



# Inter-Society Color Council News

Issue 464

Fall 2013

## Board of Directors Corner

My name is John Conant, and I'm bringing you this issue's Board of Directors column. As an applied physicist I've always been interested in color, but in fact the first 20 years of my career focused on the infrared! I am



a computer modeler with Aerodyne Research. I develop and use scientific software which mimics how light emits, absorbs, and scatters, especially "out in the open" with the Sun, Earth, and Sky – think of it

as quantitative computer graphics where we compute an entire spectrum for each pixel. At present we're developing a sensor that measures cloud thickness (which strongly impacts Climate Change), using daytime cloud brightness in the blue and red wavelengths.

It was after our group began doing color R&D that I discovered and joined the ISCC in 2008. I've loved the diversity of the members and the chance to meet a lot of terrific people with incredible expertise.

This continues to be an exciting time for the Board. We have completed a successful period where we simplified the office functions and lowered our costs. Treasurer Cameron Miller has also done a wonderful job of getting our tax records completely up to date. Our focus is now on the society's organization. As you will read elsewhere in this Newsletter, we are actively encouraging discussion with all members to decide the best way for ISCC to function in the future and the best services to provide. Please join the discussion!

I would also like to invite everyone to consider volunteering in the Council by coordinating with other societies, helping with the Newsletter, organizing meetings, or serving on the Board! As a "newbie" to professional color work, I was too shy to volunteer because I wasn't an "old hand" in the ISCC and I don't have a large reputation in the Color field. In fact, though, those are the wrong criteria! The ISCC leadership is actually comprised of a friendly group of people who love the science and art of Color, and fresh faces are welcome. This is a great opportunity for you to impact the Council's future. Since nearly all of our meetings are held as teleconferences, travel is not required. Please consider it, and let us hear from you.

John Conant, *BOD Member, Aerodyne Research*

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## President's Report from October 2013 Annual Meeting

The Board of Directors, including officers, met monthly by teleconference. Expenses were reduced by converting the ISCC Office to a virtual administrative office, which also involved changed our mailing and phone contact information. The ISCC By-Laws were edited to reflect

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**ISCC BOARD OF DIRECTORS**

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*President's Report continued*

updated practices (including electronic voting and reduced participation by Member Bodies) and are ready for ballot.

ISCC needs help from members to adapt and be valuable for members and prospective members. We currently have several openings for members of our Board of Directors. The term of office is usually three years and we have availability for 2013-2016. The Board of Directors oversees the operation of the Council. The Board typically meets monthly via teleconference lasting up to two hours. Now is the ideal opportunity for you to volunteer to shape the future of the NEW ISCC. As a board member you will meet and get to know the leaders in the color world. If you are interested, please contact Frank O'Donnell by phone at 216-515-4810 or by email at [fxodonnell@sherwin.com](mailto:fxodonnell@sherwin.com).

Respectfully submitted,

Scot R. Fernandez, *ISCC President, Hallmark*

**Secretary's Report from October 2013 Annual Meeting**

Meetings are the first item to discuss. Our last technical conference was in October, 2012 in Manchester NH. The meeting featured excellent presentations, but was poorly attended. This year's Annual Meeting, as required in our By-Laws, is this teleconference, October 21, 2013.

Awards are the next discussion topic. ISCC's Godlove Award recipient was Joy Turner Luke. The award was presented in June at the ASTM meeting. This was especially fitting, since Joy has been very active in ASTM (as a Member Body of ISCC).

The final topic to discuss is membership. In 2013 there are 75 individual members (including honorary). Please note that there were approximately 60 additional individual members in 2012. Some members may not be aware that an online dues renewal process was developed in 2012. In 2013 there are 2 Member Bodies. There were approximately 14 additional Member Bodies in 2011. In 2013 there are 3 Sustaining Members. There were approximately 5 additional Sustaining Members in 2011-12.

Respectfully submitted,

Ann Laidlaw, *ISCC Secretary, RoLyn Group*

## Treasurer's Report from October 2013 Annual Meeting

### Current Balances – SunTrust

Checking	\$55,000 (Approximately)
Paypal	\$3,973

### Membership Dues Collected

Individual	\$4055	49 regular, 19 student or retired
Member bodies	\$450	AATCC and ASTM
Sustaining members	\$2250	DataColor, Hallmark, & Avian Tech.
Total	\$6725	

### Fees

Banking Fees:		
Credit card capabilities	\$150	\$30/month through Paypal
Credit card fees	\$222	3.3% through Paypal
AIC Membership Fees	\$300AUD	Up to date \$100 AUD/yr
Salary Summary		No salaries are paid
Federal and State Taxes		All federal and state taxes are up to date.
Newsletter publication	\$561	Year to date

Since the reorganization of the ISCC office and the payment of taxes due, the financial health of the ISCC is very good. Our income currently exceeds the budgeted expenses. Not all fees were listed and the checking account is an approximation due to the fact that the treasurer does not have access to the records because of the government shutdown. A MasterCard has been obtained through the Paypal account.

