



Inter-Society Color Council News

Issue 468

Fall 2014

Board of Directors Corner

At the end of this calendar year my two-year term as the President of the ISCC will be complete. Starting in January the organization will transfer to the leadership of Mr. John Conant from Aerodyne Research, and in the next newsletter he plans to share his thoughts on the direction of the organization. The changing of the guard is a time to step back and reflect on the changes



that have occurred in that time period.

Two years ago we were just beginning the transition to a more virtual organization that relies solely on volunteer participation. During this time, I feel the Board has done an excellent job stabilizing the organization, and continues to challenge our cul-

ture/beliefs to help transform the ISCC into a more valued resource for its members. In the last two years these are some of the major accomplishments of the ISCC:

- Reduced budget obligations which translated to reduced dues structure for individual members
- Restructured the By-Laws to transfer the voice of the organization from member bodies to the individual members to better reflect the behavior of the organization for the last 10+ years.
- Shifted the newsletter to quarterly publications to emphasize quality content. Shifted the newsletter process to a digital distribution-first strategy to reduce cost and effort.
- Digitized and posted most of our past ISCC News issues so that they can be more easily referenced by the larger color community.
- Recognized two Godlove, a Macbeth, and a Nickerson Award recipients
- Held our first virtual Annual Meeting in 2013
- Will hold a follow-up virtual meeting on Wednesday, November 12, 2014 (please see details on p. 2)
- Spearheaded Color, Light and Appearance Week at NIST with one full day of an ISCC Bridge Symposium in 2014
- Launched a research exploration into the ISCC historical collection at the Hagley Museum

Despite all of the progress listed above, this is only the beginning of redefining the organization. In view of the industries and applications that rely on building their own color capabilities, what should now be the role of the ISCC? Historically our primary goal was to educate and connect, and I believe that is still our role today. Color technology has become fairly easy to use, which has lowered the educational cost of entry into our space, and in

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Board of Directors Corner continued

turn is making it more challenging for an educational based organization to have a prominent identity. But broad-based, high quality color understanding is still rare, and can still be improved through the ISCC. I believe that the focus of the next few years will be to grow the identity of the ISCC. One of the things that has me excited is that John has been leading a sub-committee that is discussing how to utilize social media better to help promote the ideals of the organization. I am hopeful that the ISCC community can generate a regular cadence of content through ISCC channels to help enhance the color community as a whole.

It has been a great honor to represent the ISCC as President for the last two years and I am looking forward to the future of the ISCC.

Scot R. Fernandez
Hallmark, ISCC President

ISCC 2nd Teleconference Meeting – Wednesday, November 12, 2014

After the success of our first teleconference meeting in 2013, the ISCC Board of Directors decided to hold a second one. We would like all ISCC members to participate in this virtual meeting. It will take place on Wednesday, November 12, 2014 from 2-3PM EST.

Our first teleconference meeting marked a significant change in our dues structure and the formation of a Social Media Committee. Individual member dues were reduced in 2014. Member Bodies are no longer required to pay any dues and they no longer have voting rights.

This dues change recognizes that we are now more an organization of active individual members than Member Bodies. The ISCC continues to support the activities of our Member Bodies by publicizing meetings and other activities like co-location of meetings. In addition, we hope that Member Bodies will share information pertaining to ISCC with their members. This teleconference will feature a report on the activities of the Social Media Committee. Feedback from our members on how the Social Media Committee is doing will be welcome.

The two biggest items that were left open from our first virtual meeting were:

1. Can the ISCC still cover such a wide group of interests – art, science, industry, education or should it narrow its focus?

continued on next page

ISCC Second Teleconference Meeting continued

2. Are the aims, as outlined in our By-Laws, still appropriate? A complete listing of our aims can be found at

<http://www.iscc.org/organization/aims.php>

Our second teleconference will focus on these two questions. Please consider joining us so that your voice can be heard.

Here is how you can participate in this important meeting:

1. **Please register for the meeting TODAY by clicking on the following link:** <https://attendee.gotowebinar.com/register/2179101566353006082>

After registering, you will receive a confirmation email containing information about joining the webinar. Registration will put the meeting on your calendar and you will receive reminders as the meeting day and time get closer.

2. **ON NOVEMBER 12th, click on the link that was sent to you in your confirmation email on the day you registered.** This will allow you to join the webinar.

You will then be prompted to choose one of the following audio options:

TO USE YOUR COMPUTER'S AUDIO:

When the webinar begins, you will be connected to audio using your computer's microphone and speakers (VoIP). A headset is recommended.

--OR--

TO USE YOUR TELEPHONE:

If you prefer to use your phone, you must select "Use Telephone" after joining the webinar and call in using the numbers below.

