



# Inter-Society Color Council *News*

## Issue 415 Contents

## May/June 2005

<b>Datacolor Becomes ISCC Sustaining Member .....</b>	<b>1</b>
<b>Are You Interested in Becoming an ISCC Sustaining Member? .....</b>	<b>2</b>
<b>Fred W. Billmeyer, Jr. Memorial Undergraduate Fellowship in Color Science .....</b>	<b>3</b>
<b>Prof. Gultekin (Tek) Celikiz's Nickerson Award Acceptance Speech .....</b>	<b>3</b>
<b>Meeting Report: ISCC 2005 Special Symposium on Automotive Color and Appearance Issues .....</b>	<b>4</b>
<b>Meeting Report: ISCC 2005 Annual Meeting, April 24-25 .....</b>	<b>5</b>
<b>2005 ISCC Godlove Citation .....</b>	<b>6</b>
<b>Alan Robertson's Godlove Award Acceptance Speech .....</b>	<b>6</b>
<b>ISCC/IS&amp;T Special Topics Meeting November 11-12, 2005 .....</b>	<b>7</b>
<b>Color Research and Application: In This Issue, June 2005 .....</b>	<b>8</b>
<b>ISCC Elects Ralph Stanziola Honorary Member .....</b>	<b>9</b>
<b>Member Items: Maria Nadal and Ted Early Receive Metals .....</b>	<b>9</b>
<b>CALENDAR .....</b>	<b>10</b>
<b>Publications Available from ISCC Office ...</b>	<b>11</b>
<b>Wanted: Colorizer System .....</b>	<b>11</b>
<b>ISCC Sustaining Members .....</b>	<b>12</b>
<b>ISCC Member Bodies .....</b>	<b>12</b>
<b>ISCC News Editor .....</b>	<b>12</b>

### **Datacolor Becomes ISCC Sustaining Member**

Datacolor is delighted to become a Sustaining Member of the ISCC. A Swiss-held company with operational headquarters in Lawrenceville, NJ, USA, Datacolor is a global leader in color-management and color-communication technology. Founded in 1970, the company initially developed solutions for industrial color problems, and then expanded its product offering to include color communication and digital imaging solutions. We understand how to manage color in many industries, and provide efficient color-management solutions for industry, professionals, and consumers.

A division of Eichhof Holding AG (Lucerne, Switzerland), Datacolor has a strong global presence through worldwide manufacturing sites and a strategic network of sales and support offices. Industries supported include plastics, paint, leather, automotive, coatings, apparel, textiles, ink, printing, paper, photography, digital imaging, and graphic design. Datacolor has the unique role of accrediting the color-QC of textile manufacturers worldwide.

ColorVision, a unit of Datacolor, provides affordable, easy-to-use color-matching tools to creative professionals, digital photographers, and consumers. Award-winning ColorVision products perform monitor calibration, printer calibration, and ICC profile editing.

In 2005, Datacolor introduced Datacolor SPECTRUM™, an integrated suite of software products, measuring systems, and supporting services for centralized control of the entire color management process worldwide.

A key new solution in the suite coordinates a fleet of instruments such as the Datacolor 600™ integrating-sphere spectrophotometer. Resident on a user's computer or centrally located on a Microsoft® Terminal Server™, Datacolor MAESTRO uses traceable reflecting specimens to transform a drifted spectrophotometer's measurements so as to agree with a reference instrument. That technology is a refinement of methods developed over the past 20 years [see D. C. Rich & D. Martin, *Analytica Chimica Acta* **380** (1999), 263-276]. MAESTRO instrument correction can now be orchestrated with software that monitors the drift of a single instrument, and also with software that monitors the drift of a fleet of instruments. Datacolor MAESTRO's fleet management module gathers performance statistics and spectral data from automatically-generated e-mails, instantly populates a database and makes the information available to standard reports provided with the application.

Continued from page 1

**ISCC EXECUTIVE OFFICERS**

<b>President</b>	<i>Dr. Joanne C. Zwinkels</i> National Research Council of Canada M-36, Montreal Road Ottawa, ON K1A 0R6 Canada 613-993-9363 fax: 613-952-1394 joanne.zwinkels@nrc.ca
<b>President-Elect</b>	<i>Dr. Robert Buckley</i> Xerox Corporation MS 0128-30E 800 Phillips Road Webster, NY 14580 585-422-1282 fax: 585-265-7441 rbuckley@xeroxlabs.com
<b>Secretary</b>	<i>Mr. John McCann</i> McCann Imaging 161 Clafin Street, Belmont, MA 02478 617-484-7865 fax: 617-484-2490 mccanns@tiac.net
<b>Treasurer</b>	<i>Mr. Hugh Fairman</i> 503 Bradley Court, Princeton, NJ 08540 609-430-1630 fax: 609-4301618 resourceiii@erols.com
<b>Past-President</b>	<i>Dr. Danny Rich</i> Sun Chemical Research 631 Central Avenue, Carlstadt, NJ 07072 201-933-4500x1144 fax: 201-933-5658 richd@sunchem.com

**ISCC BOARD OF DIRECTORS****2003-2006**

Mr. David Battle	GretagMacbeth LLC P.O. Box 14026 79 T.W. Alexander Dr., 4401Bldg, Ste 250 Research Triangle, NC 27709-4026 919-549-7575 fax: 919-549-0421 battle@gretagmacbeth.com
Dr. Maria Nadal	NIST 100 Bureau Drive, Stop 8442 Gaithersburg, MD 20899-8442 301-975-4632 fax: 301-869-5700 maria.nadal@nist.gov
Mr. Sy Commanday	Techmer PM, LLC 1168 Palmour Drive Gainesville GA 30501 770-287-3929 fax: 770-287-0665 scommanday@techmerpm.com

**2004-2007**

Ms. Britt Nordby	Degussa, Inc. 2 Turner Place P.O. Box 365 Piscataway, NJ 08855 732-981-5433 fax: 732-981-5033 britt.nordby@degussa.com
Dr. Frank O'Donnell	The Sherwin Williams Co. 601 Canal Street Cleveland, CA44113 216-515-4810 fax: 216-515-4694 fxodonnell@sherwin.com
Dr. Michael Vrhel	ViewAhead Technology 18200 NE Union Hill Rd., Ste. 120 Redmond, WA 98052 425-882-7918 fax: 425-882-4708 michael.vrhel@viewahead.com