The invoices for the 2014 membership year are being prepared in a pdf format instead of Word. These invoices will be sent in the middle of November.

C. Cameron Miller, *ISCC Treasurer, NIST*

### Annual Meeting Teleconference Starts the Discussion

Our Annual Meeting via Teleconference was held October 21, 2013. Since this was the first Virtual Annual Meeting, it is not surprising it had some glitches. We apologize to those who tried but were not able to attend because of telephone capacity limits and also for variations between the discussion questions and the agenda item distributed earlier via email. We also want to thank those who were not able to call in, but who sent their comments before the meeting. All contributions will be accumulated and considered as we plan the future of the ISCC.

The meeting began with a welcome by President Scot Fernandez, who also acted as moderator for the

meeting. Then came the official reports: Ann Laidlaw presented the Secretary's Report; Scott presented the Treasurer's Report, which had been submitted by Cameron Miller prior to the meeting since he was not able to attend; and Scot gave his President's Report including a status update on nominations for Board of Directors positions. All of these items are reproduced elsewhere in this ISCC News.

For over a year now, the Board of Directors has been considering changes in the role and activities of the ISCC to benefit the membership. Part of the reason for scheduling this Annual Business Meeting via the web, was so that we could get input from members who might not be able to travel to the Annual Meeting in person. Therefore, the majority of the meeting was set aside for discussion of what the future of the ISCC should be.

The discussion period was guided by five questions that Scot posted on the screen: 1) Why are you a member? 2) How can we better serve you? 3) How can the ISCC community be more valuable to you? 4) What do you think about ISCC becoming more of a virtual organization? 5) Is the current dues structure appropriate? The purpose of this article is to summarize the discussion that ranged across and back and forth through these topics.

On the topic of "why be a member", the interdisciplinary nature of the ISCC seemed to predominate. People cited networking with the membership which is a mix of art/design and science and manu-

*continued on next page*

*Annual Meeting Discussion continued*

facturing as well as color vision researchers and the ability to hear papers from different disciplines. Several indicated the importance of the face-to-face time for discussions. It was suggested that we have virtual annual meetings, but in-person special topical meetings. These could be related to specific areas of interest of one or more member bodies, or a wider forum that would cross the interests of many types of members.

This discussion on membership and types of meetings seemed to lead naturally into how to improve the ISCC website and to become more virtual. It was definitely felt that there needed to be a social networking forum for discussion besides in-person meetings, and that the focus should be the ISCC website. Some people wanted to know more about other members. It was suggested that there be a public section and a private section included in the ISCC website. The public section would be where ISCC activities are announced and also international and member-body meeting information and summaries could be read by anyone. The private section would be where members could find out more about other members and reach out to those people with questions or for discussions. It was pointed out that the forum needs passionate participants and should have frequent timely updates.

The final areas of discussion centered on the dues. Some felt the dues should be lowered to encourage increased membership, or even become free. Others felt it was important to keep a dues structure, especially for the large financial benefit of reduced membership subscription price for *Color Research and Application*. Several mentioned that dues should remain the same or if being lowered, it should be done slowly with careful consideration by the society. One suggestion was to get rid of member-body dues and work on developing the policy of mutual support of ISCC and member-body news and activities.

There were numerous other suggestions and comments that warrant attention, such as developing a code of conduct at meetings or in forums, and developing additional awards such as for leadership. The one hour time limit did now allow for discussion of these and some broader issues including:

- 1) can the ISCC cover such a wide group of interests – art, science, etc. or should it narrow its focus,
- 2) whether to keep the idea of member-bodies, or go to a completely individualized membership, and

- 3) whether the aims, as indicated in the By-Laws, are appropriate.

Thus the discussion has just begun.

Immediately after the teleconference, the board began discussing the suggestions put forth during the meeting and looking into possible ways to move forward. Already a group had been reviewing the By-Laws of the ISCC and has at this point proposed some changes to bring the ISCC into the twenty-first century. A development committee is forming to work specifically on a path forward for ISCC.

