.

Probably one of the most valuable contributions of the CIC is the opportunity for networking with colleagues. This meeting was no exception. The tutorials, presentations and many associated meetings provided much material for discussion. On Friday the attendees left, but already plans were being made for next year's meeting November 7-11, 2005. Mark your calendar and check the IS&T website [www.imaging.org](http://www.imaging.org) for the call for papers for next year.

*Ellen C. Carter*

## Final Call for ISCC Symposium Papers Extended

Mike Henry, Chairman of the Automotive Color and Appearance Issues Symposium, announced that the date for submitting abstracts has been extended to January 31, 2005. The Symposium will be held as part of the ISCC 2005 Annual meeting April 24-27, in Cleveland, Ohio.

Presentations that address color and appearance related issues in Automotive Design, Marketing, Interior & Exterior Color Harmony, Manufacturing, Application Processes and the Supply Chain are requested. The symposium will also include an Instrument Exhibit and 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.

Authors are invited to submit abstracts by January 31, 2005 to Mike Henry, via email at [mhenry@ppg.com](mailto:mhenry@ppg.com) or by fax at 216-671-7678.

## ISCC 2005 Annual Meeting Preliminary Schedule

**Cleveland Airport Marriott  
Cleveland Ohio**

### **Sunday, April 24, 2005**

7:30 a.m.	Registration
8:00 - 8:30 a.m.	Continental Breakfast
8:30 a.m. – 12:30 p.m.	Welcome & Opening Remarks Project Committee meetings Interest Group III: Art, Design & Psychology, Speaker presentations and discussions
12:30 – 2:00 p.m.	Lunch on your own
2:30 p.m.	Departure by bus from Conference Hotel to Cleveland Museum of Art & Cleveland Institute of Art
3:00 – 5:00 p.m.	Group tour of Phillips Collection exhibition at the Cleveland Museum of Art. <a href="http://www.clevelandart.org/">http://www.clevelandart.org/</a>
5:00 p.m. – 7:30 p.m.	Wine & Cheese Reception at Cleveland Institute of Art (CIA) Spring Industrial Design Exhibition <a href="http://www.cia.edu/academic/undergraduate/industrialdesign/springshow/past.asp">http://www.cia.edu/academic/undergraduate/industrialdesign/springshow/past.asp</a>
7:30 p.m.	Return by bus to Conference Hotel

### **Monday, April 25, 2005**

8:00 – 8:30 a.m.	Continental Breakfast
8:30 a.m. – 10:00 a.m.	Interest Group I: Basic and Applied Research, Speaker presentations and discussions
10:00 a.m. – 10:30 a.m.	Refreshment break
10:30 a.m. – 12 noon	Interest Group I (continued), Speaker presentations and discussions
12 noon - 2:00 p.m..	Conference Awards and Business Luncheon Presentation of Godlove and Nickerson Awards
2:00 – 3:30 p.m.	Interest Group II: Industrial Applications of Color, Speaker presentations and discussions
3:30 – 4:00 p.m.	Refreshment break
4:00 – 5:00 p.m.	Interest Group II (continued)

**Speakers and Presentations for Interest Group Meetings include:**

Guy Decelles, Eckart, "New holographic pigment"

Mahdi Nezamabadi, Roy S. Berns, RIT, "Investigating the effect of image size for the colour reproduction of cultural heritage".

Jeff Alspach, DuPont Performance Coatings, "Detroit Color Council, Group II Update"

Jian Liu, Joanne Zwinkels and Mario Noël, National Research Council, "NRC reference instrument for visual appearance characterization of gonioapparent materials"

Yoshio Okumura, Munsell Color Science Laboratory, "Optimizing the Saunderson coefficients based on measurement geometry and varnishing effects for artist paints"

**Symposium on Automotive Color and Appearance Issues****April 26-27, 2005****Cleveland Airport Marriott, Cleveland, Ohio**

The symposium, "Automotive Color and Appearance Issues," will highlight the color and appearance issues in the automotive world along the complete chain from Design, Engineering, Prototyping, Production, Process, to Quantification. These issues will be addressed in speaker presentations and in a panel discussion with invited experts from all of these areas talking about how to improve communication.

Among the featured speakers will be Elizabeth Miakinin of General Motors who will be talking about the need for training, Vince Dattilo of PPG Global Application and Technology Platform who will be talking about process, and Russell Ferguson of Silberline Manufacturing Inc. who will be talking about metallic color issues related to improper flake pigment orientation.