**2005-2008**

Mr. Nurhan Becidyan	United Mineral & Chemical Corp. 1100 Valley Brook Avenue Lyndhurst, NJ 07071 201-507-3300 fax: 201-507-1506 anbecidyan@umccorp.com
Mr. Jerald A. Dimas	Color Communications, Inc. 4000 West Fillmore Street Chicago, IL 60624 773-638-1400 fax: 773-638-5718 jerdim@ccicolor.com
Mr. Stephen Glasscock	Hallmark Cards, Inc. 2501 McGee Kansas City, MO 64108 816-274-4457 fax: 816-274-3867

A related software product for coordinating color creation and development is Datacolor TRACK™, which improves data management among many locations where quality control is to be uniformly exercised on the color of a product. Older methods relied solely on e-mail of text files, but more rapid and comprehensive tools were needed. In answer to this need, Datacolor TRACK provides instant visibility of color information (e.g., color development data) to all partners in a supply chain, using automated e-mail, automated display of communicated data in spreadsheet format, and optional human intervention at multiple job locations and stages. After creating or reading color-development data (a “job”), TRACK automatically delivers pass/fail results to predefined recipients without requiring users to directly access the e-mail program or to modify an e-mail message. TRACK monitors various sources for TRACK data files, including the inbox of the designated mail client. TRACK automatically extracts the contents of such files to a special database and displays them in the job list, from which a user can select and automatically transfer them to other software tools.

Despite all this coordination, Datacolor stays apart from the information flow, allowing each fleet of its instruments to steam independently and privately over the sea of color management.

At every level from instrument to fleet, Datacolor enables customers to manage color, “because color matters.”

*Michael H. Brill and Derek Finch, Datacolor*

Further information about the history of Datacolor will follow in the next issue of the ISCC newsletter.

*Gultekin (Tek) Celikiz*  
*Editor, ISCC Newsletter*

## Are You Interested in Becoming an ISCC Sustaining Member?

As a Sustaining Member of the ISCC, you are entitled to:

1. A link on our website ([www.iscc.org](http://www.iscc.org)).
2. Your contact information displayed on the back cover of the ISCC Newsletter.
3. Up to ten copies of the ISCC newsletter (although receiving the newsletter via email is preferred).
4. A copy of the newly published ISCC Technical Report “Guide to Material Standards and Their Use in Color Measurement (ISCC TR-2003-1).
5. **New benefit available to Sustaining Members Only:** You are eligible to place a 1/4 page black and white ad in our Annual Meeting Program Book - free!.

Please contact either Dave Battle 919-549-7575 ([battle@gretagmacbeth.com](mailto:battle@gretagmacbeth.com)) or Cynthia Sturke, ISCC Office Manager 703-318-0263 ([iscc@compuserve.com](mailto:iscc@compuserve.com)) for further information. You may also download an application form from the ISCC website.

## Fred W. Billmeyer, Jr. Memorial Undergraduate Fellowship in Color Science

Fred Wallace Billmeyer, Jr. was America's premier educator in color science for over 20 years. He directed the education and research programs at Rensselaer Polytechnic Institute through The Rensselaer Color Measurement Laboratory from 1964 to 1984. Dr. Billmeyer remained active for the next 20 years as a consultant and active contributor to ASTM International. He was a major figure holding officer positions in the Inter-Society Color Council since the early 1960's. He was very active in the two most prestigious international color organizations; Commission Internationale de L'Eclairage (CIE) and the International Color Association (AIC). He was pivotal in enticing John Wiley & Sons to publish the first international journal on color. A testimonial of his dedication to this premier journal, *Color Research and Application*, is that he served as its Editor-in-Chief for eleven years, from its founding in 1976. As a scholar, his life was rich: He authored over 280 papers in the fields of polymer chemistry and color science, and wrote seminal textbooks in each subject. Throughout his career he was honored by the many technical organizations to which he contributed. The legacy that any educator hopes for is successful students. Professor Billmeyer, unabashedly, was most proud of his graduates from The Rensselaer Color Measurement Laboratory. (See the figure to the right.) Many are today's leaders in color science and technology.

Rochester Institute of Technology is home

to the Munsell Color Science Laboratory. Established in 1984, it has continued the tradition of graduate education and research in color science since Billmeyer's retirement from RPI. During March 2005, RIT established an undergraduate fellowship in color science to honor Professor Billmeyer and help ensure the legacy of color science leaders.

This fellowship is aimed at supporting undergraduate research in color science as a vehicle to attract outstanding undergraduate students to the field. Funds will be used to annually employ undergraduate students as research assistants in the Munsell Color Science Laboratory or to support their activities as an intern at other universities or research institutions.

A fund of \$100,000 will assure that fellowships can be awarded annually in perpetuity. Donations to Rochester Institute of Technology are tax deductible.



## Prof. Gultekin (Tek) Celikiz's Nickerson Award Acceptance Speech

When I started to teach at the Philadelphia University in 1957, I was asked to introduce a course in "Color Science" and to join ISCC. I wrote a letter to Deane Judd requesting to become a member of the ISCC. He forwarded my letter to

Ralph Evans, who in turn sent me an application. I officially became a member of the ISCC in 1959.

I became active in the Problem Committee 25D - Dyestuff Concentration, Determination by Transmittance Methods and Committee 25R - Dyestuff Concentration, Determination by Reflectance Factor. The study must have been worth publishing as the ISCC Board of Directors gave permission for the publication of the findings of both Committees.

Eventually these two, along with other papers in the field of Color Science were compiled in book form. The book, edited by Rolf Kuehni and me, was published by AATCC entitled "Color Measurements in the Textile Industry."

During the time of ISCC's 25th Anniversary, I did have an opportunity to meet and talk with Dorothy Nickerson. Who would have thought that one day I would be receiving the award which is named after her?

I thank Roland Connelly for asking me to become the ISCC News Editor about 10 years ago. I also thank Cynthia Sturke and Mary McKnight for helping me to publish a high quality newsletter. Recently we have started sending the newsletter by e-mail to members upon request.