We would like to invite everyone, but especially those who were not able to get into the meeting, to send us their comments about the ISCC. Please address them to Ann Laidlaw [at [al99colors@yahoo.com](mailto:al99colors@yahoo.com)], the ISCC Secretary, who will pass them on to the development committee. Finally we ask anyone who would like to join the development committee to let us know by contacting Ann Laidlaw.

Ellen C. Carter, *BOD member; Editor, CR&A*

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### Interim Editor's Note

This issue marks the beginning of a new column known as **Meet Your Fellow ISCC Members**. This column will provide a new way for you to find out about the color activities of your fellow ISCC members. Each issue will feature one or two members. This could provide a new way for you to network with others who share a common interest in color. If you would like to be featured, please contact the editor using the information on the back of this News. Feedback on this column or any other aspect of this News is always welcome!

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### Meet Your Fellow ISCC Members

Meet Amy Krane, who just joined ISCC in 2013. She is an architectural color consultant and principal at Amy Krane Color where she advises clients on paint colors for their property. This includes residential, commercial and institutional buildings, interior and exterior.



Amy is dedicated to enhancing the human experience in the built world by integrating the art and science of color in design. Transplanted from New York City, she recently moved her consulting practice to

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# Call for Papers

for the June 18<sup>th</sup> ISCC Bridge Symposium during

*Color Light Appearance Week at NIST*

**June 16-20, 2014**

**CIE Div. 1 on Vision and Color  
ISCC Bridge Symposium  
ASTM E12 on Color and  
Appearance**

At the National Institute of Standards and Technology (NIST) in Gaithersburg, Maryland, USA, we are planning a full week of interesting meetings with three different organizations. CIE Division 1 is holding their technical sessions and committee meetings on June 16th and 17th. The ISCC will sponsor a Bridge Symposium on June 18th. Finally, ASTM E12 Committee on Color and Appearance will meet on June 19th and 20th for their bi-annual standard committee meetings.

You are cordially invited to submit abstracts for proposed presentations on any topics relating to color, light, or appearance. However, we especially encourage papers relating to some of the most active issues the groups are currently discussing such as color rendering, gonio appearance terminology and measurements, colorimetry calculations, gloss perception, and self-luminous neutral scales.

Please use the submission template available on the ISCC website at <http://www.iscc.org/meetings/ST2014/abstract.doc> and submit your proposals to Michael Brill at [MBrill@datacolor.com](mailto:MBrill@datacolor.com) by January 15, 2014. Further information about the meetings is available on the ISCC website at <http://www.iscc.org/meetings/ST2014/> or you can contact Ellen Carter at [Ellen.Carter@alum.rpi.edu](mailto:Ellen.Carter@alum.rpi.edu).

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## Did You Know That.....

ISCC will be a cooperating society for the 2014 IS&T Archiving Conference! Here are more details.



IS&T is pleased to announce the release of the Archiving 2014 Call for Papers. The deadline for submitting presentation abstracts for Archiving 2014 to be held May 13-16, 2014 in Berlin, Germany is **December 2, 2013**. A PDF of the Call for Papers can be found at [www.imaging.org/archiving](http://www.imaging.org/archiving).

Please note carefully the new submission rules and templates that can be found at [www.imaging.org/archiving](http://www.imaging.org/archiving).

The IS&T Archiving Conference brings together a unique community of imaging novices and experts from libraries, archives, records management, and information technology institutions to discuss and explore the expanding field of digital archiving and preservation. Attendees from around the world represent industry, academia, governments, and cultural heritage institutions. The conference presents the latest research results on archiving, provides a forum to explore new strategies and policies, and reports on successful projects that can serve as benchmarks in the field. Archiving 2014 is a blend of invited focal papers, keynote talks, and refereed oral and interactive display presentations. Prospective authors are invited to submit oral and interactive presentations by the December 2<sup>nd</sup> deadline.

Proposed program topics include:

- **Preservation of Digital Assets**
  - Web harvesting and archiving
  - Migration of digital content
  - Managing privacy rights for digital information
  - Preserving e-Government information
  - Innovative projects and activities
  - Capacity building, continuing education, and professional development
- **Technical Processes and Workflow**
  - Distributed preservation models
  - Automated metadata generation during image capture
  - Cooperative partnerships for digitization and archiving
  - Authenticating digitized government and legal information
  - Innovative approaches to digitization, including multispectral scanning
  - Applications of crowd sourcing and share economy

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*IS&T Archiving Conference continued*

- **Digital Curation**

- Cost models for digital archiving and long-term preservation
- Digital forensics and data recovery
- Managing databases and large data sets
- Employing metadata as a curation strategy
- Detection of manipulated image/video content
- Storage media and systems, including cloud storage

Please feel free to contact Diana Gonzalez with any questions.