United States

Toll: +1 (480) 297-0022

Access Code: 415-140-275

Audio PIN: Shown after joining the webinar

3. If you want to just listen to the meeting, please use the above telephone information.

If you have any questions about this procedure **before November 12th**, please contact John Conant at jconant@aerodyne.com or 978-663-9500. For questions **on November 12th during the meeting**, please contact Dave Wyble at drwyble@gmail.com or 585-259-5956.

The ISCC can be shaped by you, the members. Now is your time to help define how the ISCC can best function in 2014 and beyond.

Candidates for the Open ISCC Board of Director Positions

There are three candidates for the three ISCC Board of Directors open positions. Their terms will end in 2017.

David R. Wyble is President and founder of Avian Rochester, LLC, a color measurement and consulting company established in 2011. Prior to that, Dave was a Color Scientist and adjunct professor in the Munsell Color Science Laboratory, at Rochester Institute of Technology in Rochester, New York. He



received his Ph.D. in Color Science from Chiba University in 2007. He received a MS degree in Color Science from RIT in 1998, and a BS in Computer Science from SUNY Brockport in 1992. He has published appearance papers, book chapters, and conference proceedings on color printing, device modeling, and color measurement. Dave's original interest in color began while working on image quality modeling of color printers at Xerox Corporation.

He is been a participating member of ISCC, CORM, ASTM, and IS&T, serving in various committee and conference positions. Most recently as ISCC Webmaster, member of Board of Directors, co-chair of the 2012 ISCC Annual meeting in Manchester NH, and chair of the 2009 Annual Meeting in Rochester NY.

Renzo Shamey is a full professor of color science and technology at North Carolina State University in the Textile Engineering Chemistry and



Science Department and an honorary professor at Tianjin Polytechnic University, China. He received his Ph.D. in Color Science (Chemistry) from Leeds University in the UK. His undergraduate and M.Sc. education were in the general field of textile chemistry & engineering with a specialty in coloration technology.

He worked in the textile industry for a few years and following a short stint as a postdoc moved to teaching and research at universities first in the UK in 1997 and then in the USA in 2003. His color science research interests include blackness, whiteness, grays, modeling color differences, color perception,

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Candidates for ISCC Board of Directors continued
unique hues and texture.

Renzo has published 79 peer reviewed articles, 3 books and 3 book chapters, over 100 conference papers and 5 patents and invention disclosures. He has advised 20 Ph.D. and 5 MS theses.

He is active in several professional organizations including the American Association of Textile Chemists and Colorists (AATCC), Society of Dyers and Colorists (SDC), International Commission on Illumination (CIE), Optical Society of America, and Society for Imaging Science and Technology. Renzo currently chairs Color Measurement Test Methods committee RA36 (AATCC) and is a Co-Chair of CIE TC1-76 on Unique Hues. Renzo also serves on several journals' editorial boards and is a section editor for the Encyclopedia of Colour Science and Technology. He has won many awards within the AATCC, SDC and teaching communities. More information can be found on Renzo Shamey at the North Carolina State University website <http://www.tx.ncsu.edu/rshamey>.

Jack A Ladson studied Optics at the University of Rochester and graduate level Mathematics at the Massachusetts Institute of Technology. For thirty-five years, Ladson has worked in the field of color and appearance technology.



He chairs the ASTM sub-committees: ASTM E12.02 on Colorimetry and Spectrophotometry and ASTM E12.06 on Digital Imaging. He is the sole

creator of 5 ASTM standards.

Jack has served in professional organizations as President of the ISCC, a representative to the International Standards Organization (ISO), a BOD member of the Color and Appearance Division of the Society of Plastic Engineers (SPE), a reporter and member of the CIE, and a member of Council on Optical Radiation Measurement, (CORM).

Ladson has published over 40 refereed papers on color; including digital imaging, color appearance phenomena, instrumental performance and process control.

Ladson is an invited lecturer and teaches industry and lectures on Color and Color Science in the Americas, Africa, Asia and Europe. He is an adjunct professor for Penn State, lecturing on Color, Color Science and Coloring of Plastics throughout the state of Pennsylvania. He served as an advisor for 5 years to the PENN State Advisory Board on

Nanoparticles. He is a US Expert on Digital Cameras. He is the principal in Color Science Consultancy. More information is available at www.colorsocieties.net.

Ballots for these three Board of Director candidates will be sent out soon.

2014 ISCC Macbeth Award Announcement

The Inter-Society Color Council will present its 2014 Macbeth Award to Dr. Françoise Viénot, Professor Emeritus from the French National Museum of Natural History in Paris.

The Macbeth Award was established by Mr. Norman Macbeth, Jr. in honor of the memory of his father, Mr. Norman Macbeth. The award is usually, but not necessarily, presented biennially in even-numbered years.

The Macbeth Award is given for one or more recent outstanding contributions in the field of color. It is to be presented to a member, or former member, of the Council. The contribution to color may be direct, it may be in the active practical stimulation of the application of color, or it may be an outstanding dissemination of knowledge of color by writing or lecturing.