I thank everyone again for this honor.

## Meeting Report: ISCC 2005 Special Symposium on Automotive Color and Appearance Issues

On April 26-27, as the Cleveland snow melted following ISCC's Annual Meeting at the Airport Marriott Hotel, Mike Henry (PPG) chaired a Special Symposium on Automotive Color and Appearance Issues. The focus was on the reflecting colors of cars and of their interiors, not on self-luminous displays or headlamps. Unlike other conferences in which theory precedes application and poster papers are kept separate from commercial exhibits, here the automobile manufacturers' needs came first and the posters and commercial exhibits inhabited the same room and competed for prizes. About 70 attendees crowded into the lecture room to hear 13 papers, some poster/commercial mini-intros, and a panel discussion.

The morning session of April 26 emphasized the application of paint to a car's exterior. Jeff Alspach (Dupont, speaking for Allan Rodrigues) started by discussing color paint technology in view of research in ASTM and Detroit Color Council committees. Alspach emphasized that metallic flake paints enhance the perceived curvature of the surfaces they cover; in contrast, a matte surface would appear flatter, and a mirror surface would show what is mirrored more conspicuously than the reflecting surface. Vince Dattilo (PPG) then gave a detailed description of how metallic-flake paint is applied to cars. We heard about the atomization of the vehicle that encapsulates the flakes, the kinds of flakes, the application by centrifugal force and electrostatic field, the drying process whereby the shrinking drop forces the flakes to lie flat, and the perceived result ("voilà" or "do over"). Russ Ferguson (Silberline) then elaborated on metallic color issues in automotive coatings from a supplier's perspective. Jon Nisper (X-Rite) revisited the physical properties of the applied paint (topographic, material, subsurface reflection, and scattering) and related them to how the final product is perceived by humans. Finally, Christine Utter (GE Plastics) discussed the perplexities of instrumental versus human assessments of color difference between different materials.

The afternoon session reaffirmed the concerns of the users of colorant technology, this time emphasizing the car's interior. Keynote speaker Tom Mueller (General Motors, in place of Beth Miakinin) described the market forces: increased customer expectations and evolving technology juxtaposed with increased pressure to reduce prices due to global competition. After that talk, many discussers agreed that it is essential to commercial success for managers and technologists to attend symposia such as this one. Then David Albrecht (GTI Lighting) discussed advances in light-booth design. He pointed to several lighting technologies: filtered tungsten (needs electrical stabilization and added UV), fluorescent lights (stable and UV-laden but untunable), xenon lamps (good for flashes but not for continuous light), and LEDs (good in multitude, color characterization not yet

fully determined). Albrecht also displayed two light booths in the display/poster session, which showed the synergy that can be obtained between effect pigments and directional light sources.

The afternoon ended with a panel discussion: Vince Dattilo, Russ Ferguson, Jon Nisper, Jeff Alspach, and Christine Utter fielded questions such as "Why are gold and light-blue paints most affected by application variables?" (Answer: In such paints, the flake produces most of the color; bent and badly oriented flakes degrade the color.)

The morning session of April 27 (also the final session) became more theoretical, dealing with the optical origins, measurement, and formulation of special-effect colors. Keynote speaker Jacques Gombert (Iso-Color Inc., with Henri Debar) began with gonio-spectrophotometry and effect color matching. The ultimate goal is a piece of software that can prescribe a colorant application that produces any measured BRDF (reflectance as a function of wavelength and four angles). The colorants include not only metallics but also pearlescents (whose inclusions are transparent mica flakes). Interference color is very important in these applications. Gombert also showed a 3D graphical simulation of acquired BRDFs. In a similar vein, Christophe Dauga (Color Viz, with Patrice Kiener) described a program tailored to three absorbing colorants and a metallic one, and showed a real-time 3D graphical simulation of a car painted with a particular BRDF from these colorants. Kent Coulter (Flex Products, with Michael Nofi) described an additive-color approach to formulating with opaque color-shifting interference pigments. Werner Cramer discussed color measurement of interference pigments, and asked how few angular measurements are needed to characterize current effect pigments (one needs only a few viewing and illumination angles, all in the plane of incidence). Gerhard Roesler (Gretag Macbeth) also described the measurement of automotive effect pigments, revisiting the terminology in standards such as the ASTM. Finally, Jack Ladson (Color Science Consultancy) discussed existing and emerging technologies for measuring and controlling effect pigments. He reviewed several multi-angle spectrophotometers (Murakami GSP-1®, X-Rite MA-68®, GretagMacbeth ColorEye® series, and KonicaMinolta CM 512 m3®). Ladson also pointed to emerging technologies with more illumination angles (Datacolor FX-10™) and formulation capability (Iso-Color), and suggested future capabilities such as real-time gonio measurements and digital imaging.

Attendees voting on the interactive sessions awarded Rock-and-Roll Hall-of-Fame mementos to Robert Busquet at NIST for the best poster paper, to X-Rite for the best vendor display, to Byk-Gardner for the "best pitch", and to JDS Uniphase for the most colorful display.

When the meeting ended, the Cleveland sun shone (for a minute) and effect pigments appeared in their best light.

*Michael H. Brill, Datacolor*

## Meeting Report: ISCC 2005 Annual Meeting, April 24-25

Program Chair Dr. Joanne Zwinkels opened the meeting early Sunday morning and introduced Hugh Fairman, Chair, Project Committee 54 on Colors of Maximum Contrast. The 1965 work of ISCC PC 26, chaired by Ken Kelly, is being updated. Twenty-two colors said to be maximally different from each other were identified and defined in the ISCC/NBS system (which is no longer used) and Munsell notation. With the increase in gamut of producible surface colors, these colors no longer are the optimal set of colors with highest contrast. As did Kelly, Fairman proposed taking defective color vision into account. The new set of colors proposed by PC 54 starts with the same 4 colors selected by the Kelly committee but then differs. Hugh proposed the committee write up the work that PC 54 has done rather than doing further research.

