Inter - Society Color Council

Newsletter

Winter 2020 - Issue #489

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Photo by Maggie Maggio.

Board of Directors Corner

https://iscc.org/Sys/PublicProfile/42804700/4048538

Greetings from New England where the color right now is predominantly Frosty White. I am an IACC-NA (International Association of Color Consultants - North America) trained Architectural Color Consultant, running an independent business in Northampton, MA, serving clients locally and nationally.

My first introduction to ISCC was at the Munsell Centennial Color Symposium in Boston in June of 2018. Living a couple hours from Boston, and being incredibly excited about the conference, I volunteered to help out almost as soon as I had registered. I joined Maggie Maggio at the conference site for an early planning meeting and ultimately took on the job of providing decorations for the banquet. With the help of two teams of volunteers, one here at home and another at the conference venue, we put together a pretty amazing room on a tiny budget with mostly recycled materials.

As the Munsell conference was wrapping up, I was invited to run for a seat on the Board and have been happily serving since being elected in late 2018. Being a member of the Board has afforded me the opportunity to build friendships with those working across a broad range of fields and I have learned more about color, specifically color science, as a result.

In addition to helping to edit the ISCC quarterly newsletter, I am currently involved in the next not-to-miss conference – Color Impact 2020. See ***https://www.colorimpact2020.com***. As a member of ISCC and IACC-NA, both co-sponsors of the event, it was a natural for me to join the organizing team. Color Impact 2020 will be held at Yale University, June 7-10, 2020, and will offer a dual track focus—Color in Architecture and Color in Education. We have an inspiring group of Keynote Speakers, including Shashi Caan, a former and longtime member of the ISCC Board of Directors.

The conference will run for two days, June 8 and 9, with hands-on workshops and tours being offered on the 7th and 10th. Tours will include an architectural overview of the buildings on the Yale campus, as well as a visit to the Josef and Anni Albers Foundation in nearby Bethany, CT. Workshops will include a hands-on session with the team from The Color Literacy Project, a group of AIC and ISCC members who joined forces after Munsell 2018 and are now working to create state-of-the-art teaching materials on the art and science of color for use in classrooms. IACC will present a hands-on workshop based on their curriculum for Architectural Color Consulting. The ISCC and IACC-NA will have their Annual Meetings during lunchtime breaks on the 8th and 9th respectively.

We are also excited to announce the ISCC Student Poster Competition with a top prize of $500 for the winning contribution. Posters may present any individual or collaborative research or art and design project related to the impact of color in art and design, science, industry or education. We invite educators to share this opportunity with their students by visiting the Color Impact 2020 website ***https://www.colorimpact2020.com/studentposters***. There is a link to a print-ready flyer at the top of the page. Students are invited to join ISCC and will receive a special discounted price to attend the conference.

I look forward to reconnecting with friends and colleagues from Munsell 2018 and hope to see many of you at Color Impact 2020 in June!

Amy Woolf

Table of Contents

Hue Angles: The Virtual Image: Keeping It Real

When recently asked to explain the operation of a magnifying glass, one of us (MHB) revisited an old conundrum from secondary school: the virtual image. When a viewed object is within the focal length of the lens, an image is formed that is not inverted relative to the viewed object. Far more mystifying, it is on the same side of the lens as the light source, not on the side to which actual light is conveyed. Yet we see virtual images all the time.

You can see the traditional picture of a virtual-image situation in the part of ***Fig. 1*** that includes the "eyepiece" lens and everything to the left of it. The "object" is a short, downward-pointing black arrow. The "virtual image" is the longer, dashed black arrow at the far left. The base of the object and of the image lie on the axis of the lens. The point of the arrow in object and image are connected by two rays (dashed black lines delimiting a pink area). One of these rays passes through the center of the lens, and in the ideal (thin-lens) case this ray will be undeflected by the lens. The other ray starts out parallel to the lens axis, and is bent by the lens so it passes through the focal point (not shown) that is to the right of the lens. (A collection of such rays from the Sun could concentrate enough to cause a fire.) If the object had been to the left of the left-hand focal point of the lens, this bent axial ray would have intersected the undeflected ray so as to form a real image: inverted relative to the object, on the same side of the lens as the light propagates, and generally understandable. But when, as in ***Fig. 1***, the object lies to the right of the left-hand focal point, the two rays diverge to the right of the lens, and instead, we are told, we have to backtrack both rays until they intersect on the left-hand side, and this intersection is part of the virtual image.

How can an image form that is coincident neither with the eye nor with the light that should be generating that image? Virtual or not, this deserves an explanation.

As optical engineers will tell you (if pressed), the virtual image is a way of expressing a geometric relationship without involving the actual eye. As soon as you include the eye in the explanation (see ***Fig. 1***), the paradox is resolved. The rays that diverge as they pass to the right of the eyepiece are brought together in focus by the lens of the eye. Where these rays meet, one finds a real image on the retina. This image is shown in ***Fig.1*** as a white arrow. It is a real image, being where the light ends up, where vision takes over, and in an inverted configuration that the visual system interprets correctly. (That is a subject for another essay).

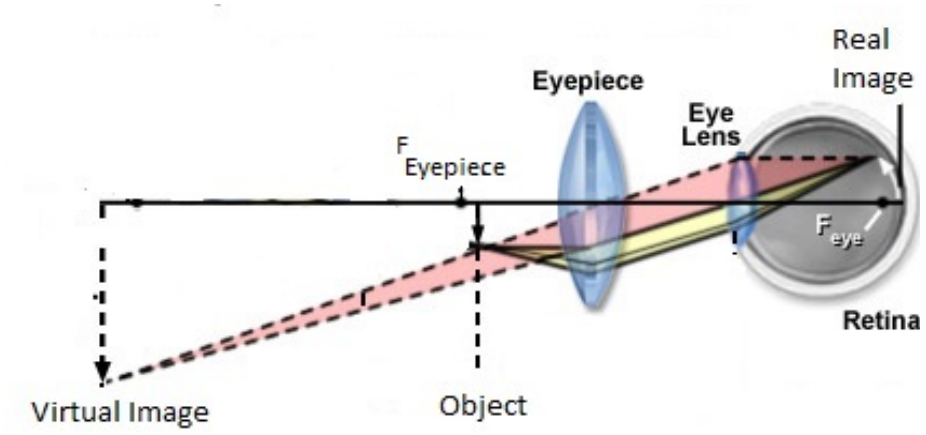


Fig. 1. Drastically abbreviated depiction of a virtual image and the real counterpart that emerges when the eye is included. Please ignore the yellow region. The figure in context can be found at https://micro.magnet.fsu.edu/primer/anatomy/components.html.

The important thing to remember about the virtual image is that it is a shorthand to replace a fairly intricate relationship of the rays that form the real image if the explanation includes the eye. That relationship is only partially apparent in ***Fig. 1***. One gets the false impression that the bent axial ray from the eyepiece lens becomes the undeflected ray of the eye's lens, and vice versa. Actually, the bent axial ray from the eyepiece lens passes through the right-hand focal point of the eyepiece, which only accidentally happens to be near the center of the eye lens.