Vendor exhibits will be a prominent part of the Symposium. Vendors will be given an opportunity to make a brief oral presentation at the Vendor Showcase Session. The following vendors will be exhibiting: GTI Lighting, X-Rite, IsoColor, Flex, and BYK Gardner. Tabletop exhibits will be open throughout the Symposium. For those who would like to exhibit and have not already registered, contact Symposium Chair, Mike Henry ([mhenry@ppg.com](mailto:mhenry@ppg.com)).

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**ISCC 2005 Annual Meeting Details**

Please find a registration form included in the newsletter as page 15. Hotel information is given on page 16. Watch the ISCC web site, [www.ISCC.org](http://www.ISCC.org), for detailed 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) for further information.



## Color Research and Application In This Issue, February 2005

Many nations are experiencing an increase in the elderly population. The vision of elderly people differs from younger adults because of aging effects on the ocular system, retina, optic nerve, and brain processing. Since older adults often remain active and control large purchasing power, it is important to develop signage, device controls, and displays that are used easily by both young and old. In order to study the effects of aging, T. Suzuki, Q. Yi, S. Sakuragawa, H. Tamura, and K. Okjima compare the response time, non-response ratio, response speed, and subjective evaluations such as visibility indices in three groups of individuals: elderly adults, young adults, and young adults wearing glasses with filters that simulate lens-aging changes. They report their results in "Comparing the Visibility of Low-Contrast Color Landolt-Cs: Effect of Aging Human Lens."

Our next article, "A Comparison of Lightness Contrast Effects in CRT and Surface Colours," investigates simultaneous contrast effect. The way the surroundings affect a color is an important consideration for designers and artists. It is also important for industrialists when evaluating production colors. Ray-Chin Wu, R. H. Wardman, and M. Ronnier Luo use both CRT colors and fabric samples to study this effect. While the effect occurred in both media, it was more pronounced on a CRT.

Since the publication of the Commission Internationale de L'Éclairage (CIE) Technical Report 142 Improvement to Industrial Colour-difference Evaluation," Division 1 of the CIE has invited comments on its implementation in industry. Dr. M. Ronnier Luo of Leeds University in the United Kingdom is the reporter collecting responses for the division. The next article is a response to this invitation. While at Xerox Corporation, Gaurav Sharma, Wencheng Wu, and Edul N. Dalal began implementing and examining the newly proposed CIEDE2000 equation. They found additional test data are necessary to verify the correctness of implementation equations. Thus in "The CIEDE2000 Color-Difference Formula: Implementation Notes, Supplementary Test Data and Mathematical Observations," they provide implementations of the equation in both Microsoft Excel and MATLAB and discuss discontinuities of the CIEDE2000 color difference formula that arise from its defining equations.

Next Claudio Oleari examines the "Hypothesis for Chromatic Opponency Functions and their Performance on Classical Psychophysical Data." Earlier analyses of the Uniform Color System of the Optical Society of America (OSAUCS) suggest separating the color signal into the product of the lightness and the chromaticity. Each of which needs separate coding. Oleari proposes chromatic opponency functions that are logarithmic functions, whose arguments are ratios of tristimulus values defined in a particular reference frame of the tristimulus space. In this article, Dr. Oleari considers the psychophysical data of the OSA-USC system for extra macula vision and chromatic discrimination ellipses for macular vision, and concludes that all these data can be correctly orga-

nized according to the hypotheses for color channels of a multi-stage color-vision model. He then goes on to summarize the kinds of mutually independent processes proposed.

In our next article Yoshinobu Nayatani demonstrates that chroma and hue appearance steps and color difference in hue and chroma directions are distinctly different perceptions using examples in the near neutral (N5 to N6 C<sub>2</sub>) regions of Munsell color space. In "Differences in Attributes between Color Difference and Color Appearance (Chroma and Hue) for Near Neutral Colors," he shows that the chroma and hue color differences in this region are associated with the chromatic strength of the hues. He then concludes that the common practice of comparing Munsell loci in a uniform color-difference space may lead to misinterpretations.

Our last full-length article of this issue, "Colour as Vocation: Werner Spillmann's Contribution to Environmental Colour Design" is written by Verena M. Schindler. Her article presents Spillmann's important contributions to environmental color design highlighting his influence in teaching and as a design professional and his role in the International Colour Association (AIC), in particular in the AIC Study Group on Environmental Color Design. She uses one of Spillmann's commissions to develop the color concept for the new area of Kirchsteigfeld in the German city of Potsdam as an example of how he integrates color into the processes of planning, designing, and realizing an urban project.