Professor Meg Meile next introduced students from the Fashion Institute of Technology in New York. Melody Rosa and Lisa Mastroianni presented "The selection of Crayola® Colors that reminded children of their favorite food." Through the use of surveys and product comparisons, they created a set of food-orientated colors and went on to design packaging and a product presentation for Crayola. This was made more interesting as, quite by chance, a representative from the Crayola® Company was in the audience.

Joe Rosa showed how the use of color in children's books could be extended to help tell the story and so grasp a child's attention from beginning to end. He also incorporated color into the dialogue to help show who was talking. Jason Offsey designed packaging for a line of hair care products. He found the use of vibrant colors necessary to excite kids and make a product stand out on a bottom shelf. Shanif Ladha presented a powerful new brochure for the BMW3 series that used color to enforce brand identity and organize content by using color to highlight major features. Rachael Hinton showed how the use of color in graphic design was as important as traditional text and graphics. Amy Nicole Bannar presented several theatrical gowns for an off-broadway production of Robin Hood in which she used specific colors to illustrate characters; green for Robin Hood, earth tones for the Merry Men and gold for the Tax Collector.

Dr. Alan Robertson, National Research Council of Canada, gave a talk entitled "How color science helps designers to communicate." Alan noted that designers can start to communicate using descriptions of colors, but this leaves open interpretation. He introduced the use of numeric color specification based on physical measurements to reduce confusion and be more precise. He explained the workings of the human eye and how we perceive color and describe it mathematically. He gave one of the best descriptions of metamerism I have ever heard. Alan used several demonstrations to show how Color Appearance depends on the surroundings. He went on to explain how color appearance models work taking into account chroma, color fullness, saturation, hue, adaptation and the adopted white background. The CIE is close to recommending a standard set of eye responses with a link to the standard color matching func-

tions. This will provide a basis for better color formulation with improved indices based on the color appearance model.

Eduardo Milrud an Industrial Designer with the Cleveland Institute of Art explained his interest in industrial design and how to use color to communicate functionality and trigger the desired emotional response to a product. Color influences the user interface, appearance, comfort and acceptance of a product. Industrial designers work at creating an experience combining hard and soft variables, then use color to defines the difference. He used the example of the highly colorful Dyson vacuum cleaner and showed how this stands out verses traditional designs.

Monday papers were from Interest Group I: Basic and Applied Research, Mr. Milt Hardt, Color Communications Inc., Chair. Jeff Alspach of Dupont described the work of the Detroit Colour Council committee on the use of color tolerancing for metallic colors using SAE J1545. This standard was published in 1986 and deals with the determination of numerical color difference and pass/fail for solid colors in the automotive industry. The committee is working to improve the understanding of the relationship between measured and observed color difference and to develop acceptable tolerances for metallic and other special effect coatings.

Brent Luarenti of Eckart America presented "Ultra-thin aluminum pigments for waterborne coatings." Brent described the ball mill process for making conventional aluminum flakes, both corn flake and the thicker and flatter silver dollar type and the Physical Vapor Deposition process that allows for the production of extremely thin pigments having a uniform, smooth surface. These pigments are much brighter in appearance and can give a brilliant mirror like effect. A passivation treatment is used to prevent hydrogen production in water borne coatings.

Dr. Jian Liu described the NRC reference instrument for visual appearance and characterization of gonioapparent materials. It is a fully automated multifunctional instrument for specular gloss and goniochrometric measurements for total visual appearance characterization. The instrument routinely measures over the spectral range 380nm -760nm and can be extended to 300nm - 1000nm. The geometric and spectral performance of the instrument has been compared for reference materials with NIST measurements.

Jeffrey Quill of Q-Panel Products presented the paper "Accelerated acid etch for automobile clearcoats: A joint research project provides lab and field correlation." Acid rain damage of automotive clear coats became a problem in the 80's. Blount Island in Jacksonville Florida is the key field test location. Results of past methods of accelerated testing have not correlated well with the field test results. The idea behind this research project was to match field exposure in Jacksonville in the lab using the Q-sun Xenon test chamber.

On Monday afternoon the papers were from Interest Group II: Industrial Applications of Color. Mr. Gary Regulski, Dupont, Chair. William Lucas of Atlas Material Testing Technology presented the first paper "Using concentrated natural sunlight to accelerate weathering - new developments."

## 2005 ISCC Godlove Citation

To all my distinguished ISCC colleagues and especially to my dear friend, Alan Robertson, please accept my sincere apologies for being unable to attend the Godlove Award ceremony. Although I am not physically present, please know that my heart and spirit are with you today. Alan, I hope my words, spoken by Joanne Zwinkels, help make you feel my touch.

I have had the rare and unique privilege in my lifetime to know a person, first as my idol, then as my mentor, then as my colleague and finally, and most importantly, as my friend. That person is today's Godlove recipient, Dr. Alan R. Robertson. I met Alan at the AIC Troy, NY Congress in 1977 at RPI where I was a very "green" color science graduate student. When I met him, I felt like a science student meeting Albert Einstein for the first time. I idolized him for his breadth of knowledge in all aspects of color science and I couldn't believe that he was so young. I thought I would never be able to gain as much color science expertise as Alan in my lifetime.

As time went on and I started my career at Kodak, my relationship with Alan changed. He became my mentor. I needed help as I introduced the 1976 CIE color difference formulae to the Kodak research community. My Kodak colleagues would ask questions like; "When should I use CIELAB?" or "When should I use CIELUV?" I knew that Alan was like the "father" of these color difference formulae, so I called him asking for advice on how to answer these questions. His advice gave me, "the new kid on the Kodak block," more credibility. Then Kodak research moved into a mode where basic colorimetry was no longer serving its purpose to answer all of our imaging color applications. So I invited Alan to come to the Kodak Research Labs to educate us on advanced colorimetry. This launched years of research at Kodak that allowed us to incorporate some important color appearance aspects into our product portfolio to make it more attractive to the consumer. Alan, for this significant contribution, I thank you and Kodak thanks you.

Then Kodak started sending me to CIE meetings where I was able to see a different side of Alan. As Associate Director of CIE Division 1 on Color, Alan was my coach on how to be a good Technical Committee Chair. My CIE work would never have been successful if it hadn't have been for the help and support of Alan. Today Alan and I are more like colleagues working together on standardizing various aspects of color important to CIE Division 1.