A clearer picture of the eye's focusing of the diverging rays is shown in ***Fig. 2***, a ray-tracing simulation. Here the optical elements are more stylized than in ***Fig. 1***: the two lenses are red-tipped line segments, the object consists of a pair of radiating green dots, and rays from the dots proceed through both lenses and meet at the right-hand convergence points that depict the real image on the retina. The virtual image is too far to the left to be captured by the figure. We think that both ***Figs. 1*** and ***2*** are needed to show how the eye acts in a virtual-image situation.

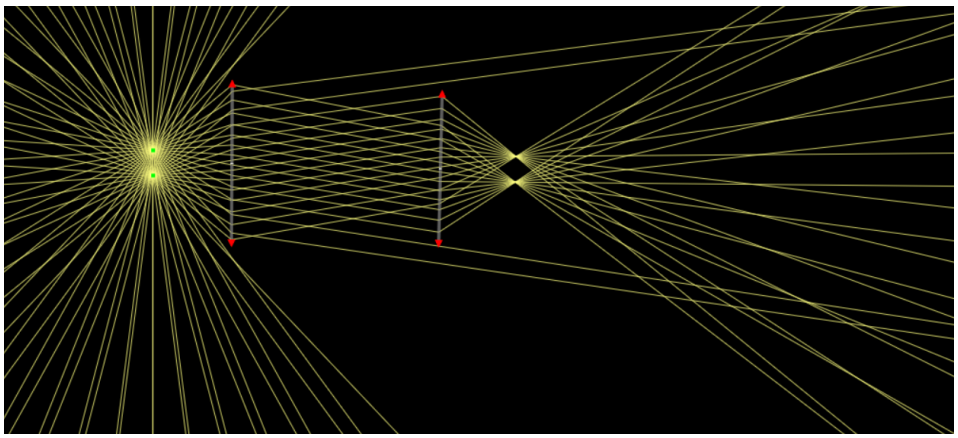


Fig. 2. Simulation of formation of a real image using two lenses. The divergence of the rays through the left-hand (eyepiece) lens is evident from the rays that proceed outside the lens aperture of the eye. (See https://ricktu288.github.io/ray-optics/simulator/.)

In short, experts know the virtual image and how to "keep it real." Now you know too.

Michael H. Brill and Nilesh Dhote
Datacolor
(send contributions to mbrill@datacolor.com)

Election Results

The ISCC Board of Directors is proud to announce the election results from the January 2020 balloting.

The three new Board of Directors members are:

Ellen Divers

Jennifer Kruschwitz

Michael J. Murdoch

The term of service began in January 2020 and will end in December 2022. Contact information is listed on page 3 of the newsletter.

Congratulations to our new Directors!

COLOR
RESEARCH AND APPLICATION

Over the past few years we have had an increasing number of submissions and articles from China. As a result of this increased participation, we are excited to announce our newest endorsing society, the ***Color Association of China.*** We also welcome our new Associate Editor from China, Prof. Haisong Xu. Dr. Xu is a professor in the College of Optical Science & Engineering at Zhejiang University in Hangzhou, China. Dr. Xu has written a brief introduction to the Color Association of China, which immediately follows this column.

For nearly a century now, there has been a history of using three variables to numerically specify color. The three variables relate either to how the color is observed (as in the sensors in the eye), or how the color is produced (lights, television, photography, or printing). These sets of colorimetric values parallel variables in the field of spectrophotometry, which are measurements of the stimulus at the wavelengths in the visible section of the electromagnetic spectrum (emission, transmittance or reflectance). It is not unusual to find the situation where we have only colorimetric values, when what we really need is the spectrophotometric data. But we must remember that different spectra can have the same color appearance. Which one is the right spectra to use? Can we reconstruct the spectrum from our colorimetric data? Many methods have been reported in the past; our first author cites 37. However, in his article, Scott A. Burns introduces three new ***"Numerical Methods for Smoothest Reflectance Reconstruction."*** The three methods differ from each other in their definition of smooth, and the color domain over which they operate. One selects the appropriate one to be implemented depending on the situation. Burns' methods are shown to create reflectance curves that closely resemble those of real colors, both natural and synthetic, and avoid some of the pitfalls of other methods previously recommended.

In the coatings industry, color is the primary factor in sales. People take joy in selecting just the right hue for each room in their house, or for the outside of their house. For years the selection options included a limited number of different paint factory-prepared colors. The insertion of machines in retail stores that allowed shades to be mixed in the store greatly increased the buyer's options. The point of sale (POS) option works on the platform in which accent colors are added to a common base paint. However, to keep the quality of the paint high, it is important to understand the interaction of other chemicals that are included in the paint formulation, such as extenders and additives. In ***"Effect of ingredients of Accent base on shade development in Point of Sale Tinting,"*** Elvina Rose, Pramod Nikam and Amit Joshi point out that the proper dispersion and stabilization of titanium dioxide/extender in a coating is critical for the color development. Their study examines the raw material interactions and their effect on color development.

In our next article Shabnam Rezaei, Barat Ghobadian, Mohammad Taqhi Ebadi, Hossein Ahmadian and Farzaneh Janqi try to determine if color imaging measurements can replace a spectrophotometer in the quality evaluation of their leafy green vegetables. They experimented with methods of processing and preservation of freshness. In their article ***"Effects of Cold Plasma on the Color Parameters of Hyssop (Hyssopus officinalis L.) Using Color Imaging Instrumentation and Spectrophotometer,"*** they report on experiments conducted to evaluate the effects of cold atmospheric plasma treatment on the color of Hyssop, where they compare the use of colorimeter CIE L*a*b* data with data obtained from a digital still camera using digital image processing (MATLAB) software. Based on their results, they found that a digital still camera could be used for color evaluation and for evaluation of product quality.

Like the stored leafy green vegetables, a piece of artwork can change over time and lighting conditions, although the time span is different. Therefore, conservation researchers have a goal of capturing a faithful reproduction of an image (of artwork) as it appeared when it was first produced, so it can be available for posterity. Agnieszka Olejnik-Krugly and Przemyslaw Korytkowski are adding a step toward the success of this goal by developing a procedure for ***"Precise Color Capture Using Custom Color Targets"*** for color accuracy, assuming that the rest of the parameters have the right values. Their hybrid approach, combines the uniformity of color and the size of the color gamut found in standard targets with the precision obtained from the personalized palette of additional colors. Also, by using direct spectral measurements in the artwork, their approach reduces the risk of a spectral mismatch to paints used in the work of art.

Color Research and Application
IN THIS ISSUE
Volume 45 Issue #1, February 2020
By Ellen Carter

"Optimization of a Spectrally Tunable Daylight Simulator Using Four Quantum Dot LEDs for Visual Appraisal of Color" is the topic of the next article. The Commission Internationale de l'Eclairage (CIE) provides standard data for daylight illuminants, (known as D50, D55, D65 and D75), which are used widely in calculations of colorimetric data in calibrations, measurements in commercial applications, and other areas such as color vision testing. However, when making visual appraisals, lights that very closely match the spectra of the selected CIE standard illuminant are difficult to find. Using tunable LED sources makes it possible to achieve closer matches to the standard CIE standard illuminants. The next authors Qi Feng, Yifei Zhao, Ding Ke, Ping Zhong, and Guoxing He used optimization simulations to determine the limits of luminous efficacy and the quantum efficiency. See the article for the detailed limits.