Also in this issue we have two notes. Notes are short articles, which have undergone the same referee process as full-length articles. In the first note Hugh S. Fairman and Michael H. Brill identify a CIELAB anomaly. It is a common practice to correct a spectrophotometer's reflectance measurements to that of a master instrument by determining a correction wavelength by wavelength. Having arrived at the best correction for each wavelength, people then often use a CIELAB color difference as a single-number metric of success. However, Fairman and Brill found that there are situations where one can reduce the magnitudes of the spectrophotometric errors at each wavelength, but actually increase the CIELAB DE\*. They explain this and give examples in the "Note: CIELAB Reversal in Calibration and Verification."

The second note is from Robert W. G. Hunt, Changjun Li, and M. Ronnier Luo. In "Chromatic Adaptation Transforms," they describe the different forms of chromatic adaptation transform or CATs and explain the factors that govern which type of CAT should be used for a particular application. Chromatic adaptation transforms have many uses. They are one step in color appearance modeling. They also are used to compare corresponding colors, or to predict color constancy or the lack of it.

Four book reviews, a meeting report, a call for papers, and a news item close out this issue. Rolf Kuehni highlights a book that has been out for several years, but should be brought to the attention of CR&A readers, *The Measurement of Sensation* by Lamington. Charles Poynton reviews *Display Interfaces: Fundamentals and Standards* by



Continued from page 8

Robert L. Myers. Next Thomas Lazar reports on *Industrial Dyes- Chemistry, Properties, Applications* edited by Hunger.

Finally, Eileen Korenic discusses *Optical Demonstrations Using an Overhead Projector*, which is published by the Optical Society of America. The Seventh Spanish Color Congress was held in Pamplona Spain. Begon̄a Jermańdez and Carlos Sańez report on it here. There is a call for papers on Automotive Color and Appearance Issues for the upcoming Inter-Society Color Council Annual meeting in April in Cleveland, Ohio. Finally, the Munsell Color Laboratory at Rochester Institute of Technology announces color science scholarships.

Ellen Carter, Editor  
*Color Research and Application*

## Book Review:

### ***Color: An Introduction to Practice and Principles*, by Rolf G. Kuehni**

2<sup>nd</sup> Ed. (Wiley, New York, 2005), 199 pp., \$89.95 hardback.

With these new notes, my review of the First Edition (ISCC News No. 369 [1997], pp. 6-7) applies also to the Second Edition. In less than 200 pages, Rolf G. Kuehni's *Color: An Introduction to Practice and Principles* summarizes all of color: science, technology, aesthetic theories, philosophy, and history. It is technically correct, accessible to artists and interested lay people, and graphically appealing. Now, in his Second Edition, Kuehni has endeavored to trim the inessentials, use plainer language when possible, update the material, and preserve the length. I think these measures will widen the audience.

Chapter 2 (previously "What is color?" and now "What is color and how did we come to experience it?") is a case in point. In that chapter, Kuehni discusses the philosophical question of whether a color inheres in an object or requires a perceiver. In the First Edition, Kuehni gave a good, terse summary of the philosophical debate and its implications for the relation of mind, brain, and computer. To support the spectral realities being represented as color, the figures in Chapter 2 were graphs of the principal components of natural illuminants and reflectances. In the seven years since the First Edition, Kuehni changed Chapter 2 so we don't get stopped by the philosophical problem, but immediately confront pragmatic realities about color. Qualia take a second place to evolution. The formal graphs are replaced by a color plate that shows how much is lost if color is replaced by black-and-white: red fruit become inconspicuous amid green leaves. And without adding length, Kuehni adds new references to molecular genetics, to synesthesia, and even to the old color-realism debate continued by younger debaters.

Other new material includes the color-management work of the International Color Consortium, the CIE DE2000 color-difference formula (replete with caveats), and the CIE committee that is (re)investigating Grassmann's color-matching rules. Some chapters are reorganized: "Orderly arrangements of colors" coalesced from two chapters to one; and "Putting

numbers on colors" expanded to two chapters, "Defining the color stimulus" and "Calculating color." Subtler changes can be found at all levels in the text, for the author seems to have rethought every sentence. For example, in the color-constancy section (pp. 46-47), Kuehni restricts color constancy to lights that "are similar to black-body radiators," whereas in the First Edition he restricted it to lights "that are white or near white." In comparing editions, one can see that, Kuehni has become substantially less committal about the validity of most models. He believes that less is known about color perception than we usually admit.