Our paths crossed again in the international color community of the AIC. I was asked to serve on the AIC Executive Committee and I really knew nothing about what such a commitment would entail. Alan was AIC President at the time and he not only explained the commitment to me but expressed his confidence in me being a good candidate to serve on the AIC Executive Committee. Once again, without Alan's encouragement, I may never have pursued involvement in the International Color Association.

Throughout our CIE and AIC lives, my friendship with Alan has grown as we have met in various countries all over the world. As a female traveling alone, he made sure I was included on group outings. Alan, I am forever grateful that you always included me. You never minded walking with me in my suit and sneakers from hotels to conference centers.

I have just shared with you how, over the course of the

last 28 years, Alan's lifetime contributions to color science have impacted my life and such organizations as the CIE and AIC. Joanne will share with you more details of Alan's career.

I would like to close my comments with this message: "Alan it has been my distinct honor and pleasure to have had you as my idol, mentor, colleague and friend for the past 28 years. Congratulations on receiving the ISCC's highest award of honor, the 2005 Godlove Award. You are exceptionally deserving of the award. I hope you cherish this moment for the rest of your life."

*Paula Alessi, Eastman Kodak*



## Alan Robertson's Godlove Award Acceptance Speech

I would like to thank the ISCC and the Godlove Award Committee most sincerely for honouring me with this Award, and Joanne Zwinkels and Paula Alessi for their kind and flattering words. I would also like to thank the local ISCC Committee for their hospitality and particularly for arranging this nice Canadian weather. However, they need not have made the effort – I would have been quite happy to endure some warm American sunshine!

When Joanne came to my office a few weeks ago to give me the news, I could not believe it. I have twice had the honour of giving the citation for the Godlove Award but never in my wildest dreams did I think I would ever be on the receiving side. The citations that I presented were for my two main mentors – David Wright who was my Ph.D. supervisor and Gunter Wyszecki who was my supervisor at NRC for 20 years. I owe a lot to both of them and am proud to be following in their footsteps.

Terry Godlove, in his introduction a few minutes ago, mentioned several colour scientists he had met, including Deane Judd, Dorothy Nickerson, Hugh Davidson and Henry Hemmendinger, all previous recipients of this Award. In my younger days, I met all of them too but I would like to mention one other scientist, who lived well before my and Terry's time, but who brings a link between our field of colour science and Terry's field of nuclear science—Erwin Schrodinger who, in addition to his better known work in nuclear science, wrote some important papers on colour thresholds.

I am grateful to Terry Godlove's step-mother, Margaret Godlove, for establishing the Award in 1956 in memory of her husband, and to Terry who, as you have heard, has added a significant monetary component. Thank you all very much.

## ISCC/IS&T Special Topics Meeting November 11-12, 2005

The Inter-Society Color Council (ISCC) and the Society for Imaging Science and Technology (IS&T) will host a Special Topics Conference (historically known as a Williamsburg Conference) Nov. 11-12, 2005 in Scottsdale, Arizona immediately following the annual Color Imaging Conference. The Conference will address, "Precision and Accuracy in the Determination of Color in Imaging."

Over the past ten years there have been many advances in the analysis and modeling of the color and appearance of colored images and colored image reproduction. These models include ICC profiles, 4D profiles, gamut mapping, illuminant estimation, adaptation, multi-resolution spatial comparisons, LED, OLED and general color appearance predictions. In each of these applications, the reliability of the model depends critically on the reliability of the measurements of the color stimulus functions. This conference will specialize on accurate measurements of materials and scenes across the visible spectrum and over a wide range of radiances. The conference will cover the scientific techniques for photometric and radiometric measurements with special emphasis on the degree of precision and accuracy required for specific applications. Additionally, the conference will include discussion of a wide variety of practical applications, verifying the performance of instruments for these measurements and the pitfalls of inaccurate measurements. Topics covered will include the

effects of fluorescence on measurements, assessing and quantifying instrument performance and methods for reducing the uncertainty of instrumental measurements. Also included will be a focused session on the problems of standardization in high dynamic range imaging.

This meeting will include keynote addresses by scientists from standards laboratories and industrial research groups and contributed papers that address the issues of precision and accuracy in the measurement of color for use in characterizing and profiling graphic devices such as digital printers, digital proofers, presses, scanners, digital cameras and visual display units. Current speakers include Dr. Michael Pointer of the NPL, Dave Wyble of RIT, Danny Rich of Sun Chemical, and others.

The meeting is being co-hosted by the IS&T (Imaging Society) and the ISCC. If you want more information please contact the program chairs. If you would like to submit a paper, please send your submissions to a program chair no later than July 15th, 2005.

Danny C. Rich  
Sun Chemical Corp.  
(201)933-4500x1144

[danny.rich@na.sunchem.com](mailto:danny.rich@na.sunchem.com)

John McCann  
McCann Imaging  
(617)484-7865

[mccanns@tiac.net](mailto:mccanns@tiac.net)

Meeting updates will be posted at [www.iscc.org](http://www.iscc.org).

*Continued from page 5*

He explained how the EMMAQUE, a fresnel-reflecting solar concentration device, is used to concentrate direct sunlight on a sample to produce 1-year worth of irradiance over a 3-4 month period. New developments in this field provide for independent control of temperature, humidity and irradiance allowing much more control over accelerated testing.

John Campbell of Americhem presented "Color tolerances using color equations and visual data for automotive interior polypropylene colors," or alternatively "CMC for fun and profit." CMC is a color difference equation resulting from a modification of the CIElab color space and is based on lightness, chroma and hue. The modification provides a numeric value, DE<sub>cmc</sub>, which describes the color difference between a standard and a sample in a more uniform color space and represents the volume of the acceptance ellipsoid around the standard. The elliptical tolerancing provided by CMC changes size in response to the region in color space. Typically the eye allows for greater differences in lightness than chroma or hue. The Holy Grail of color tolerancing is to get agreement between instrumental and visual data. Unfortunately however eyes often disagree. One of the advantages of CMC is the use of a single pass/fail number. John finished by suggesting that recent developments in this field, CIE 94 and CIEDE2000, are potentially more accurate.