Diana Gonzalez

*IS&T Conference Program Manager*

[archiving@imaging.org](mailto:archiving@imaging.org)

703/642-9090 x 106

*Meet Fellow ISCC members continued*

Columbia County where she also services surrounding areas including Northern Dutchess and Litchfield Counties, Greene, Southern Berkshire and Albany Counties in New York State.

Krane's career has taken her from producing television commercials to designing floral arrangements. Color consulting was just a natural segue from there. Always passionate about color, she confesses she finds inspiration everywhere, from nature to man's artistry.

Trained by and a member of the International Association of Color Consultant/Designers, Amy is educated in the functional application of color. Her knowledge includes, but goes beyond design aesthetics. She considers the profound psychological and physiological impact of color on the human experience.

Collaborating with home or business owners, architects or builders, her goal is always to marry color to space, form and function and create an environment that is cohesive, beautiful and inviting. Her involvement in a new build can forestall construction delays as the palette is chosen before painting is scheduled to begin.

To quote her, "One has to be particularly thoughtful about choosing colors for certain types of spaces in ways which go beyond mere decorating. A waiting room or a bedroom ought to be soothing, a retail space inviting, a business where people stand all day, energizing, and an office, productive. The effective use of color goes a long way towards creating the atmosphere needed to enhance the function

of a space and make people feel good in it. And that's what we seek!"

Amy develops a color palette by employing her artistic judgment as well as using her understanding of space, light and context. Her aim is to deliver customized color solutions. She creates flow between rooms and harmony between a building and its surroundings. Her services are also very helpful when staging a property for sale.

A portfolio of Amy's work can be viewed online at [amykranecolor.com](http://amykranecolor.com). Amy can be contacted at [amy@amykranecolor.com](mailto:amy@amykranecolor.com).

## Further Discussion for the Future of ISCC

The agenda that was circulated before the Annual Meeting teleconference included the following discussion section:

### Future of the ISCC

#### a. Relevancy of Current Aims:

i. To stimulate and coordinate the work being done by the various members leading to the description and specification of color by those members.

ii. To promote the practical application of this work to the color problems arising in science, art, history, and industry, for the benefit of the public at large.

iii. To promote communications between technically oriented specialists in color and creative workers in art, design, and education, so as to facilitate more effective use of color by the public through dissemination of information about color in both scientific and artistic applications.

iv. To promote educational activities and the interchange of ideas on the subject of color and appearance among its members and the public generally.

v. To cooperate with other organizations, both public and private, to accomplish these objectives for the direct and indirect enjoyment and benefit of the public at large.

#### b. Membership

i. Participation at meetings and in leadership roles

ii. Dues

iii. Structure : Individuals vs Member Bodies

iv. Benefits

#### c. Virtual Organization Possibilities

#### d. Relevancy of Newsletter

#### e. Other

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*Further Discussion for ISCC Future continued*

We would like to invite comments on any of these topics for our development committee to consider. Please address them to Ann Laidlaw [at [ac199colors@yahoo.com](mailto:ac199colors@yahoo.com)]. The ISCC can only be as strong as its members. Thank you.

## AIC 12th Congress 2013, Newcastle, Great Britain

The AIC 12<sup>th</sup> Congress was held in Newcastle, Great Britain on July 8-12 2013 at The Sage Gateshead on the south bank of River Tyne. The congress was very well organized by the Colour Group of Great Britain. The congress turned out to be a very successful meeting both from a scientific as well as from a social point of view. 538 people registered in advance (600 individual delegates in total - though not all for the whole week) from 48 different countries.

It featured a full 5 days schedule with 203 oral presentations by both engaging Keynote speakers as well as interesting paper presentations and 270 posters. Four different Study Group Meetings (Environmental Design, Color Education, Language and Color and Visual Illusions and Effects) were held. Lively discussions among international color friends were enjoyed by all. This truly was a congress to be remembered!



*Photo: Stephen Westland and Lindsay McDonald handing over the AIC banner to Carlos I. Aguirre-Velez, the organiser of AIC 2014 watched over by Berit Bergström.*

There is an updated book of abstracts for AIC2013 that is available for free download from <http://www.aic2013.org/>. To access the abstracts go to the web page and right-click on Book of Abstracts in the Downloads section (right-hand side of the page).