When trying to find an object in a physical scene, the reflectance of the target is an important factor. Often vision enhancers, such as night-time goggles, which extend the visible wavelength range into the near infrared region, are used. With this in mind, formulations of printed dyes can include additional compounds to affect the reflectance in both the visible and near infrared regions of the spectrum. Seyedeh Ameneh Siadat and Javad Mokhtari investigated near and short-wave IR emission spectra of printed cotton/nylon blend fabrics coated with inorganic compounds to tune the diffuse reflectance behavior of them to match the diffuse reflectance behavior of woodland and desert backgrounds. They report on the ***"Diffuse Reflectance Behavior of the Printed Cotton/Nylon blend Fabrics Treated with Zirconium and Cerium Dioxide and Citric Acid in Near and Short-Wave IR Radiation Spectral Ranges"*** in their article with the same title.

We often talk of the beauty in nature, and what can be more beautiful than colorful butterflies? In our next article ***"Computational color combination analysis of Papilionidae butterflies as aesthetic objects,"*** Erina Kakehashi, Keiichi Muramatsu and Haruo Hibino report on their study of a set of 118 butterfly images including color polyphenism from the 47 Papilionidae species that are generally preferred by humans. Through analysis, they sorted the images into clusters, then analyzed the clusters in terms of the color components of hue, chroma, and lightness to derive the color combination rules of the Papilionidae family of butterflies preferred by humans. Needless to say, what is beautiful or harmonious to a human, probably is not what seems beautiful to another butterfly, or to a species looking to make a butterfly their next meal. However, what humans perceive as beautiful in butterflies may correlate to general rules of human perception of beauty. In terms of experimental psychology, several studies have obtained four common principles of color harmony: equal hue, equal chroma, unequal lightness, and high lightness. Thinking along these lines, they compared the results of their present study with conventional color harmony theories.

Jun Chen, Jie Yang, Marjin Vazarian, and Stephen Westland turned around the question of what emotion does a specific color evoke? Instead, they asked the participants of their study to assign a color or colors to specific adjectives. In their article, ***"A Method for Exploring Word-Colour Associations,"*** they show through explicit observation that there is not a one-to-one relationship between words and colors. To find whether their data could be considered general, they used two groups of observers, one from the UK and the other Chinese. The data derived showed, for example, that there are a great many similarities between the word-color relationships for UK and Chinese participants, although some interesting differences were also revealed.

As I mentioned earlier in this column people have traditionally enjoyed choosing the color for homes, both inside and out. In the next article, Naveen Joshi and Gopal Singh Rawat explored their observation ***"Why Only Blue in Traditional Architecture of Western Himalaya, India?"*** There can be many reasons for the choice of color, ranging from but not limited to past experiences, culture, beliefs, and personal preference. Therefore, Joshi and Rawat conducted a study to document the color preference and motivations for the preference of specific colors by an ethnic community residing in the interior valleys of Western Himalaya. The study revealed that a participant's color preference in architecture was influenced by psychological and socio-cultural reasons, which varied with gender and age classes. The color pattern can be an important clue to the connections between various cultures and their history.

Moving from the mountainous regions to urban settings, color may take on a different role. Some urban areas have zoning or other regulations about the use of color to give a sense of unity to a city, or distinct unique feeling differentiating the particular city to other cities. In already established cities, urban renewal provides an opportunity to apply new principles to color selection. In their ***"Research on Color Harmony of Building Façades,"*** Ke-Run Li, Ya-Qian Yang and Zhi-Qiang Zheng summarize the principles for the application of building color harmony in urban renewal, and proposed guidance on building color harmony into an urban renewal project. They focus on the Wanhua District of Taipei City, Taiwan. While not limiting the selections of hues, they develop recommendations of selection rules for choosing a main color and secondary color to be used harmoniously together on one building, when targeting a building for renewal.

Turning our attention to the lighting design of buildings in cities, there are many factors to be considered, ranging from economy of energy usage, security, and increasing observer's attention and attraction. While it is obvious that enough of the right type of light is necessary for

crucial activities within the building and security both inside and out, there are other considerations for the lighting architect. These include the cost, the impact of the lighting on the environment and also observer's attraction to the building. To clarify these relationships, Maedeh Pourfathollah, Mohammadjavad Mahdavinejad and Mojtaba Ansari have introduced a new term, viewerphilic, which combines visual attention and visual desirability. The authors also developed a theoretical model showing the relationship between the variables that directly and indirectly influence the formation of a viewerphilic night perspective. In ***"Viewerphilic Nightscape Based on Correlated Color Temperature,"*** they report that the elements with high correlated color temperature in the background with low correlated color temperature and neutral color were in the viewerphilic range, while the element with low color temperature and background with high color temperature was in the range of viewer phobic.

Again, mentioning the joy people take in selecting just the right hue for each room in their house, the next authors, Elif Güneş and Nilgün Olguntürk, take a step further to report on ***"Color Emotion Associations in Interiors."*** Their research study examined the relationship between two crucial phenomena of design color and emotion in interior spaces. They created virtual environments where the 180 participants could individually wander around two of the four 3D interior spaces with four different wall colors (red, green, blue, and gray). The participants were equally and randomly divided into groups to experience two of the four settings. The individuals self-reported information that only each of them had access to by matching the colored interior spaces experienced with one of seven faces (six different emotions and one neutral). This study developed a guideline for designers and interior architects that may be used as a dictionary to illustrate which color in interior space is associated with which specific emotion.

Rather than choosing paint for a room, the next two articles discuss the color decision process necessary to optimize the color selection for products. The first article discusses multi-emotional product color design. Authors Man Ding and Wei Dong report that the use of emotional design for product colors plays a significant role in improving the viability and competitiveness of business. Therefore, in their article, ***"Multi-emotional Product Color Design Using Gray Theory and Nondominated Sorting Genetic Algorithm-III,"*** they apply multi-objective optimizing approaches for solving multi-emotion product color design problems to establish a product color design method that can satisfy the complex and varied multi-emotional images of users and ultimately improve the theoretical significance of multi-emotion product color design along with the applicability of practical engineering design. They describe their procedure, then show its implementation in the two-color design of a forklift to verify the effectiveness of the proposed method.

The next article discusses how to achieve multi-objective optimization of tri-color product color design to be used, for example, in producing a new baby stroller. Fu Gou, Fengxiang Li, Mitsuo Nagamachi, Mingcai Hu and Mingming Li discuss the ***"Research on Color Optimization of Tri-Color Product Considering Color Harmony and Users' Emotion."*** In their proposed process, a preliminary survey is made to determine five perceptual features of color design: order, excitement, temperature, color harmony, and user's emotional preference. Their process then uses a radial basis function neural network and a genetic algorithm procedure to achieve the multi-objective optimization of the tri-color product design optimized for color harmony and users' emotional preference. After developing the coloration for one product, they then demonstrate the process with a second product (a child's electric car).

There are two Research Notes in this issue. The first is a warning from Kevin Smet and Shining Ma. They have ***"Some Concerns Regarding the CAT16 Chromatic Adaptation Transform."*** As they explain, a new chromatic adaptation transform (CAT16) has been published to improve upon the widely used CAT02 model. The CAT16 used in the CAM16 (color appearance model) is based on the form of the CAT02 transform adopted in CIECAM02, but uses a slightly different sensor space to fix some gamut problems plaguing CIECAM02 and adopts a two-step CAT to ensure symmetry and transitivity. However, there can be inconsistencies between results from the CAT16 used by itself and the results from its use in the CAM16. In their Research Note, they briefly discuss these issues in more detail and provide a consistent two-step CAT adopting the CAT16 sensor space.