Dr. Romesh Kumar of Clariant Corporation presented "Lead-free pigmentation of paints: Possibilities and limitations." The paint industry has been looking for ways to re-

place lead-based pigments for many years due to environmental and toxicological regulations. Decorative coatings went lead free in the 60's; however industrial coatings still use lead for yellows, reds and oranges. Lead-based pigments provide highly saturated shades with excellent hiding power, good flow, and a low price. Organic lead-free pigments are associated with poor viscosity, higher cost, poor opacity and dispensing. However, Romesh noted several ways of improving the performance of organic pigments, including optimizing particle size, adding light scattering inorganic lead-free pigments, adding complimentary pigments, and using pale grey or colored primers to improve apparent hiding.

Yoshio Okumura presented "Optimizing Saunderson coefficients based on measurement geometry and varnishing effects for artist paints." The Saunderson coefficients, K1 and K2, used in Kubelka-Monk match prediction are based on measurement geometry and varnishing effects. A key issue for spectral match prediction is the effect of surface roughness. A statistical model was developed to optimize the coefficients based on correlation between surface roughness and spectrophotometer measurements. Acrylic paint samples were prepared with different surface states, varnished and nonvarnished. When measuring paint with and without varnish no difference is seen in diffuse sphere geometry specular included (SPIN) reflectance but differences were seen in the sphere geometry specular excluded (SPEX). Hence, the authors wanted to simulate SPEX and determine a

*Continued on page 11*

## Color Research and Application

### In This Issue, June 2005

Does the temperature of the material affect the color measured? For some materials it does, for others not. For example, it has been well documented that the red ceramic tile that is widely used to calibrate colorimeters and spectrophotometers is thermochromic. Thus, temperature is one of the parameters that must be measured and controlled when doing precise calibration with these tiles. In our first article, J. Mutanen, T. Jaaskelainen, and J. P. S. Parkkinen go a step further and extend this question to fluorescent materials. With the advent of commercial bispectral instruments, it is now possible to measure fluorescent materials more easily. Data is collected on temperature-dependent changes in the radiance spectra of several materials. In "Thermochromism of Fluorescent Colors" Drs. Mutanen, Jaaskelainen, and Parkkinen report that in some materials that have fluorescence, the thermochromic changes can be as high as four times the thermochromism of similarly colored non-fluorescent materials. They find that there can be color difference changes as high as 25 CIELAB color difference units.

Reflected light conveys information to the observer about the objects in the scene, but it also provides information about the ambient illumination. Even when there are significant changes in illumination color and luminance level, there is a tendency to perceive that the color of objects remains the same. We use the term "color constancy" for this phenomenon. In an earlier article Marcel P. Lucassen and Jan Walraven examined color constancy in the chromatic domain. Now our next article, "Separate Processing of Chromatic and Achromatic Contrast in Color Constancy," focuses on the achromatic dimension examining luminance contrast and overall illumination level. They present a modified version of the cone-specific response function, incorporating separate processing of color and luminance contrast and discuss the implications.

Our next article also relates to illumination level. Color discrimination ellipses form the basis of color difference metrics and are basic components leading to a uniform color space. In "Effect of Luminance of Samples on Color Discrimination Ellipses: Analysis and Prediction of Data" Ralph Pridmore and Manuel Melgosa look at three effects of luminance on chromaticity discrimination. The luminance affects the ellipse area, the axis dimensions, and the axis ratio. The authors go on to discuss the implications of these effects on uniform color space.

Most of the color-difference formulae, which were introduced after the CIELAB formula was recommended in 1976, were developed by fitting certain bodies of experimental data. Thus, they incorporate certain reference viewing conditions and a comparison of samples within a certain range of differences (usually small). It would be desirable to have a universal color-difference equation for all industrial applications. Such an equation would cover not only different viewing parameters such as background colors, separation, textures, etc., but also color differences of different magnitudes. Our

next article reports data gathered from visual experiments conducted using a CRT for the evaluation of threshold and suprathreshold color differences. In "Visual Evaluation at Scale Threshold to Suprathreshold Color Difference," Haisong Xu and Hirohisa Yaguchi analyze these data and use the visual results to test three color-difference formulae: CMC, CIE94, and CIEDE2000.

In the December 2004 issue of this journal Kevin W. Houser and Xin Hu reported on "Visually Matching Daylight Fluorescent Lamplight with Two Primary Sets." For that work they used a specially designed visual colorimeter. In this issue the same authors describe "The UNL Trichromatic Colorimeter" used for that and other research. The colorimeter at the University of Nebraska-Lincoln was principally designed to study the effect of field size on the structure of color-matching functions and to explore the validity of transformation of primaries. However, it has the flexibility to be used for numerous other psychophysical experiments in which the main variable is the spectral structure of the light being viewed. The article in this issue documents the construction and performance of this visual colorimeter. The authors also report Maxwell-method color-matching functions measured on this apparatus and compare the results to those reported by Thornton under similar conditions.

Before we leave color perception, we have one more article. In an earlier article [Vol 28: 284-297, 2003], Yoshinobu Nayatani proposed a perceived color-appearance space that was a modification of the Hering opponent-colors system. This space was quite different from both the Munsell Color System and the Natural Color System. Thus it is organized with different perceptual concepts. In the article in this issue, Dr. Nayatani joins with Hitoshi Komatsubara to clarify the "Relationships among Chromatic Tone, Perceived Lightness, and Degree of Vividness" in this new system.

After five articles in a row that deal with color perception, we change course completely for our last article of this issue. The question asked in this article is "Can Future Colour Trends be Predicted on the Basis of Past Colour Trends?" Humans can perceive millions of colors, but which ones will be popular next? If one knows the future, there are economies of production to be reaped, and advantages of preparation that can give a company an edge. Thus color forecasting has become an important industry. Jill Stansfield and T. W. A. Whitfield investigate the popularity of residential interior colors in Australia during the twentieth century and the possible causes of changing color palettes. From this data they examine the assumptions upon which color forecasting is based.