*AIC e-news, September issue*



## Margaret Walch Obituary

Margaret Walch (c. 1940–2013). The design historian and colour forecaster Margaret Walch died in New York on August 10<sup>th</sup>. She studied art and art history at Vassar College NY and Swarthmore College PA, and social history at New York University. As a journalist, she worked in Claremont CA and London (where she wrote *How the British Viewed the American Revolution*, 1976). Following 15 years in Albuquerque NM, she returned to New York City (1986) and was director (until about 2008) of the Color Association of the United States, in association with her step-mother, Marielle Bancou-Segal. She was a long time member of ISCC. Her father, William Charles Segal (1905–2000), an entrepreneur and artist, founded and managed *American Fabrics* magazine (1941–81), and transformed the Textile Color Card Association into CAUS in 1955. Walch's extensive research into the history of colour in design is documented in three publications: *The Color Source Book* (1971), *The Color Compendium* (A–Z encyclopaedia, 1991) and *Living Colors* (1995), the latter two in association with Augustine Hope. Margaret, we will miss you!

*Courtesy of The Colour Group Newsletter, November issue*



## 2014 AIC Interim Meeting, Oaxaca City, Mexico

**Theme:** Colors, culture and identity: past, present, future

**Date:** 21 - 24 October 2014

**Organizer:** The Mexican Color Researchers Association (AMEXINC),

**Info:** [www.aic2014.org](http://www.aic2014.org)



## Metameric Blacks: A Color Curious Column

Ever wonder ... "Why can't I see colors at night?"

You can't see colors at night because our visual systems are not designed to see colors when there isn't very much light in a scene. We actually have two visual systems that work in parallel to help us survive in the world. When there is plenty of light, we use our cone photoreceptors. There are three types of cones roughly sensitive to red, green, and blue light and we can compare the images captured with these three systems to perceive the colors in the scene. We can also see fine detail with our cones.

However, the ability to see colors and detail with our cone system means that the cones cannot be very sensitive to light. As the light levels decrease at night, we reach a point where our cones can no longer respond because there simply is not enough light for them to produce a response. In this situation, our visual system automatically switches to a second set of photoreceptors known as rods. There is only one type of rod receptor, so that means we can only see in shades of gray when our rods are working and our cones are not. The rods also gang up together to capture light over relatively large areas. This helps them to be very sensitive to the small amounts of light available at night, but it means that they cannot possibly allow us to resolve fine details.

Thus, it is our switch from the color-sensitive, but light-insensitive, cone system to the color-insensitive, but very light-sensitive, rod system that causes us to lose our color vision at night. Or as it was once written by the rock band, The Moody Blues:

Cold hearted orb that rules the night  
Removes the colours from our sight  
Red is gray and yellow, white  
But we decide which is right  
And which is an illusion



As the image (which can also be found on the cover of the 3rd Ed. of Color Appearance Models) shows, the stimulus for color hasn't disappeared at night. The problem is that there simply isn't enough light for us to perceive colors. I took this picture of Yosemite Falls at night (about 11:00PM) on an early spring evening with a nearly-full moon. I set my camera exposure time to about two minutes in order to capture enough light to make the image. Check out the sky for evidence. This full-color night-time image shows that all the colors are still there under moonlight, but we just can't see them. The sky is blue, the water white, trees green and brown, rocks gray and brown, etc. Standing there, I could only see a black and white version of the scene with my naked eyes because there was only enough light for my rods to function.

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 preschool 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](mailto:mark.fairchild@rit.edu)> or use the feedback form at <[whyiscolor.org](http://whyiscolor.org)>. This specific topic can be found at <<http://whyiscolor.org/Questions/3-5.html>>.

Mark D. Fairchild  
*Rochester Institute of Technology*

## Mercury May Turn Masterpieces Black

Vermilion paint, used by artists for centuries, degrades to black over time, and mercury may be to blame, according to a study published in *Angewandte Chemie*. Vermilion paint contains mercury and researchers theorize that the element's exposure to chlorine ions and light cause the degradation. To test this, chemists at the University of Antwerp in Belgium placed vermilion on a platinum surface and put it into water containing chlorine ions, causing the paint to turn black when exposed to laser light.