The second Research Note is an update of new research following the work published by Mayuko Iriguchi, Hiroki Koda, Takamasa Koyama and Nobuo Masataka, [Color Res Appl, 2019; 44: 1024-1033]. In their note, they discuss ***"Colour-odour correspondences in women during the menstrual cycle: comparative analysis between the menstrual and ovulation phases."*** Their research found that participants had similar impressions of colors and odors, and made similar color choices for odors in both the menstrual and ovulation phases, while "pleasant-unpleasant" impressions of color and odor might vary according to the menstrual cycle.

This issue ends with a Meeting report, a book review, and a publication. Yulia A.Griber and Verena M. M. Schindler report on ***"The First Russian Congress on Color."*** Danny C. Rich reviews the new ***(4th) Edition of Billmeyer and Saltzman's Principles of Color Technology***, and in Publications Briefly Mentioned, the CIE announces the publication of Technical Note ***"The Use of "Accuracy" and Related Terms in the Specifications of Testing and Measurement Equipment."***

32nd Center for Visual Science (CVS) Symposium: "Active Vision"

Under natural conditions, visual processes unfold in the incessant presence of motor behavior, as visually-guided actions contribute to shaping the input signals to the retina. Active vision, the study of vision in the context of natural motor behavior, has grown and expanded greatly in recent years, in part due to advances in computational power, display technology, and tracking of body movements. This symposium will focus on the indissoluble bond between vision and action. It will cover a broad array of tightly related topics, including: the visual consequences of various types of body movements, the role of motor activity in extracting and processing visual information, and the visuomotor strategies for controlling behaviors such as locomotion, reaching, and grasping. By bringing together a diverse array of viewpoints and creative methodological approaches to the study of the visual system in action, this symposium aims to uncover common principles of visuomotor computation, identify promising research directions, disseminate knowledge on recent advances in the field, and attract and help forming a new generation of researchers. A list of currently confirmed speakers can be found here:

http://www.cvs.rochester.edu/symposium/program.html

This is the 32nd symposium of the biennial series organized by The Center for Visual Science (CVS) at the University of Rochester. CVS symposia are highly interactive meetings with a group of invited speakers and an audience of 100-200 participants. Scientific sessions include talks and poster presentations. Ample time will be given for debates of ideas and hypotheses, with sessions specifically dedicated to general discussions and a program designed to promote interactions. Because of their highly interactive nature, CVS symposia provide great opportunities for students and post-doctoral fellows to engage in deep discussions with leading scientists in the field.

The Abstract Submission Deadline is March 7, 2020.
Abstract acceptance will be notified by March 31, 2020.

Dates: June 10-13, 2020

Location: The University of Rochester, Rochester, NY
Website, registration & logistics:

http://www.cvs.rochester.edu/symposium/index.html
https://www3.cvs.rochester.edu/symp2020_reg/symposium_reg.htm
http://www.cvs.rochester.edu/symposium/logistics.html

Abstract Submission (3/7/20 deadline):
http://www.cvs.rochester.edu/symposium/abstracts.html

Organizers: Jude Mitchell, Martina Poletti, and Michele Rucci

ISCC Webinars

The ISCC Webinar committee is delighted to announce the following webinars for 2020. These webinars are thanks to Jean's diligent recruiting! Thank you, Jean!

Jan 28, 2020
2pm EST

Ken Butts:
ULTRA-PORTABLE COLOR MEASUREMENT – A Spectro in Your Pocket?

Abstract:

With the introduction of ultra-portable color measuring devices, the need for designers to purchase garments – or discreetly cut a corner – may be coming to an end. The promise of these devices is that designers can easily measure inspiration colors at the fashion show or in the competitor's store and quickly determine whether or not the color is in their own library or available from a color standards provider. This session will review the possibilities and limitations of ultra-portable color measurement, not only for design but as a potential low-cost QC tool for some supply chains

Bio:

Ken Butts is a graduate of NC State University with a BS in Textile Chemistry. He has spent 27 years at Datacolor in various technical and product management roles helping customers in the retail/apparel industry implement digital color management solutions. Ken is currently Global Key Account Team Director at Datacolor. Over the years he has been a frequent speaker at AATCC events including the annual Color Management Workshop. He has also been guest lecturer for textile and apparel departments of multiple US universities.

Feb 25, 2020
2pm EST

Ruthanne M. Hanlon:
Color + Culture COLOR & DESIGN TRENDS

Abstract:

Color trends come and go, season after season and year after year. Sometimes it seems as if they show up without warning and are quite suddenly everywhere – in every product category (clothes, furniture, cars, even computers!) – as if every individual in the design world privately joined forces to release the same hues during the same season. And while there are some groups like that in existence, they are never, and have never been, the creator of color trends. Color trends are determined by our collective identities. In that regard, they are in fact never without warning, because true trends (as opposed to fads, for example) are born out of a whole web of interconnected elements that shape our culture and inform our subconscious needs, wants, and buying patterns. But where does such a web begin? Where is the origin of a trending color or palette of colors, and how does it become relevant? Color trends are in fact an outcome; a product of timing, events, and moods.

Bio:

Ruthanne has been in the field of design since graduating in 1994 from FIDR accredited Villa Maria College located in upstate NY. Her career includes experience in kitchen and bath design, custom furnishings and space planning. Ruthanne has focused specifically on color specifications since 2000 as a representative of PPG Architectural Coatings, and has consulted on commercial and residential projects

along with historic restorations using the powerful influence color has in transforming a space, creating an atmosphere and providing the personalization and character everyone strives for. Ruthanne's understanding of the depth and power of color is reflected in her work.

Ruthanne travels North America and the Caribbean speaking to groups of interior designers, architects and students to conduct PPG's accredited CEUs. She also offers expert advice to homeowners on choosing color and using it with ease and confidence in, or on, their home.

Mar 17, 2020
2pm EDT

Ellen Divers:
The "Blind Spot" in Architectural Color

Abstract:

People are often surprised when they learn what interior designers actually do, and how their curriculum prepares students when it comes to the use of color. The reality is that many designers (and architects) enter their new professions with a 'blind spot' when it comes to using color in the built environment. This circumstance, in fact, has paved the way for the growing profession of architectural color consultants with solid color instincts, yet still an absence of evidence to support their practices. This webinar sheds light on the factors that contribute to these circumstances:

•What does the work of interior designers really entail? Where does discussion of color appear in the design process and how do design students learn about color?

•Public discussion on the human response to color inevitably takes the same path: a description of the associations and symbols that people have with each of the hues (blue is calming, red symbolizes passion, etc.). Why is this "Hue Paradigm" of limited use in architectural color?

•The Hue Paradigm has also shaped research questions/methodology and has, inadvertently, reinforced the 'blind spot' in architectural color. How has this way of conceiving color interfered with understanding color in a way that is meaningful to designers?