The Second Edition is actually a third version of *Color: Essence and Logic* (Van-Nostrand Reinhold, 1983), but the edition number reinitialized when the title and publisher changed. That explains the first sentence of the "Preface to the Second Edition," which says, "This is the third version of an introductory text..." I look nostalgically at the \$17.95 price and terse obverse page of the 1983 edition, and can hardly believe the escalation of expense and legalese in the publication industry. But the improved rendering in the color plates of the current edition indicates a positive evolution. I think the author is principally responsible for these production improvements. He chose better reproductions of Runge's color sphere and van Dole's color circles, and much of the improvement derives from the fact that the colors are reproduced as given (with age-yellowed background intact) rather than in washed-out tones with the background forced to be white as in the previous edition.

If you do not have the earlier edition, this one will be a valuable tool; if you have that edition, this one will allow you to see how the author's view has changed over the past seven years, and that too can be valuable.

Michael H. Brill, *Datacolor*

## **AATCC Textile Technician Certification Program**

The AATCC Textile Technician Certification Program is a rigorous hands-on training program that seeks to ensure the proper execution of AATCC Test Methods and Evaluation Procedures. Three modules are being taught at this time.

Module 1 covers gray scales for color change and staining and the 9-step chromatic transference scale. Module 2 covers colorfastness to crocking, and accelerated methods for colorfastness to home and commercial laundering. Module 3 covers, smoothness of seams in fabrics, retention of creases in fabrics, appearance of fabrics, and dimensional changes of woven and knit fabrics after home laundering.

The 2005 dates for these modules are:

Modules 1 and 2: June 8-10, University of Rhode Island, Kingston; and Dec. 6-8, North Carolina State University, Raleigh.

Module 3: June 21-22, North Carolina State University, Raleigh; and Oct. 18-19, North Carolina State University, Raleigh.

For more information on these programs visit the AATCC website: <http://www.aatcc.org/workshops/textech.cfm>.

## CALENDAR

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

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**ISCC Office**  
**11491 Sunset Hills Road, Reston, VA 20190**  
**703-318-0263 tel 703-318-0514 fax**  
[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>.
- Mar 9-10** **AATCC and IFAI's Outdoor Performance Materials 2005**, Hilton University Place, Charlotte, NC, [www.aatcc.org](http://www.aatcc.org).
- 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 20-22** **CPMA's 2005 International Color Pigments Conference: Innovation in Color Technology**, Hyatt Regency, Baltimore, MD, [cpma@cpma.com](mailto:cpma@cpma.com), <http://www.pigments.org>.
- 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/>.

### Calendar, Continued

- 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>.

### 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

### AATCC/IFAI Outdoor Performance Materials Conference

Outdoor Performance Materials 2005, a technical conference highlighting advancements in outdoor, high performance textile materials and products, will be held March 9-10 at the Hilton University Place in Charlotte, N.C.

Organized by the American Association of Textile Chemists and Colorists (AATCC) and the Industrial Fabrics Association International (IFAI), the Conference will be tailored for fiber, yarn, chemical, and fabric producing firms; textile, material, and product manufacturing firms; research, academic, and government laboratories; and testing facilities.

Session topics will include polymers and fibers, colorants and stabilizers, performance finishes, coatings and laminates, flammability, and product testing.

Visit [www.aatcc.org](http://www.aatcc.org) or [www.ifai.com](http://www.ifai.com) for updated information on Outdoor Performance Materials 2005.

### 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 #413

Jan/Feb 2005

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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
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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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<http://www.iscc.org>



# *Inter-Society Color Council*

Dear ISCC Members:

Attached (or page 14 of the electronic version of the newsletter), please find your ISCC Ballot for the new candidates for the Board of Directors of the ISCC.

It is very important to respond in one of the following ways:

fax your ballot to: 703-318-0514 with a copy of your signature  
or  
mail your ballot in with your signature to the ISCC Office address below  
or  
email your ballot to [iscc@compuserve.com](mailto:iscc@compuserve.com).

These votes need to be sent in by February 28th as we need to tabulate and verify the ballots before the April 23rd Board of Directors Meeting in Cleveland, OH.

In the future, please keep in mind that email is the preferred method of contact for ISCC correspondence.

Every vote is important and we look forward to you being a part of this election. The ISCC exists to serve each ISCC member. This is one of the many ways you can participate in the future of the ISCC.