In the case of Dr. Viénot, she is being recognized for her leadership in the development of a "Fundamental chromaticity diagram with physiological significant axes" by the CIE Technical Committee 1-36. This is an exciting and significant achievement in the field of color vision and provides color science researchers with a framework for examining many longstanding questions in applied color technology. Already,



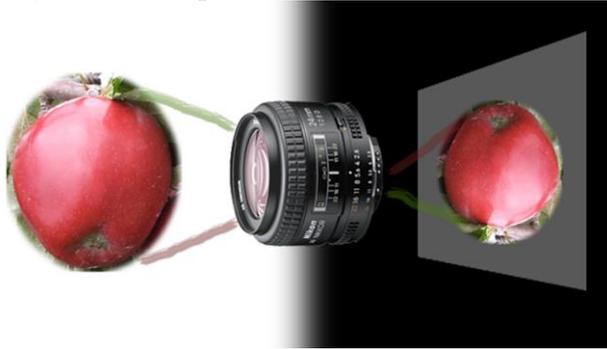
there are computer applications being developed based on this work that will allow researchers in color vision and color technology to begin modeling perceptual phenomena based not on the mixtures of imaginary primaries but on the known responses of the cone fundamentals. This is a highly significant advance in making the science of color vision available to the color engineering community.

The ISCC is proud to honor Dr. Viénot for her work and dedication in developing this advancement for color science.

Metameric Blacks: A Color Curious Column

Ever wonder ... "What is a camera?"

Original man-made cameras were called a camera obscura in Latin. Literally translated, that means dark chamber. The camera obscura was a dark room, or chamber, with a hole in one side (perhaps with a lens mounted in the hole to collect more light). Observers, or artists, would enter the camera obscura and see an image of the world projected (upside down) on a white surface on the other side of the room. They could trace, or paint, this image if they wanted to reproduce the scene.



This image shows how the lens of a camera gathers light from a scene (an apple) and projects it onto a light-sensitive surface (the backwards and upside-down apple on the screen). In the original cameras, the image was projected onto a piece of paper or canvas and traced by an artist. Later on photographic film was used in cameras to capture images of the world. Nowadays, the light sensitive surface is normally a digital detector array made of silicon. Our eyes can also be thought of as cameras. What is our light-sensitive surface?

Today, cameras are still dark chambers. Normally there is a lens at the front of the camera to gather light. Modern lenses are actually made up of combinations of many individual lenses to improve the quality of the image. This light is then projected onto a surface at the back of a small (sometimes incredibly small as in cell-phone cameras) dark chamber. A light sensor is placed at the back of the chamber to capture an image of the light from the scene and allow us to process and view it. Our eyes are also built in the same basic form as a camera and can also be thought of as dark chambers.

So that's it ... a camera is a dark chamber.

Content of this column is derived from *The Color Curiosity Shop*, an interactive website, also available as both English-language and Spanish-language books, allowing curious students from pre-school to grad-school to explore color and perhaps

become interested in pursuing a science education along the way. Please send any comments or suggestions on either the column or the webpage to me at <mark.fairchild@rit.edu> or use the feedback form at <whyiscolor.org>. This specific topic can be found at <<http://whyiscolor.org/Questions/6-2.html>>.

Mark D. Fairchild
Rochester Institute of Technology

Media Madness: Answer to Puzzle

To recap the puzzle in Issue 467, a ray of light is incident on a planar interface between two media. The incident ray angle is such as to form a 3-4-5 right triangle with the surface normal, and the refracted ray forms a 4-3-5 right-triangle with the normal. What are the media? The answer, to close approximation, is air and water. When the light's wavelength is 589 nm and the temperature is 20 C, air has refractive index 1.000293, water has refractive index 1.3330, and the ratio is 1.3326, which is approximately the required Snell's-law value of 4/3. You can approximate the 4/3 ratio as closely as you like by mixing some solute with the water.

Several people (e.g., the Datacolor CEO, a senior optical engineer, and the Editor of the ISCC News) got the answer immediately, and wondered if they had missed a subtlety. I was not going for subtlety here, but only the beautiful coincidence of water and the 3-4-5 right triangle.

Michael H. Brill, Datacolor

Editor's Note

This issue marks the beginning of a new recurring column called "A Blast from the Past". This column highlights the content of an ISCC newsletter from 50 years ago. Since we have put the newsletter archive on our website, we have uncovered ISCC's significant role in the development of color not only in the U.S. but worldwide. We hope you enjoy this journey back to ISCC's impactful past! (Please see <http://www.iscc.org/resources/NewsletterArchive.php> for the complete archive.)