[Nature \(free content\)](#) (10/4)



## HUE ANGLES

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

### What color is an orange?

Thomas E. Phipps has recently written: “The secret of doing physics lies in the finding of harmless idealizations---those that reveal more than they conceal. There is no formula for it. It is an art...but also a matter of taste, guided by experience.” [1] Not only do I agree, but I see different “harmless idealizations” in different parts of physics.

In the above quote, I could have replaced “doing physics” by “writing nonfiction books for children” and offended fewer people. With this substitution, author Tristan Boyer Binns seems to have applied Phipps’s philosophy in her little book, *What Color is an Orange?* [2]

In the space of 32 picture-studded pages (including title page and table of contents), and using simple declarative sentences, Binns has captured a surprising amount of color science. We learn that oranges don’t have to be orange (e.g., no light—no orange; and an orange in blue light looks black). Also, we learn that rods and cones trap the light from an orange, that a prism disperses light into different colors, and a lens re-unites the colors. We even learn about mixtures of paint, ink, and light using three primaries each. The light mixtures reveal their red, green, and blue components when the orange is shown on TV and we see a raster-image detail. In each case, photographs and illustrations (in color) carry much of the message, well beyond the text. For example, in describing the action of a prism the text says “Each colour of light bends a little more than the colour next to it.” Binns doesn’t say which rays refract the most, but it is clear from the picture of a prism refracting light on the opposite page.

There are lots of idealizations. When describing light reflection from an orange, Binns says, “White light falls on an orange. The orange reflects back only the orange light. It traps, or absorbs, all the other colours in the white light.” Another idealization: the colors in a rainbow are exhausted by ROYGBIV. Another: you can get any color by admixing red, green, and blue lights. One can object at every turn. But the picture is intelligible and consistent. It avoids graphs and formulas. And I believe the only numbers in the book are the page numbers.

Binns is addressing children age nine and over. Could I do better than she did in conveying the subject to this audience? I don’t think so. And she has written many other books whose topics are far from

color science---indeed, far from any science. The target audience, however, is probably the same.

I came upon Binns’s book because a Datacolor visitor from China gave it to me during a stay in Lawrenceville. It looked rather strange and not entirely inviting to see all the Chinese text crowding out the feng shui of the page layout. But that just showed something else: within 32 pages, you can even explain the concepts in two languages.

Whenever we teach, we must deal in “harmless idealizations”---in this case, pictures that retain their basic integrity when refinements are introduced. Deciding which idealizations are harmless is no mean feat. It is a matter of taste, guided by experience...

1. T. E. Phipps, Jr., *Old Physics for New: a worldview alternative to Einstein’s relativity theory*, 2<sup>nd</sup> ed. (Apeiron, Montreal, 2012), p. 47.
2. T. B. Binns, *What Color is an Orange?* Raintree, 2006 (Republished 2007 by Harbin Inst of Tech. Press, as *What Colour is an Orange?* with inter-line Chinese translation.)

Michael H. Brill  
Datacolor



### Color Research and Application IN THIS ISSUE, October 2013

Some people using color have been confused by the difference between sources and illuminants. A source is an object that produces light. An illuminant is radiation with a relative spectral power distribution defined over the wavelength range that influences object color perception, which may or may not be physically made. Over the years the Commission Internationale de l’Éclairage (CIE) has defined a number of illuminants. In particular in the

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1960s a series of daylight illuminants, which were based on various measurements of daylight, were specified. However, since then light designers and engineers have found it impossible to produce a source that exactly replicated the daylight illuminants such as D65 (so named for having a color temperature of approximately 6500 Kelvin). In this issue Zsolt Kosztyán and Janos Schanda investigated the possibility of adopting smoothed curves approaching the current daylight illuminants that would make it possible to design daylight sources with minimal colorimetric error. The results of their work are described in the article “Smoothing Spectral Power Distribution of Daylights.”

In 1994 and 1995 Yan Liu and his colleagues published articles in this journal about the color of gem stones, specifically about the “Alexandrite Effect” where the gemstones appeared to change color when viewed under light sources. In the 1995 article they identified what is called an abnormal hue angle change in CIELAB space. The abnormality is that the change in CIELAB Hue Angle did not agree with what people observed. In this issue, Changjun Li and Manuel Melgosa present “A Note about the Abnormal Hue Angle Change in CIELAB Space.” In this article Drs. Li and Melgosa suggest using chromatic adaptation transforms to investigate this phenomenon, since one is only dealing with a change in illumination. They go on to point out that using the chromatic adaptation transforms in sharpened sensor space and in cone fundamental space yield very different results, and those in cone fundamental space in better agreement with visual observations.