Ellen will present studies that inspired her own research and introduce the "Value-Chroma Paradigm" as a new framework for investigating the human response to color

Bio:

Ellen is an independent researcher on the topic of human response to color, an endeavor that grew out of a lifelong interest in design. Curious about the application of color in built environments, she completed seminars led by Frank Mahnke of the IACC-NA (International Association of Color Consultants/Designers – North America). She then began delving into the research literature and formulating a point-of-view based on the gaps and opportunities she observed in the evidence. A desire to participate in the field of design led her to pursue a B.S. in Interior Design with a Minor in Studio Art at Meredith College (Raleigh, NC) where she conducted her first study on color. A follow-up investigation is underway to further explore the findings of the earlier study. Ellen also has a B.A. in Psychology (University of Richmond, VA) and an M.Ed. in Adult Education (Virginia Commonwealth University, VA). Her goal is to continue deepening her knowledge and experience with color and to eventually design learning opportunities on the subject for design professionals. www.ellendiversdesign.com

April 14, 2020
2pm EDT

Tyler McTigue:
Light & Color with LED

Abstract:

Our eyes can play tricks on us when it comes to color and how the eyes adapt. Lighting designs are affected, positively and negatively, by this. Understanding basic vision science, and how the eye perceives colors of objects and the environment, are important elements in design considerations. Comprehending color metrics that are used with conventional and LED sources will allow for a more thoughtful technical and artistic approach to the design.

Bio:

Tyler "Ty" McTigue – Strategic Account Manager – GE Current, a Daintree company

Ty holds a BSBA from John Carroll University's Boler College of Business. Ty began his career with GE in professional marketing at a co-op at their East Cleveland headquarters, Nela Park. He participated in GE's Commercial Leadership Program (CLP) in Shanghai, Chicago, Malawi, and everywhere in between.

Ty has a passion for disruptive technology, and spoke on the topic at a Leadership Symposium held at the Rock and Roll Hall of Fame in 2018. He regularly speaks in classes in the Boler College of Business on topics including leadership and managing difficult conversations in the workplace. Consistent with his double-bottom line mentality, Ty serves as a mentor at the Cleveland Metropolitan School District's MC2 STEM School. He helps 10th grade students with interview skills, resumes and the challenges of navigating high school life.

A Blast from the Past: ISCC Newsletter from 50 Years Ago.

ISCC News No. 204 Jan./Feb. 1970

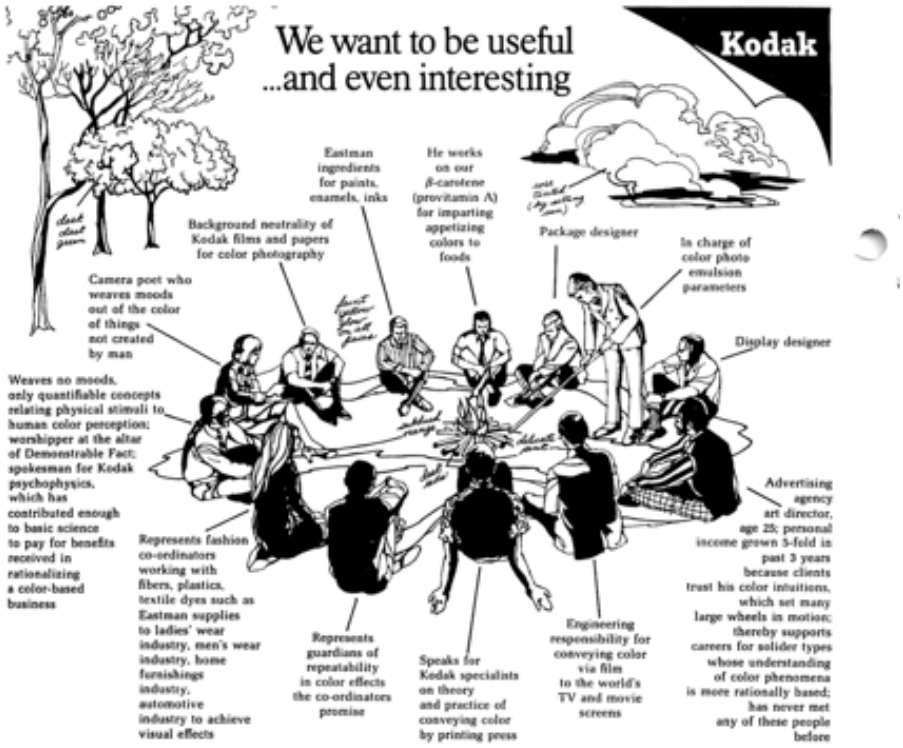
As we head into a new decade in the 21st century, I thought it would be interesting to take a look back at where ISCC was as they launched into the decade of the 1970s! ISCC News No. 204 published an article entitled ***The Threat of Conformity*** with the following statement about "Color":

"Fortunately, no one will ever be able to leash color. Each of us sees it differently. We react individually. Our preferences are unique. The more science, technology and merchandising pressures tend to drive the world into a single channel, the more we must look to color to break the chain; to serve as the resistant element and the bold challenger. For color, like music, knows no barrier. It reaches all alike, always evoking individual responses. Indeed COLOR MAKES THE DIFFERENCE."
From the Color Association of the United States, Inc.

As we all know, color has been unleashed and the decade of the 1970s, thanks to ISCC, played a major role in that process!

ISCC had relationships with major corporations, especially in the '70s. One of those corporations was the company that employed me as a color scientist for 32 years: **Eastman Kodak Company**. This newsletter from 50 years ago highlighted a Kodak advertisement that was posted to encourage its employees as well as others around the world to ***"supply objectivity and renew it"*** by attending the ISCC Annual Meeting and considering joining this diverse group of color-interested individuals to broaden color horizons for all! Kodak was further invested in ISCC as many of the speakers at the 1970 Annual Meeting were Kodak employees.

This newsletter also featured an article from the Vice President of Kollmorgen



We take counsel in preparation for the annual meeting of the Inter-Society Color Council in New York on April 13 and 14.

and the President of its Macbeth Color and Photometry Group, W. B. Reese, supporting Color Technology Education. This support came in the form of ***"financial grants in aid, invited lecturers from its technical and research staffs, and demonstration materials and equipment for use in laboratory workshops."*** This article also announced the one-week course, ***"The Principles of Color Technology"***, at Rensselaer Polytechnic Institute offered by Dr. Fred W. Billmeyer, Jr. of The Rensselaer Color Measurement Laboratory in Troy, New York and the one-week course, ***"Application of Computers to Color Science"*** at Clemson University in Clemson, South Carolina offered by Professor Frederick T. Simon.

Kollmorgen Corporation also announced a new color measurement service that would provide accurate spectrophotometric data in graphical and tabular form to those looking for close color control.

The 1970s marked the beginning of a new decade in New York City where all city-licensed taxis had to be painted yellow. Police would ticket cabs that were not painted yellow!

https://viewing.nyc/new-yorks-taxi-cabs-through-the-years/

There was also a fascinating article called ***What Color is A Telephone Call?*** In the 21st century, where cell phones abound, this concept of a telephone call having a color is vey foreign. But in the 1970s, when accurate phone call connections depended on a cable splicer or installer running the correct wires from your house phone to a cable and then through a cable to your telephone central office, telephone wire colors were very important. In fact, different wire colors were essential for an easy, fast and accurate installation. One important characteristic of a cable splicer or installer was that they could not be color blind! Here are some interesting facts that came from the article: "Last year, some 10.6 billion conductor-feet of wire, all kinds of wire, were added in metropolitan New York. Another 12.5 billion conductor feet are planned for 1970." That is a lot of colored wire!