Postal Mail Address: Inter-Society Color Council  
Attn: Cynthia J. Sturke, Office Manager  
11491 Sunset Hills Road  
Reston, VA 20190

ISCC Office Fax Number: 703-318-0514

ISCC Email Address: [iscc@compuserve.com](mailto:iscc@compuserve.com)

*Inter-Society Color Council*

**2005 ISCC Ballot**

**Election of Board of Directors  
(2005-2008 term)**

Vote for THREE candidates

**A. Nurhan Becidyan** ( )

**Jerald A. Dimas** ( )

**Stephen D. Glasscock** ( )

**Jim Roberts** ( )

Signature \_\_\_\_\_

**Return of Ballot: Please return the completed ballot to the Inter-Society Color Council Office by February 28th as these ballots need to be tabulated and verified before the April 23rd Board of Directors meeting.**

**Thank you.**



# ISCC 2005 Annual Meeting & Special Symposium on Automotive Color and Appearance Issues

Cleveland Airport Marriott  
Cleveland, OH  
April 24 - 27, 2005

Registration Fees: (USD)	Until Mar 15	After Mar 15
<b>ISCC Annual Meeting Only, April 24-25</b> Includes Annual Mtg, Wine & Cheese Reception, Awards Luncheon, Continental Breakfasts and Breaks.	\$325 <input type="checkbox"/>	\$350 <input type="checkbox"/>
<b>Symposium Only, April 26-27</b> Includes Symposium, Continental Breakfasts and Breaks	\$225 <input type="checkbox"/>	\$250 <input type="checkbox"/>
<b>ISCC Annual Mtg &amp; Symposium, April 24-27</b> Includes all Sessions, Wine & Cheese Reception, Awards Luncheon," Continental Breakfasts and Breaks.	\$525 <input type="checkbox"/>	\$550 <input type="checkbox"/>
<b>Students (must have valid student ID-copy included with registration)</b> Annual Mtg <input type="checkbox"/> Symposium <input type="checkbox"/> Annual Mtg & Symposium <input type="checkbox"/>	\$100 <input type="checkbox"/>	\$100 <input type="checkbox"/>
<b>Exhibit Table</b> (*includes 1 full registration to Annual Mtg & Symposium)	\$800 <input type="checkbox"/>	\$825 <input type="checkbox"/>
<b>Exhibit Table</b> (**includes 1 registration to Symposium only)	\$500 <input type="checkbox"/>	\$525 <input type="checkbox"/>

\*Full Registration Fee includes attendance to all Sessions, Wine and Cheese Reception, Awards Luncheon, Continental Breakfasts and Breaks. \*\*Includes Symposium Sessions, Continental Breakfasts & Breaks.

**Cut-off Date for registration: April 14th, 2005. No refunds after this date.  
On-site registration will be available.**

Last Name/ First Name \_\_\_\_\_  
 Badge Name \_\_\_\_\_  
 Affiliation \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Country \_\_\_\_\_ Postal Code \_\_\_\_\_  
 Tel. (Include Int'l Code) \_\_\_\_\_ Fax: \_\_\_\_\_  
 E-Mail \_\_\_\_\_ Country of Citizenship \_\_\_\_\_  
 Accompanying Person (s) \_\_\_\_\_

Accompanying Person(s) Registrations: (Not entitled to attend sessions)

- Wine and Cheese Reception, April 24th Evening    \$ 20
- ISCC Annual Awards Luncheon, April 25th    \$ 30

**Total Amount Due** \$ \_\_\_\_\_ **USD**

- Check or money order payable in U.S. Funds on a U.S. Bank to "Inter-Society Color Council"
  - Charge to the following credit card:     DISC     MC     VISA     AMEX
- Card No. \_\_\_\_\_ Exp. Date \_\_\_\_/\_\_\_\_  
 (Please print clearly) Mo. / Year

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 Attn: Cynthia J. Sturke  
 11491 Sunset Hills Rd, Reston, VA 20190  
 Tel: 703-318-0263 Fax: 703-318-0514  
[iscc@compuserve.com](mailto:iscc@compuserve.com)

For further information and meeting updates, please check our website: [www.iscc.org](http://www.iscc.org)

## **Conference Hotel Information Hotel Information**

Marriott Cleveland Airport

4277 West 150<sup>th</sup> St.

Cleveland, Ohio 44135

Tel: 216-252-5333 Toll-Free: 1-800-228-9290

<http://www.marriott.com>

Attendees should mention ISCC or the Inter-Society Color Council

Cost: \$85 per night

### **Directions for Travel From Cleveland Airport (CLE)**

- 1-216-265-6000
- Hotel direction: 2 mi NE
- Driving directions: Take I-71 North to West 150th St. Exit.
- Bus service, fee: 12 USD (one way)
- Subway service, fee: 1 USD (one way)
- Estimated taxi fare: 12 USD (one way)