As it happens, Yan Liu has come back to the journal in this issue with a new set of coauthors to discuss the “Color Measurement of a Ruby.” Rubies are special in that the color observed is the result of both selective absorption of the illuminating light and a red fluorescent emission from the gem. As Yan Liu, Taijin Lu, Tao Mu, Jie Ke, and Hua Chen explain the fluorescence is due to absorption of visible, not ultraviolet light. In addition they explain how to calculate the average color successfully from the measured spectrum and how to evaluate the ruby’s true color grade by artificial intelligence software.

In color science, researchers often develop metrics or algorithms to express mathematically some principle or practice relating to color. To be valid these expressions must agree with what an observer perceives. To find what the observer perceives the

researcher performs experiments in which the observer is asked to choose the stimulus they prefer or best fits some attribute. However, the result of such experiments can be influenced by the design of the experiment. In our next article Matthias M. Scheller, Lichtenauer, Peter Zolliker, and Iris Sprow discuss designing “Choice-Based Experiments in Multiple Dimensions.” In experiments with multiple dimensions, some of the dimensions might not be completely controlled. For these situations especially, they discuss the challenges of experimental design, the curse of dimensionality, and the use of meta-parameters. Then they propose an alternative analytic approach based on machine learning. They illustrate the challenges and the results with the example of a study of lightness contrasts inspired by gamut mapping where, when moving from a displayed image to a print, the highlights are diminished and structures in dark areas become more visible.

The next two articles deal with architecture, but in different ways and focusing on different issues. First, Juan Serra, who described “Three color strategies in architectural composition” in the last issue, is back to report that in the 21<sup>st</sup> century there is a shift in the way and amount of color used in architecture. This shift can be seen both in the use of color in new buildings and in the written analysis of architect’s use of color. In “The versatility of color in contemporary architecture,” Dr. Serra identifies four concepts that can be identified with this versatility: transformation, fragmentation, movement, and novelty. He suggests that pursuit of these four objectives helps to explain the way in which colors are conceived and arranged in much of contemporary architecture. The color figures provide beautiful illustrations of the concepts.

Next in the reconstruction of architectural heritage, it is often necessary to repair or replace damaged portions of the structure. While strength and durability need to be achieved, it is important also to preserve the visual effect of the monument, i.e., the repairs should be as imperceptible as possible. Nicolas Concha-Lozano, Dominique Lafon, and Noura Refik-Sabiri developed a test protocol to locate the threshold that separates visible and imperceptible replaced stone. In “Color thresholds for aesthetically compatible replacement stones on monuments” they describe a color-calibrated image chain processing system from acquisition to final display, and use a case study of the medieval ramparts of Auigues-Mortes to investigate the advantages and limitations of the procedure.

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From images of stone for building repair, we move to another use of digital imaging. Natural products such as fruits and vegetable have long provided some of the biggest challenges in color measurement. While an observer easily evaluates the quality of a piece of fruit by observing its color: a banana as yellow, or an apple as red, instrumental measurements of the same piece of fruit can vary greatly. Traditionally, inspectors use color charts to rate fruits and vegetables visually for quality and ripeness. In our next article “Digital Method for Measuring Banana Ripeness” Wei Ji, Georgios Koutsidis, M. Ronnier Luo, John Hutchings, Mahmood Akhtar, Francisco Megias and Mick Butterworth demonstrate that the image processing software they developed is capable of predicting the ripeness grade of bananas with greater reproducibility and grade resolution while being more flexible and consistent than either spectral methods or visual assessment methods.

In our Industrial Applications Section, Shih-Wen Hsiao, Chiao-Fei Hsu, and Kai-Wei Tang discuss the development of “Consultation and Simulation System for Product Color Planning Based on Interactive Genetic Algorithms.” This two-part system helps the designer develop the color plan for components and decorative patterns for products. First, the designer can employ an interactive genetic

algorithm to invent and produce novel design schemes. Then the color simulator using a boundary extraction algorithm can apply colors to the areas of components and decorative patterns to the simulated product. The combined system allows the designer to explore and evaluate the color impact in the early stages of product design.

This year is the 100<sup>th</sup> Anniversary of the founding of the CIE. It was celebrated in April in Paris, France at the CIE mid-term meeting. CIE Publication x038:2013 Proceedings of the CIE Centenary Conference “Towards a New Century of Light” has been published and is briefly described in this issue. Another CIE Publ. 204:2013 Methods for Redefining CIE D Illuminants is briefly mentioned. Finally, Michael H. Brill reviews *The Structure and Properties of Color Spaces and the Representation of Color Images* by Eric Dubois.