In ***"A Research Team at Lehigh Studies Color Phenomena"***, we learn that Dr. Eugene (Gene) Allen had funded research projects to develop mathematical formulae that would make the mixing of ink dyes faster and simpler while creating a mixture that was constant under any type of illumination. His research was also going to explore the physical, physiological and psychological aspects of color that were not explained by 1970s color theory, such as ***"how light imparts color to an object and how the object modifies the light."*** Gene Allen was a very good friend and essential color contributor to the ISCC knowledge-base for many years.
We also learned that Harry Hammond, III published a concise 27-page treatise on colorimeters in Part 2, Chapter 5 of Applied Optics and Optical Engineering Volume V, Optical Instruments. It contained a summary table with the characteristics of 26 photoelectric tristimulus colorimeters for reflecting samples.

https://physicstoday.scitation.org/doi/full/10.1063/1.2012476

Finally, in an article entitled ***Wrong Office Dyed Blue: Color Painter's Face Red***, by Mike Causey from The Washington Post, we find out that a group of painters walked into a government lawyer's office and started painting the walls robin's egg blue. The lawyer said that he did not recall any orders for his office to be painted at all. The painter's chief had a document that said otherwise, so the lawyer stopped asking questions. Fellow lawyers peeked in as the office was being painted and mentioned that they really liked the color and he should be honored that he was selected to have his office painted this color. As it was happening, even the lawyer started liking the color very much. Just as the painters were about to finish the job, the chief checked the paperwork one last time and embarrassingly discovered that they had painted the correct office number and floor but the wrong address. So, the painter's face turned red as he had to explain the mistake to the lawyer. The lawyer was delighted because he loved the new color and wanted to keep it. So, the unpainted office still had to be painted—meaning the painting company was going to have to eat the cost because it was their mistake! C'est la vie!

By the way, everyone who received the No. 204 newsletter also received a reprint of Dorothy Nickerson's classic article on the History of the Munsell Color System, (Color Engineering, Vol. 7, No. 5, Sept.-Oct. 1969, pp. 42- 51) What a treasure!

Paula J. Alessi, Senior Color Scientist.

Refractions: A Strange New World: the Art of Olafur Eliason

Most artists and designers are familiar with color—they work with it just about every day, but very few actually understand the science behind it. Interestingly enough, this is not a requirement for being a good artist or designer. In the same way that somebody can be an excellent driver, yet possess little understanding of how everything works under the hood, artists can use color effectively without understanding anything about what is "under the hood" of the colors they use. For artists, what's important is knowing how to use color – to control palettes, harmonies, and perceptual interactions, as well as mixing colors. Understanding how to manipulate and control the basic elements of color (hue, value, and chroma), as well as a healthy dose of intuition, to bend and break the rules, is all one really needs. There are some artists though whose curiosity takes them across disciplinary boundaries and whose keen understanding of the science of color forms the basis of their work and their experiments.

One such person is the Danish-Icelandic artist **Ólafur Eliasson**. Eliasson is highly regarded as one of the most prominent and influential artists working today with major shows, in major museums, all over the world including the Tate Modern (London), the Museum of Modern Art (New York) and the Venice Biennale. His work is often large and employs a variety of media, and he maintains studios in both Berlin and Reykjavik, with a staff of over a hundred assistants, that include fabricators, archivists, architects, designers, and researchers!

Like the artist James Turrell, who we examined earlier (Issue 479) the viewer's experience is a key feature of his art. Eliasson often deals with the intersection of art and science, and he views his pieces much like experiments – ways to interrogate the natural world to understand it through experience and interaction. One of his central concerns is our perception of light and the ethereal atmosphere it creates. In his most well-known work, The Weather Project ***(Fig. 1)***, he installed a half-circle of yellow lights next to a giant mirrored ceiling and pumped-in mist. The illusion was of a giant sunset inside the building with people interacting by lying down on the floor and contemplating the sun and their reflections on the ceiling. In many of Eliasson's works, such as Room for One Color ***(Fig.2)***, he uses mono-frequency, low pressure sodium lamps that emit a very narrow frequency band of yellow light (589 nanometres). The effect is to transform the environment so that all colors, except for variations of yellow and black, disappear. Eventually, due to the effect of chromatic adaption to ambient light, the yellowness of the light appears to fade over prolonged exposure, leaving the viewer to experience a form of mono-chromacy, as if they were living in a black and white world! It was, as the curator and historian Katy Barrett described, ***"an oddly distressing experience to lose your sense of colour nuance in this way." [1]***

Fig. 1, Olafur Eliasson, The Weather Project, 2003. Turbine Hall at the Tate Modern (London). (Image Source: David Firn, Flickr Commons)

Fig. 2, Visitors to Olafur Eliasson's, Room for one colour, 2008 (Image Source: Susan Sermoneta Flickr Commons)

Eliason is interested in harnessing the science of what we know about color and perception, to generate experiences within the domain of art, that provoke thought and contemplation. In his own words:

"It makes us aware of the limits of our senses and helps us to see the relativity of our colour perception. Understanding how we see colour can make us reconsider how we constitute the world. By reducing experience to the minimum, the monochrome allows us to reflect on what is happening when we perceive something, on how perception is also a type of world-making. For a moment, we can imagine what it might be like to become colour-blind or another species of animal or even more radically other. What strange, new worlds might emerge then?" [2]

Carl Jennings

[1] Barrett, K. (2001, November 8). The artists who gave up color. Apollo Magazine. Retrieved from. https://www.apollo-magazine.com/the-artists-who-gave-up-colour/

[2] Eliasson, O. (2017) Your monochromatic listening, Monochrome: Painting in Black and White, National Gallery Company Limited, London. p. 211

Article online: ***https://www.refractionsblog.com/***

AIC 2019 Midterm Meeting

The Grupo Argentino del Color (GAC) hosted the AIC 2019 Midterm Meeting in Buenos Aires, Argentina October 15-18, 2019. The theme of meeting was "Color and Landscape" which offered a range of 21 topics in 10 fields of color research. The venue was the Universidad de Belgrano, which is located outside the city center, surrounded by quaint cafes, boutiques and cultural venues. This was the spring season for Argentina, which brought mostly very rainy, soggy days for the meeting, but the atmosphere was bright, sunny and colorful for all participants who stayed inside to enjoy the talks and other festivities.

The meeting was very successful with 144 registered participants, from 31 countries. AIC and GAC were proud to welcome many student participants to this midterm meeting! The student contributions to the oral and poster presentations offered a refreshing point of view on many different color topics.

The meeting opened with a cocktail party at the famed Croque Madame restaurant, at Larreta Museum where we were treated to an amazing assortment of local cuisine and music in the garden.