We close this issue with two book reviews. Prof. Ken Burchett tells us about *Color Harmony and the Visual Message* by Antal Nemcsics and Rolf Kuehni reviews *Sight Unseen An Exploration of Conscious and Unconscious Vision* by Melvyn A. Goodale and A. David Milner. The CIE has three publications which are briefly introduced: CIE Publication 152:2003, *Proceedings of the 25th Session of the CIE San Diego, USA, 25 June - 2 July 2003 (CD-ROM)*;

*Continued on page 9*



Continued from page 8

CIE 162:2004, *Chromatic Adaptation under Mixed Illumination Condition When Comparing Softcopy and Hardcopy Images Vienna: CIE Central*; and CIE S 012/E:2004- *CIE Standard Method of Assessing the Spectral Quality of Daylight Simulators for Visual Appraisal and Measurement of Colour*. Also Magenta Yglesias reports on the ISCC Williamsburg Conference on Color and Design and Maria de Matiello gives a brief summary of ArgenColor04.

Ellen Carter, Editor

Color Research and Application



## ISCC Elects Ralph Stanziola Honorary Member

The Inter-Society Color Council (ISCC) is pleased to announce that Mr. Ralph Stanziola has been elected as an Honorary Member. Honorary Membership is reserved for those ISCC members who have rendered signal service to the ISCC or to those fields served by the individual Member-Bodies of the ISCC, in such manner as to aid in accomplishing the objectives of the ISCC.

Founded in 1931, the ISCC is an organization of societies and creative individuals who work to propagate the understanding of color and to promote communication between technically oriented specialists in color and creative workers in art, design and education. Additionally the ISCC promotes educational activities and the interchange of ideas on the subjects of color and appearance among its members and the general public.

Mr. Stanziola joined the ISCC in 1962 and has been an active member since that time. He served two terms on the ISCC Board of Directors — from 1980 to 1983 and from 1999 until 2002. He co-chaired the ISCC 1992 Annual Meeting that celebrated the 25th anniversary of the AIC and the joint meeting with the Detroit Colour Council in 1994 on Color and Quality. Most recently Stanziola co-chaired the very successful Williamsburg Conference on Industrial Color Problems. He was instrumental in setting up the Education Interest Group and was also the first chairman of the Industrial & Applied Color Interest Group. In 2004 Mr. Stanziola was presented the ISCC Nickerson Service Award.

In 1985 Mr. Stanziola founded Industrial Color Technology, which offers a variety of services primarily directed towards the solution of industrial problems that involve color control. In 1970 he was one of the founders of Applied Color Systems, Inc. where he was the Executive Vice-President and Technical Director. He spent nine years as Technical Representative and General Sales Manager for Davidson and Hemmendinger, Inc. and later for Kollmorgen Corporation, which had acquired Davidson and Hemmendinger. Stanziola also spent nine years in Research and Technical Service for the Dyes Department of the American Cyanamid Company.

Mr. Stanziola received his B.S. degree in Chemistry from the Philadelphia College of Textiles and Science, which is now Philadelphia University. He holds three patents and has authored a number of technical papers. Stanziola developed the Color Curve System for color communication. In 1995, the Technical Association of the Pulp and Paper Industry presented him with their Finest Faculty Award. He is a member of the Federation of Societies for Coatings Technology (FSCT) from which he received the Armin J. Bruning Award for his outstanding contribution to the science of color in the field of coatings technology. He is also a member of the American Association of Textile Chemists and Colorists (ATTCC), and the Detroit Colour Council (DCC).

---

## Member Items:

### Maria Nadal and Ted Early Receive Metals

Maria Nadal, Physics Laboratory, National Institute of Standards and Technology (NIST) and Edward Early, formerly with NIST, were awarded Department of Commerce's Bronze Metals in a December 2004 ceremony at NIST. It is the highest honorary award granted by the NIST Director and given for superior performance characterized by outstanding or significant contributions which have increased the efficiency and effectiveness of NIST. Nadal and Early were awarded the metal for the development of a state-of-the-art instrument and the associated calibration service to meet industry's needs for improved color measurements and standards. The team also developed the statistical analysis tools to help industry determine their color-measurement uncertainties. Maria also serves on the BOD of ISCC and is active in ASTM, E12.

## CALENDAR

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

**Ms. Cynthia Sturke**  
**ISCC Office**  
**11491 Sunset Hills Road, Reston, VA 20190**  
**703-318-0263 tel 703-318-0514 fax**  
[iscc@compuserve.com](mailto:iscc@compuserve.com) website: <http://www.iscc.org>

### 2005

- 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, 703/641-9090, <http://www.imaging.org/conferences/beijing/index.cfm>
- May 24-25** **PRINTING 2005: A DIGITAL REALITY**, a symposium sponsored by AATCC and [TC]2 at the New School University, 65 Fifth Ave. at 13th St., 919-549-8141  
<http://www.aatcc.org/>
- Jun 4** **International Conference on Testing and Quality Control for the Textile Industry** AATCC, China Textile & Apparel (CTA) and Journal for Asia on Textile & Apparel (ATA), Holiday Inn Pudong in Shanghai, 919-549-3538, <http://www.aatcc.org/>
- June 15-17** **ASTM E12, Color and Appearance**, Hilton Reno Resort; Reno, NV, [www.astm.org](http://www.astm.org)
- July 20-21** **AATCC Textile Testing Workshop**, AATCC Technical Center in Research Triangle Park, N.C, 919-549-3535, [www.aatcc.org](http://www.aatcc.org)
- Sept 19-21** **Print Quality Symposium – 2005 TAPPI**, Wyndham Baltimore Inner Harbor , Baltimore, MD, (770) 209-7399, [mquinlin@tappi.org](mailto:mquinlin@tappi.org)
- Sept 15** **Exterior Color and Appearance Harmony Symposium**, Detroit Colour Council, <http://www.detroitcc.org/>
- Oct 4-5** **Color Technology**, Detroit Colour Council, <http://www.detroitcc.org/calendar.htm>
- Oct 6-7** **VEHICLE DISPLAY 2005, 12th Annual Symposium on Vehicle Displays**, SID, Dearborn, Michigan, 408-977-1013, <http://www.sid.org/>
- Oct 14-18** **CMG's Fall International Conference**, Color Marketing Group, Vancouver, British Columbia, Canada, 703-329-8500, [www.colormarketing.org](http://www.colormarketing.org)
- Oct 16-20** **Frontiers in Optics 2004 / Laser Science XXI**, Optical Society of America/American Physics Society, Hilton Tucson El Conquistador Golf and Tennis Resort, Tucson, AZ, 202-223-8130, <http://www.osa.org/meetings/annual/>
- Oct 21-23** **OSA Vision Meeting**, Optical Society of America, Doubletree Hotel, Pat Broyles, Tucson, AZ, (520) 322-3800 ext. 202, <http://www.osavisionmeeting.org/2005/overview.php>
- Oct 25-27** **2005 AATCC International Conference & Exhibition, Hyatt Harborside, Boston, MA**, 919-549-8141, <http://www.aatcc.org/>
- Nov 7- 11** **IS&T/SID's Thirteenth Color Imaging Conference**, The SunBurst Resort, Scottsdale, Arizona, 703/642-9090, <http://www.imaging.org>
- Nov 11-12** **ISCC/IS&T Special Topics Meeting, "Precision and Accuracy in the Determination of Color in Imaging,"** Scottsdale, Arizona, 703-318-0263, <http://www.iscc.org>
- Dec 4-6** **PIA/GATF Color Management Conference**, Pointe Hilton Tapatio Cliffs Resort, Phoenix, AZ, 412-259-1755 <http://www.gain.net/conference/brochure/index.cfm?ConferenceID=550>