A Blast from the Past: ISCC Newsletter 50 Years Ago

Number 173 September – December 1964 on ISCC website

This very informative issue is 32 pages long. (Its official title is “Inter-Society Color Council Newsletter”, which has become shortened to Inter-Society Color Council News in the present day.) It opens with a fascinating story that reflects on the journey that the ISCC had been on from inception in 1931 to this issue in 1964. There are many items worthy of note in this 5 ½ page story. First, the two aims and purposes match our present day list, which is now up to five. In the membership section, we learn that by the end of 1964, 29 Member Bodies belonged to ISCC. Some worth noting are the American Ceramic Society, Inc., The American Oil Chemists’ Society, Folding Paper Box Association of America, Package Designer’s Council, Tanner’s Council of America, Inc. to name a few. The next section of the story focuses on the milestones in Council history. Did you know that the idea to form ISCC came out of a 1930 color conference where the main goal was to discuss how to select color names for describing drugs and drug products from U. S. Pharmacopeia? Professor E. N. Gathercoal from the University of Illinois College of Pharmacy arranged this color conference in Washington D. C.. Fast-forward to 1964, in which the three main activities of the Council were:

1. Standing Committee on Problems to investigate the most pressing color problems. From 1931 to 1964, work was done on 23 problems.
2. Publication of the ISCC “Newsletter” by a 10 member committee including a Chair. It always included a selected bibliography of member publications. Delegates as well as individual members were expected to contribute to the content and they did in a big way!
3. Annual Meeting where they discussed “mutual color problems as part of a continuing effort to sponsor color education.”

The story closes with a poem that Dr. I. H. Godlove wrote for ISCC:

“It’s not the brains or genius
Nor money that we pay;
It’s the close cooperation
That’s bound to win the day.
It’s not the individual
Nor Council as a whole,
But the everlastin’ teamwork
Of every bloomin’ soul.”

A report on the ISCC Color Aptitude Test (Problems Subcommittee 10) showed that the test was in such high demand that the supply had become depleted. Efforts to fill back orders prevented them from accepting new orders. An interesting application of the test is also noted. An ASTM Tentative Recommended Practice for Visual Evaluation of Color Differences of Opaque Materials (D1729-60T) defines a qualified observer as “a person with considerable experience in paper color matching, who is able to score at least 75 on the ISCC Color Aptitude Test.” Read more about this critical color matching task.

There is an announcement and invitation to the second International Color Meeting in Lucerne, Switzerland (June 1965) on the Scientific and Practical Aspects of Color. This meeting was the precursor to AIC and its first Congress, which was held in 1969. Read more about ISCC’s important role in the 1961 and 1965 International Color Meetings that formed the basis for AIC.

An interesting article written by Dorothy Nickerson about the color standards chosen for the five rings in the Olympics logo is featured. See how the Munsell Color Order System played a role.

An excellent article from Howard Ketcham reprinted from American Institute of Architects Journal, April 1964 entitled “Human Needs Demand Effective Color” educates the reader on how architects, builders and manufacturers should abandon drab structures and start addressing the human need for colorful living environments. This article points out that people in 1964 had color in their clothing, yards and interior home furnishings because it “brightens, refreshes, soothes, and stimulates.” It was the time to add color to building exteriors.

“Natural Selection and Color Blindness is a summary of a reprint from *Eugenics Review*, July 1963 written by Professor Pickford from the Psychology Department at the University of Glasgow. It reports that, throughout the development of civilization, the tendency for color blindness, especially red-green, was on the rise.

In the short article, “Was ‘Mauve’ Discovered Before Perkins?”, you will learn how F. F. Runge discovered coal tar dyes, including Perkins violet, before Perkins was born.

In “Internationale Bibliographie der Farbenlehre und ihrer Grenzgebiete”, David MacAdam re-

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A Blast from the Past continued

views volume 2 of Manfred Richter's bibliography on international color papers.

The following global reports or announcements can be enjoyed:

- The Colour Group of Great Britain report
- CIE Informal Report from Committee E-1.3,2, Color Rendering on the terminology of color rendering
- Industrial Designers Institute report
- Calendar of Member Body Meetings
- Richard Hunter receives the first Armin J. Bruning Award
- Hannes Beckmann's review of Josef Albers, Interaction of Color book

In the article, "Fact and Fancy Concerning Derived Reactions to Color", we hear why R. M. Hanes has issues with an ISCC report that he co-authored with C. J. Bartleson and R. W. Burnham entitled "Color: A Guide to Basic Facts and Concepts." He feels that the facts in the report about derived reactions to color are limited. The limitations could be lifted if systematic experiments were performed to study the reported effects of colors that are warm or cold, receding or advancing, exciting or soothing, etc. He proposes an experimental protocol that can be used to study "color-distance illusion reaction of observers in a full sized room under full illumination."