A total of 104 papers and posters were presented covering 14 topics. Oral papers and posters topics included:

A busy registration desk at AIC 2019

Verena M. Schindler giving oral presentation

•Environmental color design
•Architecture and landscape
•Urban landscape
•Seminar on color ambiences
•Color and cultural landscapes
•Color in art and design
•Color and psychology
•The language of color
•Color education
•Light and color
•Color science and technology
•Color vision and psychophysics

Participants enjoyed five invited presentations by:

•Robert Hirschler (Hungary): "Colour theory and neo-impressionist landscapes"
•Ming Ronnier Luo (United Kingdom): "A summary of the parametric studies on colour difference evaluation"
•Paula Csillag and Ana Lúcia Lupinacci (Brazil): "Landscapes used in design and art: The work of Fred Jordan, the Brazilian master of color"
•Zena O'Connor (Australia): "Effective environmental visual literacy: Pedestrian crossing design and the key roles of colour and contrast"
•Verena M. Schindler (Switzerland): "Geography of Colour: Back to the origins and its international impact"

For the first year, The Colour Group (GB) offered Robert W. G. Hunt Poster Awards for the best poster presentations on the topic of color. The winners were decided by the Colour Group (GB) Committee. Prizes were awarded to young researchers on the basis of the quality of the work and the poster design. The Robert W. G. Hunt Poster Awards were presented to:

•Glen McArthur: "Local colour and patterns (essence of place)"
•Yen-Ching Tseng, Yuh-Chang Wei, Monica Kuo, Ya-Ping Kuo, Wen-Guey Kuo: "A case study on environmental landscape color harmony via the Zhengbin Fishing Port color scheme"
•Ana Torres-Barchino, Juan Serra-Lluch, Anna Delcampo-Carda: "Chromatic applications in interior spaces for the elderly in the P. Borja Geriatric Center of the Fontilles Foundation"

The coveted Judd Award was presented to Professor Hirohisa Yaguchi, Chiba University in Japan to recognize his lifetime of outstanding work in the color science field. Participants enjoyed a presentation given by Professor Yaguchi on "Individual color vision".

The AIC CADE Award was presented to Professor Roy Osborne, an artist, educator and writer from the United Kingdom for his outstanding body of work in the art, education and history of color. Participants were treated to a presentation by Professor Osbourne on "Renaissance colour symbolism".

Two AIC Study Groups met in Buenos Aires. The first one was Color Education (CE) run by Chair Robert Hirschler (Hungary and Brazil), and Co-chair: Maggie Maggio (USA). The SGCE meeting focused on the question "What is Color Theory and Do We Need It?" Robert Hirschler, Maggie Maggio, and Stephen Westland each presented a short powerpoint before opening the floor to a lively discussion of the question. The second Study Group that met was Environmental Color Design (ECD) run by Co-chairs Verena M. Schindler (Switzerland) and Yulia A. Griber (Russia). The SGECD meeting included a series of five-minute presentations by members of the group.

The conference ended with an optional tour to the Tigre region which is about one hour from Buenos Aries. The tour of the Paraná Delta was a rare treat. The Delta is an 8,400 square-mile maze of river and rainforest, containing over one thousand tiny islands. The region has been named for the jaguars that once called this region home.

The meeting ended on a high with a banquet dinner at Piazzolla Tango, which included a Tango show.

AIC 2019 Poster Display

Tien-Rien Lee, AIC President, giving Professor Hirohisa Yaguchi the 2019 AIC Judd Award

Tien-Rien Lee, AIC President, giving Professor Roy Osbourne the 2019 AIC CADE Award

The book abstracts can be found on the AIC site: https://aic-color.org/page-18077.

Respectfully submitted,
Paula J. Alessi, Senior Color Scientist
Leslie Harrington, LHColor, CAUS
Maggie Maggio, Smashing Color

Call for Nominations for the 2020 ISCC Nickerson Service Award

The Nickerson Service Award is presented by the Inter-Society Color Council to honor long term contributions towards the advancement of the Council and its aims and purposes. The contribution may be in the form of organizational, clerical, technical, or other services that benefit the Council and its members. The candidates must be members of the Council and must have been active in the affairs of the Council.

Nominations should include the following information on this form: ***https://www.iscc.org/resources/Documents/PDFs/UniversalNominationForm.pdf***

1. ***The name and full address of the nominee.***

2. ***A sentence or two giving the specific reason for the award's bestowal. This will normally form the basis for the citation presented to the successful nominee.***

3. ***A narrative (up to one-page) of the nominee's contribution and its significance.***

4. ***A curriculum vitae and a publication list for the nominee, as well as any other material deemed useful.***

5. ***The name of the person or Member Body or Award Committee.***

Note: Confidentiality of the nomination is of the utmost importance. The nominating individual/group must ensure that the nomination is not disclosed to the proposed nominee. If any of the above information cannot be obtained without risking disclosure, then the information should be omitted from the nominating letter.

Nominations should be sent to the Chair of the Nickerson Service Award Committee:

Ann Laidlaw
ACL99colors@yahoo.com
336-420-1998

The deadline for receipt of nominations is March 10, 2020.

Note: Nominations received after March 10, 2020 will be retained for 2021. Nominations for the Nickerson Service Award may be considered to be "open" for submissions at any time. Future Nickerson Service Award committees will review nominations on hand for a given award period.

Call for Nominations for the 2020 ISCC Macbeth Award

The Macbeth Award was established by *Mr. Norman Macbeth, Jr.* in honor of the memory of his father, Mr. Norman Macbeth. The award is presented biennially in even-numbered years, when deserving candidates have been nominated.

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 contributions shall have advanced the field of color, interpreted broadly as in the objectives of the Council as defined in Article II of the Constitution. The merit of a candidate shall be judged by his or her recent contributions to any of the fields of interest related to color whether or not it is represented by a Member-Body. The recent 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. ***The candidates for the Macbeth Award need not have been active in the affairs of the Council.***

Nominations should include the following information:

1. ***The name and full address of the nominee.***

2. ***A sentence or two giving the specific reason for the award's bestowal. This will normally form the basis for the citation presented to the successful nominee.***

3. ***A narrative (up to one-page) of the nominee's contribution and its significance.***

4. ***A curriculum vitae for the nominee, as well as any other material deemed useful.***

5. ***The name of the person or Member Body or Award Committee who prepared the nomination with appropriate contact information.***

Note: Confidentiality of the nomination is of the utmost importance. The nominating individual/ group must ensure that the nomination is not disclosed to the proposed nominee. If any of the above information cannot be obtained without risking disclosure, then the information should be omitted from the nominating letter.

Nominations should be submitted using the form found at ***https://www.iscc.org/resources/Documents/PDFs/UniversalNominationForm.pdf*** This form can be filled out, scanned and emailed to ***joanne.zwinkels@nrc-cnrc.gc.ca*** or printed, completed and sent to:

Joanne C. Zwinkels, ISCC Macbeth Award Chair
National Research Council Canada
1200 Montreal Road
Ottawa, ON Canada K1A 0R6

The deadline for receipt of nominations is March 10, 2020.
Note: Nominations received after March 10, 2020 will be retained for future consideration.

COLOR IMPACT 2020

Environment•Education

Yale University from June 7-10, 2020

Please join us at Yale University from June 7-10, 2020, for Color Impact 2020. This conference is a collaboration between the Inter-Society Color Council (ISCC) and the International Association of Color Consultants - North America (IACC-NA).