### 2006

- Jan 8–11** **IESNA Annual Conference**, Marriott Marquis Hotel, New York City, NY, 212-248-5000, [http://www.iesna.org/programs/meetings\\_calendar.cfm](http://www.iesna.org/programs/meetings_calendar.cfm)
- Jan 22-25** **ASTM E12, Color and Appearance**, Embassy Suites Hotel, Ft. Lauderdale, FL, (610) 832-9585, [www.astm.org](http://www.astm.org)

<b>Apr 7-11</b>	<b>CMG's Spring International Conference</b> , Color Marketing Group, Denver, Colorado, 703-329-8500, <a href="http://www.colormarketing.org">www.colormarketing.org</a>
<b>May 1-5</b>	<b>Prospecting for Geospatial Information Integration, asprs</b> , The Imaging and Geospatial Information Society, Reno Hilton Hotel, Reno Nevada, 301) 493-0290, <a href="http://www.asprs.org">http://www.asprs.org</a>
<b>May 9-11</b>	<b>CORM 2006 Annual Conference, Industry and National Metrology Institutes: Partners in Light Measurement Problem Solving</b> , National Institute of Standards and Technology Gaithersburg, MD, 440-542-8042, <a href="http://www.corm.org/CORM2006_information.shtml">http://www.corm.org/CORM2006_information.shtml</a>

**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

**Wanted: Colorizer System**

For a book project on color order systems, I am looking for an owner of the original version of the Colorizer System published in mid-20th century by the Colorizer Association in Salt Lake City, UT and containing over 1500 standards. Owners are asked to contact Rolf Kuehni at 704-366-1760 or at [rkuehni@carolina.rr.com](mailto:rkuehni@carolina.rr.com).

*ISCC Meeting Report, Continued from page 7*

relationship between SPIN & SPEX. A high correlation between specular gloss and the visual gloss effect was found.

Brian Thompson of Sun Chemical presented a paper on "Quinacridone: synthesis and use in automotive coatings." Quinacridone pigments, used in the automotive industry for many years, are a high performance pigment providing yellowish red to violet shades depending on the substitute used in the chemical formula. They are manufactured by competing processes from a couple of manufacturers. Solid solutions offer extensions to the possible shade range and improvements in transparency, color strength, light-fastness and rheology. By manipulating particle size it is possible to control color and opacity, with crystal shape affecting rheology and hue. Host/guest and mixed crystal forms occur when molecules of a quinacridone structure insert themselves into the crystal lattice of host quinacridone with a different structure during a co-crystallization process. This results in a color shift, which extends the range of shades and can give improvements in chroma and hue.

*David Battle, GretagMacbeth LLC*

**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 #415**

**May/June 2005**

**Editor: Prof. Gultekin Celikiz**

tel: 215-836-5729 fax: 215-836-0448

[iscc@compuserve.com](mailto:iscc@compuserve.com)

**Associate Editor: Cynthia Sturke**

tel: 703-318-0263 fax: 703-318-0514

[iscc@compuserve.com](mailto:iscc@compuserve.com)

**Assistant Editor: Mary McKnight**

tel: 301-975-6714 fax: 301-990-6891

[mary.mcknight@nist.gov](mailto:mary.mcknight@nist.gov)

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
DataColor	<a href="http://www.datacolor.com">www.datacolor.com</a>	609-895-7432
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
GretagMacbeth, LLC	<a href="http://www.gretagmacbeth.com">www.gretagmacbeth.com</a>	800-622-2384
Hewlett-Packard Company	<a href="http://www.hp.com">www.hp.com</a>	650-857-6713
Hunter Associates Laboratory, Inc.	<a href="http://www.hunterlab.com">www.hunterlab.com</a>	703-471-6870
IsoColor Inc.	<a href="http://www.spc-software.com">www.spc-software.com</a>	201-935-4494
Konica Minolta	<a href="http://www.konicaminolta.us">www.konicaminolta.us</a>	201-574-4000
Labsphere, Inc.	<a href="http://www.labsphere.com">www.labsphere.com</a>	603-927-4266
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)

### ISCC News Editor

Prof. Gultekin (Tek) Celikiz  
[iscc@compuserve.com](mailto:iscc@compuserve.com)

1309 Paper Mill Rd, Erdenheim, PA 19038-7025  
 tel: 215-836-5729 fax: 215-836-0448

### ISCC Office Manager

Cynthia J. Sturke, Office Mgr.  
[iscc@compuserve.com](mailto:iscc@compuserve.com)  
<http://www.iscc.org>

11491 Sunset Hills Road, Reston, VA 20190  
 tel: 703-318-0263 fax: 703-318-0514