In "Color on Time" they discuss how *Time* magazine was able to get a magazine off to press with "spectacular" colors the morning after the 1964 presidential election. This was remarkable when the normal amount of time to produce good color plates was 2-3 weeks. *Life* magazine was able to do this one year before *Time*. Read how!

Before closing the newsletter with a bibliography of the color articles received since the previous newsletter (number 172), the information on the following color tidbits is a curious read:

- "Colored Steel"
- King Olav Ends Squabble Over Village Church's Color"
- "Self-Tinting Glass Seen"
- "\$300,00 Color Test Program Financed by Drug Industry"
- "Car Colors Seen Link to Crashes"
- "Colors Dominate New Travel Gear"

Paula J. Alessi, ISCC News Editor

2015 ISCC Godlove Award Announcement

The Inter-Society Color Council will present its 2015 Godlove Award to Anna Campbell Bliss.

Mrs. Margaret N. Godlove established the Godlove Award in 1956 in memory of her husband, Dr. I. H. Godlove. The award is usually, but not necessarily, presented biennially in odd-numbered years.

The Godlove Award is the most prestigious award bestowed by the Inter-Society Color Council, and honors long-term contributions in the field of color. This contribution may be direct, it may be in the active practical stimulation of the application of color, or it may be an outstanding dissemination of knowledge of color by writing or lecturing, based upon original contributions of the recipient.

The ISCC is honoring Anna Campbell Bliss for her lifetime achievements (over 5 decades) in the areas of color, art design, computer modeling and their interactions. Anna has a Bachelor of Arts from



Source: deseretnews.com

Wellesley College and a Master of Architecture from Harvard's Graduate School of Design. She studied color theory and design with Gyorgy Kepes

at MIT and with Josef Albers. With this vast educational background, she has had a profound impact on the color and design world through her explorations of the connections between poetry and mathematics, nature and the constructed environment. As she says, "Often the most exciting ideas emerge at the intersection where more than one discipline meets." As an artist/designer, Anna is unique because she has become a pioneer with computer modeling to create shapes, colors and patterns that we have never seen in design spaces before.

Anna's work has garnered many awards for her solo exhibits spanning U.S. galleries from San Francisco to New York City, with an emphasis on galleries in her home state of Utah. Internationally, her work can be found at the Minami Gallery in Tokyo and she has participated in computer design exhibits at the Stuttgart Design Center in Germany.

Anna's many silkscreen contributions are highly regarded by the artistic community, but the wider color community will honor for her contributions combining the use of computers, mathematics, science, and color studies into her artistic creations.

The ISCC is proud to honor Anna Campbell Bliss with the 2015 Godlove Award for her years of dedication in developing her innovative art/design/computer work advancing the color community into the 21st century.

HUE ANGLES

(Send contributions to mbrill@datacolor.com and see <http://hueangles.blogspot.com>)

Orange rage against the dying of light

It's autumn again, and the sunlight fades. The world waxes orange, from tree leaves to squash and pumpkins (and their Halloween simulacra). Last autumn's ISCC News had a Hue Angles column on the color orange. Now let's look at a possible psychological effect of the color: its hypothetical ability to encourage a fighting response---even rage. {as if orange in autumn encourages us to "rage against the dying of the light," to quote Dylan Thomas.)



<http://thehdwall.com/central-park-mall-fall-hd-resolution-9287/>

Football teams such as that of Syracuse University sport orange uniforms. Could this be a kind of visual "fight song?" I don't know about Syracuse, but it surely was a visual "fight song" for Princeton's baseball team, which long ago adopted the colors orange and black based on such a premise. This is recalled by one of us (HSF) with particular authority: His father was the head of the Princeton athletic department.

Here are the relevant facts [see ref. 1]: In May of 1869, the Princeton College Class of 1869 Baseball Club had a game against Yale scheduled to take place in New Haven. As visitors, they would traditionally wear black shirts and black or grey pants. The pants were likely their street clothes as were their shoes. The home team would wear white shirts and the same selection of pants. The club, hearing that orange was a color that inspired fear in an opponent, elected to have about an inch and a half ribbon commissioned that said "'69 B.B.C" in black on a bright orange ribbon. They cut these to length and wore them on their arms the way one would wear a black ribbon at a funeral. This was the first recorded use of orange and black among Princeton teams. The first college football game would not be played until the fall of the next academic year, November 1869. Princeton participated in that event,

but there is no record as to whether they wore orange that day. By the 1880's, Princeton football teams were wearing black jerseys with orange and black stripes around the sleeves.

Odeda Rosenthal, who is best known in the color world for her book *Coping with Color Blindness* [Avery Pub. Grp., 1997], once presented an ISCC paper (probably in Interest Group III, in the late 1990s) on the relation of orange color and rage. Nobody seems able to find an abstract, but a personal letter she sent to me 25 Oct 1997 made the promise, "Next year I would like to present OBSERVATIONS ON THE COLOR ORANGE. By then I should be in the green." I remember hearing the presentation---not deep and scholarly, but anecdotal and forceful. She was wearing an orange dress. Cynthia Sturke remembers this too---I am not alone in my recollection.