Ellen Carter  
Editor, Color Research and Application

### Calendar

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|-------------------|---|
| <b>Nov 4-8</b>    | <b>IS&amp;T Color Imaging Conference</b> , Hotel Albuquerque, Albuquerque, NM<br><a href="http://www.imaging.org/ist/conferences/cic">www.imaging.org/ist/conferences/cic</a>   |
| <b>Nov 12</b>     | <b>Detroit Color Council Meeting</b> , St. Johns, Plymouth, MI, Information Contact - <a href="mailto:cssouby@hotmail.com">cssouby@hotmail.com</a>  |
| <b>Dec 5-6</b>    | <b>AATCC Textile Testing Workshop</b> Research Triangle Park, N.C. <a href="http://aatcc.org/events/workshops/ITT.htm">aatcc.org/events/workshops/ITT.htm</a>   |
| <b>Dec 12-13</b>  | <b>ASTM E12 Color and Appearance</b> , Hyatt Regency Riverfront, Jacksonville, FL   |
| <b>2014</b>       |   |
| <b>Feb 2-6</b>    | <b>IS&amp;T/SPIE Conference on Human Vision and Electronic Imaging</b> , San Francisco, CA  |
| <b>April 1-3</b>  | <b>AATCC International Conference</b> , Crowne Plaza Resort, Asheville, NC  |
| <b>May 13-16</b>  | <b>IS&amp;T Archiving Conference</b> , Berlin, Germany, <a href="http://www.imaging.org/archiving">www.imaging.org/archiving</a>  |
| <b>May 16-21</b>  | <b>Vision Sciences Society, “VSS 2014”</b> , Tradewinds Island Resort, St. Pete Beach, FL,<br><a href="http://www.visionsciences.org/st.pete_beach_info.html">http://www.visionsciences.org/st.pete_beach_info.html</a> |
| <b>Jun 1-6</b>    | <b>SID Display Week</b> , San Diego Convention Center, San Diego, CA, <a href="http://www.sid.org/">www.sid.org/</a>  |
| <b>Jun 16-17</b>  | <b>CIE Division 1 on Color and Vision</b> , NIST, Gaithersburg, MD  |
| <b>Jun 18</b>     | <b>ISCC Bridge Symposium</b> , NIST, Gaithersburg, MD   |
| <b>Jun 19-20</b>  | <b>ASTM E12 Color and Appearance</b> , NIST, Gaithersburg, MD   |
| <b>Oct 21-24</b>  | <b>AIC Interim Meeting, The Color and The Culture</b> , Hotel Misión de los Ángeles, Oaxaca, Mexico, <a href="http://www.aic2014.org">www.aic2014.org</a>   |
| <b>2015</b>       |   |
| <b>Jan 28-29</b>  | <b>ASTM E12 Color and Appearance</b> , Sheraton, New Orleans, LA  |
| <b>May 19-22</b>  | <b>AIC Midterm Meeting, Color and Image</b> , Toyko, Japan, <a href="http://www.aic2015.org">www.aic2015.org</a>  |
| <b>Jul29-Aug3</b> | <b>CIE Quadrennial Meeting (including Div. 1)</b> , Manchester, UK  |

## 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	<a href="http://www.aviantechnologies.com">www.aviantechnologies.com</a>	603-526-2420
BYK-Gardner USA	<a href="http://www.byk.com/instruments">www.byk.com/instruments</a>	301-483-6500
CERAM Research Ltd.	<a href="http://www.ceram.com">www.ceram.com</a>	+44(0)1782 764428
Datacolor	<a href="http://www.datacolor.com">www.datacolor.com</a>	609-895-7432
Gamma Scientific	<a href="http://www.gamma-sci.com">www.gamma-sci.com</a>	800-637-2758
Hallmark	<a href="http://www.hallmark.com">www.hallmark.com</a>	816-274-5111
Hunter Associates Laboratory, Inc.	<a href="http://www.hunterlab.com">www.hunterlab.com</a>	703-471-6870
IsoColor Inc.	<a href="http://www.isocolor.com">www.isocolor.com</a>	201-935-4494
X-Rite Incorporated	<a href="http://www.xrite.com">www.xrite.com</a>	616-803-2113

### We could still use your help!

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

### ISCC News Issue #464, Fall 2013

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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](http://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)