This is the place to be whether you are an architect, interior or industrial designer, artist, art and design educator, student or a color scientist who collaborates with artists and designers. We plan to explore lighting and color science, plus the best ways to teach color to your students and your clients. Meet researchers who have developed innovative studies and applications in many facets of color.

Yale University was chosen as the site of the conference due to its strong architecture, design and art departments and because of its connection to the Bauhaus through Josef and Anni Albers. It is also home to the Faber Birren Color Library and numerous buildings of architectural significance. Don't miss the chance to visit all of these interesting places.

Visit **ColorImpact2020.com** for the link to **REGISTRATION** and information on meals and housing.

I am thrilled to announce that we have four internationally known art and design professionals, who will speak on the impact color has had on their lives and careers. Regardless of whether you are familiar with their work, you will leave the conference inspired.

- **Spencer Finch** – American Artist fascinated with the mysteries of color and light. Known for his ethereal light installations, the 911 Memorial Museum, and investigations of the nature of perception.
- **Shashi Caan** – Design Futurist with dedication and commitment to furthering human betterment through and by design.
- **Jill Pilaroscia** – Accredited IACC Designer who believes in the power of color, which shaped her quest to educate the public and design professionals about the value of color.
- **Eve Ashcraft** – Designer consulting on color for everything from interiors, exteriors, and corporate branding to paint lines and knitting yarn.

In addition, we will hear from four expert researchers on education and application of color.

- **Robert Hirschler** – Bauhaus Influence on Color Education
- **Renzo Shamey** – Color Pioneer Faber Birren
- **Leslie Harrington** – Augmented Color Intelligence
- **Kory Stamper** – "Rose" by any other Name, The Color Name Problem from the Language Specialist's Point of View

Additional Educational Opportunities for attendees:

- A monthly webinar series
- Student Poster Competition with prizes, **deadline March 15**
- Short Courses at the conference on Color Literacy, Josef Albers Color Experiments, Measuring Color, and Humane Color Design
- Tours of the campus architecture, the Birren Library, and the Albers Foundation
- Lighting Panel and Education Panel

See you there!

Jean Hoskin
Conference Co-Chair

Visit **ColorImpact2020.com** for the link to **REGISTRATION** and information on meals and housing.

Inter-Society Color Council
Student Poster Competition

COLOR IMPACT 2020

ART & DESIGN · SCIENCE · INDUSTRY · EDUCATION

1st $500
2nd $300
3rd $150

Posters will be presented at the Color Impact 2020 Conference

June 8 - 9, 2020

Yale University

The poster competition is open to undergraduate and graduate students.

Submit entry form by:
March 15, 2020, 4:00 p.m. EST

Submit posters for printing by:
May 15, 2020, 4:00 p.m. EST

https://www.colorimpact2020.com/studentposters

INTER-SOCIETY COLOR COUNCIL, INC. FOUNDED 1931 SCIENCE · ART · INDUSTRY

Calendar 2020

2020	Calendar
Feb 2-7	ASTM E12 Atlanta, Marriot Marquis; Atlanta, Georgia Info: https://www.astm.org
Feb 25	ISCC Webinar Info: https:// https://www.iscc.org/event-3707609
Mar 10	CMG 2020 ChromaZone® Bonn, Germany Info: https://colormarketing.org/event/bonn-germany-2020/
Mar 11	CMG 2020 ChromaZone® Chattanooga, Tenesse Info: https://colormarketing.org/event/chromazone-chattanooga-2020/
Apr 6-7	The London Imaging Meeting 2020, London, United Kindom Info: http://www.imaging.org/site/IST/IST/Conferences/LIM/LIM_Home.aspx
Apr 20	CMG 2020 ChromaZone® Milan, Italy Info: https://colormarketing.org/event/chromazone-milan-2020/
Apr 20-24	5th CIE Expert Symposium on Colour and Visual Appearance, Hong Kong, Info: http://cie.co.at/news/5th-cie-expert-symposium-colour-and-visual-appearance
Apr 24	CMG 2020 ChromaZone® San Francisco, California Info: https://colormarketing.org/event/chromazone-san-francisco-2020/
Apr 30	CMG 2020 ChromaZone® Cleveland, Ohio Info: https://colormarketing.org/event/cleveland-chromazone-2020/
May 7	CMG 2020 ChromaZone® Toronto, Canada Info: https://colormarketing.org/event/chromazone-toronto-2020/
May 8	CMG 2020 ChromaZone® Vancouver, Canada Info: https://colormarketing.org/event/chromazone-vancouver-2020/
May 12-14	Techtextil, Atlanta, Georgia Info: https://techtextil-north-america.us.messefrankfurt.com/us/en.html?us/en.html
May 13-15	CMG 2020 European Conference, Stockholm, Sweden Info: https://colormarketing.org/event/2020-european-color-conference/
May 15	CMG 2020 ChromaZone® Santa Ana, California Info: https://colormarketing.org/event/chromazone-santa-ana-2020/
May 21	CMG 2020 ChromaZone® Davidson, North Carolina Info: https://colormarketing.org/event/chromazone-davidsonl-2020/
May 29	CMG 2020 ChromaZone® Montréal, Canada Info: https://colormarketing.org/event/chromazone-montreal-2020/
Jun 7-10	Color impact 2020, Yale University, New Haven, Connecticut Info: https://www.colorimpact2020.com/
Jun. 9-10	ASTM E12 International, West Conshohocken, PA Info: https://www.astm.org
Jun 10	CMG 2020 ChromaZone® Chicago, Illinois Info: https://colormarketing.org/event/chromazone-chicago-2020/
Jun 14-19	4th workshop on Visual Understanding by Learning From Test MSG Web Data, Seattle, Washington. Info: http://www.vision.ee.ethz.ch/webvision/workshop.html
Jun 15	New Trends in Image Restoration and Enhancement workshop, Seattle, Washington Info: http://www.vision.ee.ethz.ch/ntire20/
July 14	CMG 2020 ChromaZone® Minneapolis, Minnesota Info: https://colormarketing.org/event/chromazone-chicagol-2020/
July 23-24	CMG 2020 Asia Pacific Conference, Shangai, China Info: https://colormarketing.org/event/asia-pacific-conference-2020/
Aug 6-8	Illumination Engineering Society Annual Conference, Hilton New Orleans Riverside, New Orleans, Louisiana Info: https://www.ies.org/events/annual-conference/
Oct 5-7	15th International Symposium on Visual Computing, San Diego, California. Info: http://www.isvc.net
Oct 6-9	AIC Interim Meeting on Natural Colors-Digital Colors, Avignon, France Info: http://aic2020.org
Nov 2-6	CIC28, Makuhari Messe, Chiba, Japan Info: http://www.imaging.org/site/IST/IST/Conferences/CIC/CIC_Home.aspx
Nov 2	ICC DevCon 2020, Chiba, Japan Info:http://www.color.org/DevCon/devcon2020/index.xalter
Nov 19-21	CMG International Summit, Austin, Texas Info: https://colormarketing.org/upcoming-events/

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.

Datacolor

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ISCC would like to thank the following people for volunteering their time and talents to make this issue.

ISCC Newsletter Issue #489, Winter 2020

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Printing: Thanks to Konica Minolta in Ramsey, NJ

Newsletter Coordinator: Jodi Baker

Final Edit Reviewers: Amy Woolf, Dave Wyble, Mike Brill and Paula Alessi


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