Although the evidence is circumstantial, one of us (MHB) couldn't resist using the message of the paper. When he went to Tambov in 2008 to teach English to Russian students, he wrote this poem to be read at the closing ceremony, after he saw the commemorative T-shirts in the terrible color scheme of bright orange, white, and beige.

Color Selection

The RGBs of color---
the laws that give us light
say: Don't prepare your briefing slides
in colors equi-bright.

Though op art thrived on reds and greens
of equal luminosity,
attempts to read such art
could cause blown lunch of low viscosity.

The hues themselves are also key:
A certain study shows
bright orange taps amygdalas
and makes us come to blows.

So make your message clearly seen
in hues that don't enrage:
Don't print it on a T-shirt
in bright orange, white, and beige.

continued on the next page

Hue Angles continued

Are Princeton's visual fight song, Odeda's paper, the colors of autumn, and Dylan Thomas all connected? Odeda would perhaps have speculated, but sadly she is not with us, having passed away more than six years ago.

Reference:

1. Don Oberdorfer, *Princeton University: The First 250 Years*, ISBN 0-691-01122-2, The Trustees of Princeton University (1995), pg. 68.

Michael H. Brill, *Datacolor*
Hugh S. Fairman, *Resource III, Inc.*

**IN THIS ISSUE, December 2014**

The CIE system, which was formulated in the 1930s based upon the work of David Wright and John Guild, became the foundation of modern colorimetry, the science underlying modern, instrument-based, industrial color production. Colorimetry soon led to the British developing National Standards for diverse applications from electrical wiring to traffic lights. In our first article T. W. Allan Whitfield discusses "The Men Who Coloured Britain", architecturally speaking. He introduces three men who through standards provided a color palette covering the entire built environment of Britain: Horatio Lawrence (Bill) Gloag, David Medd, and Alex Hardy.

That was then, but where are we now? New applications include devices such as digital cameras to evaluate our colored environment. However, careful calibration of the digital camera's R, G, B output in terms of a colorimetric space such as CIEXYZ is necessary for accurate representation of colors in the environment. This is not so easily accomplished. In "Irradiance-Independent Camera Color Calibration", Brian Funt and Pouya Bastani propose two computational methods for camera color calibration that require only that the relative spectral power distribution of the illumination be constant across the color checker, while allowing its irradiance to vary, and yet resolve for a color correction matrix that remains unaffected by any irradiance variation that may be present.

Our next article is an example of the use of another new device for modern colorimetry. Meritxell Vilaseca, Barbara Schael, Xana Delpueyo, Elisabet

Chorro, Esther Perales, and Jaume Pujol show a new hyperspectral system, which can be used in the industry to perform spectral readings reliably with a high spatial resolution. The hyperspectral system consisted of a CCD camera, a spectrograph and an objective lens with an additional linear moving system allowing the mechanical scanning of the complete scene. They describe the system and features in "Repeatability, reproducibility and accuracy of a novel hyperspectral system."

Speaking about gloss, in our next article, "Towards the soft metrology of surface gloss: a review" Frédéric B. Leloup, Gael Obein, Mike Pointer, and Peter Hanselaer go beyond the measurement of specular gloss to discuss understanding how the human visual system arrives at a particular sensation of surface gloss, and which factors influence this process. They provide an overview of the most important developments and findings regarding gloss measurement and gloss perception over the past 15 years. Then they discuss alternative measurement methods, and present suggestions for future research.

This is the third time this year we have an article on color constancy. There are many color constancy algorithms, but generally they can be divided into groups based on the technique or assumptions. One such group uses the assumption that the average of all colors is gray. The algorithms in this group work well, but they fail when this assumption is not fulfilled. Mehdi Faghih and Mohsen Ebrahimi Moghaddam have proposed an extension of this family of color constancy algorithms by using a neural network trained offset to move toward neutrality. In "Neural Gray: A Color Constancy Technique Using Neural Network" they describe their experiments on some benchmark datasets showing how the proposed approach improved the performance of Gray algorithms, and also outperformed state of the art methods.

Our next two articles look at color differences and tolerances with special emphasis on blacks and whites. Most recent color difference metrics are based on acceptability of product color, and most recent work has been on developing metrics that are more consistently applied over color space as a whole including vivid colors. In "Color Tolerance Study on White in Practical Aspect: Perceptibility Versus Acceptability," Nooree Na, Kyungah Choi, Jeongmin Lee, Hyeon-Jeong Suk examine whether there is a difference in metrics when perceptibility is the key factor rather than acceptability. They also

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looked at whether off-white in various directions were less or more well tolerated using printed color patches. In contrast, Renzo Shamey, Juan Lin, Weethima Sawatwarakul, and Renbo Cao compare the performance of the more recent color difference formulae when evaluating black textile samples. The “Evaluation of Performance of Recent Color-Difference Formulae Using a New NCSU Experimental Black Dataset” shows the CAM02 color difference equations exhibited the best agreement against visual data with statistically significant improvement over other models tested and the CIEDE2000 (1:1:1) equation also showed good performance in this region of the color space.

When investigating the color of textiles, sometimes microscopic investigation is necessary. However, this raises the question of the use of transmittance measurements instead of the standard reflectance measurements used on larger textile specimens. In “Reflectance versus transmittance: the effects of light scattering on red colorants (carmines, Amazonian red annatto, and Peruvian cochinitilla rojo and rosado) in biological, textile and museum science” Howard Swatland tackles this issue. Studying four red colorants, he found while the broad descriptions of their color were similar, the detailed differences in their spectral characteristics of transmission and reflectance were important for their selection in various applications.

Our next article is an example of researchers Jian Lin, Li Xu, and Huiyuan Zhang applying a technique that had been developed in an entirely different discipline, to solve a color production problem. In this case the technique is “hybrid biogeography-based optimization” or BBO and the application area is “optimal spot color matching.” Biogeography is the science of the distribution of species and ecosystems in geographic space and through geologic time. BBO is an evolutionary algorithm that optimizes a function by iteratively improving candidate solutions with regard to a given measure of quality, or fitness function. The basic technique has been extended from its original use to many other applications, in this case the problem of developing the optimum formulation for a spot color. Read about “Hybrid biogeography based optimization for constrained optimal spot color matching.”

Pichayada Katemake and Razvan Ion Preda are attempting to preserve one of Thai’s endangered cultural treasures – the colors used in traditional Thai mural paintings. In their article “Complete

Study of Traditional Thai Colours Used in Mural Paintings. Traditional Thai Colour Name Dictionary” they describe how they worked with 10 artists who have the knowledge and experience with traditional Thai color names and are involved in restorations of mural paintings. Working with this group they developed a dictionary of 147 Thai colors, and compared the methods the artists produced the colors to find what was thought to be the most historically correct formulation for all but 8 of the colors.

Color is used by man and nature and often we believe the color itself has a purpose that gives meaning to the observer. In our final article of this issue Calvin Or and Heller H. L. Wang examine whether and how our cultural group and or our occupation affects our interpretation of specific colors. Their article “Color-Concept Associations among Chinese Steel Workers and Managerial Staff” compares the responses of industrial workers and managers to the responses of broader cultural groups of Chinese and American people in general. While they found broad acceptance of red for stop or danger, and green for go or safety, other colors had few, if any, consistent interpretations. Thus once the optimal colors to represent certain concepts have been identified, other reinforcing coding and staff training is necessary to strengthen these color-concept associations.

Danny C. Rich wrote a Letter to the Editor about Roy S. Berns’s recent article “Extending CIELAB: Vividness, V*ab, Depth, D*ab, and Clarity, T*ab” [Color Res Appl 2014;39:322-330]. In this issue’s Communications and Comments section both the letter and a response by Dr. Berns are included. Also in this issue two new publications from the International Commission on Illumination (CIE) are introduced. They are the Joint ISO/CIE International Standard ISO/CIE 19476:2014(E) Characterization of the Performance of Illuminance Meters and Luminance Meters and the CIE Publication 211:2014 Colour Appearance in Peripheral Vision.

Ellen Carter

Editor, Color Research and Application

Meet Your Fellow ISCC Members

My name is Romesh Kumar. After graduating from Rensselaer Polytechnic Institute, I joined American Hoechst Corporation as “Color Specialist”. Today, I am Senior Technical Manager for North America for the same company now called “Clariant Corporation”, a global chemical company

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Meet Your Fellow ISCC Members continued

manufacturing pigments and other chemicals for many applications. This position allows me to travel all over North America to share my expertise with customers to make their products better. I am a regular speaker for pigments and color-related subjects at many of the national and international events. I also teach about pigments for coatings and color at the University of Southern Missis-



sippi and University of North Dakota (Fargo) to business people from most of the major paint and related companies

My involvement with ISCC began during my school days (1977), and I have had the opportunity to meet most of the who's who in color in academia and industry. I believe that ISCC is the only organization in the U.S. where such networking is possible to discuss fundamentals and practical issues about color. I have benefited tremendously from my involvement with ISCC.

Calendar

- Nov 2-4 **2014 IES Annual Conference Art Science and Practice of Illumination**, Pittsburgh, PA, <http://www.ies.org/ac>
- Nov 3-7 **IS&T Color and Imaging Conference**, Boston, MA, <http://www.imaging.org/ist/conferences/cic>
- Nov 12 **ISCC 2nd Teleconference Meeting**, Register at <https://attendee.gotowebinar.com/register/2179101566353006082>
- Nov 20 **22nd Annual Workshop on Object Perception, Attention, and Memory**, Hyatt Regency, Long Beach, CA, <http://www.opam.net/>
- Nov 23-27 **10th International Conference on Signal Image Technology and Internet Based Systems**, Marrakech, Morocco, <http://www.sitis-conf.org/>
- Nov 29-Dec 2 **1st International Conference on Photoalignment and Photopatterning in Soft Materials**, Hong Kong University of Science and Technology, Info: conferences@sid.org
- 2015**
- Jan 28-29 **ASTM E12 Color and Appearance**, Sheraton, New Orleans, LA
- Feb 8-12 **SPIE/IS&T Electronic Imaging Symposium**, San Francisco, CA, <http://spie.org/electronic-imaging.xml>
- Feb 9-12 **Human, Vision, and Electronic Imaging Conference: Research at the Intersection between Perception/Cognition, Imaging Technologies, and Art**, San Francisco Union Square Hilton, <http://hvei.eecs.northwestern.edu/>
- Mar 24-26 **AATCC International Conference**, Hilton Desoto, Savannah, GA, http://www.aatcc.org/ic/gen_info2015.cfm
- Mar 24-26 **5th IAPR Computational Color Imaging Workshop (CCIW'15)**, Saint Etienne, France, <http://www.cciw2015.org>
- Apr 18-25 **NETInc Conference and PaperCon as part of TAPPI's Centennial Celebration**, Atlanta, GA, Info: athomas@tappi.org
- May 13-15 **Computational and Mathematical Models in Vision (MODVIS)**, Tradewinds Resort, St. Pete Beach, FL, <http://www.conf.purdue.edu/modvis/>
- May 19-22 **AIC Midterm Meeting Color and Image**, Toyko, Japan, www.aic2015.org
- May 19-22 **Archiving 2015**, The Getty Center, Los Angeles, CA, Info: archiving@imaging.org
- Jun 24-25 **ASTM E12 Color and Appearance**, Harbor Beach Marriott, Ft. Lauderdale, FL (D2)
- Jun 28-Jul 3 **28th Session of the CIE, 2015**, Manchester, UK, [website coming soon](http://www.cie.org)
- Aug 23-27 **38th European Conference on Visual Perception (ECVP)**, Liverpool, UK, <http://www.ecvp.org/2015> or ecvp2015info@gmail.com
- Sep 2-4 **Computer Analysis of Images and Patterns (CAIP) 2015**, Mediterranean Conference Center, Valletta (Malta), <http://caip.eu.org/caip2015/>
- Sep 9-11 **The Eye, The Brain, & The Auto International Conference**, Dearborn, MI, Info: Carolyn Barth, clbarth@dioeyes.org
- Oct 4-6 **SPE/CAD RETEC & ISCC, Show Your Colors**, Westin Hotel, Indianapolis, IN, Info: Betty Puckerin, betty.puckerin@ampacet.com

ISCC Sustaining Members

Sustaining Members of the ISCC are organizations who support the mission and goals of the ISCC through financial or other support. With our Member Bodies, Sustaining Members also provide a critical connection to the color community. If you feel your company or organization should support the ISCC in this way, please contact the office for more information about member benefits.

Avian Technologies	www.aviantechologies.com	603-526-2420
Datacolor	www.datacolor.com	609-895-7432
Hallmark	www.hallmark.com	816-274-5111
Hunter Associates Laboratory, Inc.	www.hunterlab.com	703-471-6870

We could still use your help!

ISCC has positions in the organization that need filling. We can help identify a place for you depending on your skills and desires. Contact Nomination Chair Frank O'Donnell, fxodonnell@sherwin.com

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ISCC Member Bodies

At its foundation, the ISCC is composed of many related societies. These societies, our Member Bodies, help the ISCC through small annual dues as well as maintaining a relationship with each organization's individual members. We frequently hold joint meetings to further the technical cross-pollination between the organizations.

If you belong to one of our member body organizations, we encourage you to work with ISCC and your society to further the connection. Contacting the ISCC President is a good place to start. If your organization is not on this list and you think it should be, the ISCC office can provide you with details about membership.

Or use our new online application: www.iscc.org/applicationForm.php

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)
 Gemological Institute of America (GIA)
 Illumination Engineering Society of North America (IESNA)
 International Color Consortium (ICC)
 National Association of Printing Ink Manufacturers (NAPIM)
 Optical Society of America (OSA)
 The Society for Color and Appearance in Dentistry (SCAD)
 Society for Information Display (SID)
 Society for Imaging Science and Technology (IS&T)
 Society of Plastics Engineers Color and Appearance Division (SPE/CAD)