



Inter-Society Color Council News

Issue 473

Winter 2016

Board of Directors Corner

Hi, I am Renzo Shamey and I bring this issue's Board of Directors Corner to you. I joined ISCC's



BoD in 2014 and I am honored to be among many outstanding color enthusiasts who have contributed so much to our understanding of color over the years.

While working as an engineer in the textile coloration industry in late 1980s and early 90s, I learned of the intricacies associated with developing an acceptable shade.

I quickly learned that this 'skill' heavily relied on the experience of the colorist. I then decided to return to school to continue my higher education. I had

realized that achieving the correct shade based on color mixture required not only a knowledge of the colorants and a sense of their proportions in admixture but also the material used. During my Master's degree, I had the pleasure to work with Dr. James Nobbs, a physicist and a color scientist at Leeds University's Colour Chemistry department, who provided me with an opportunity to investigate the effect of medium on color match predictions. The work focused on semi-transparent layers which required a good understanding of the Kubelka-Munk functions and Saunderson's corrections. I decided to continue to work with Jim towards a PhD. We first settled on a theoretical topic but I wanted a practical challenge so I asked to work on the development of a real time control system to monitor and assess the depletion of dye from dyebath in real time.

I joined the Society of Dyers and Colourists (SDC) in late 1980s as a student. The Society's Colour Measurement Committee involved Jim as an avid contributor and he introduced me to the work done in that committee and its members. Jim and I decided to present our control strategy at a conference in the USA. This was a perfect opportunity for me to join the American Association of Textile Chemists and Colorists (AATCC). The period that followed my PhD was spent on a project for Unilever for about a year and following that I moved to Heriot Watt University as a faculty member in 1998 at the Scottish Borders. After joining North Carolina State University (NCSU) in 2004, as a faculty member, I met and have had the pleasure to collaborate with Professor Rolf Kuehni on a number of projects. I was honored to be elected a Fellow of the Society of Dyers and Colourists in 2010. In the USA, I was elected Chair of the Education Committee of the AATCC for six years; Chair of the Color Measurement Test Methods Committee, RA36, for two and a half years and also served on its Board of Directors. I have also had the pleasure to co-chair a CIE Technical Committee on Unique Hues and participate in a number of other committees.

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Board of Directors Corner continued

My participation in the ISCC is in large part due to meeting several of its active members within AATCC meetings. ISCC has a unique platform to bring together researchers from different sectors of the color science and technology domain. As a member of the Society, I would like to encourage you and especially students to become more actively engaged in its activities and let us know how we can best serve you.

Finally, as a member of the Board, it is my pleasure to announce that the Inter-Society Color Council will be conducting elections for Board of Director positions at the beginning of March. The slate of candidates is announced in this Newsletter on page 4 and can also be found on our social media sites including LinkedIn. Please enjoy reading about the candidates who, when elected, will serve you from April 1, 2016 to the end of 2018.

It is my honor to serve on the Board and I more than welcome your comments, ideas and suggestions on how best we can serve you. Please feel free to contact me or any of the other Board members if you wish to discuss a topic or suggest an improvement.

Renzo Shamey, *North Carolina State University*

Summary of Second ISCC Webinar

On December 8, 2015 the ISCC held its second online webinar. The presentation was recorded from the ISCC 2015 Annual Meeting, combined with SPE/CAD RETEC meeting in Indianapolis Oct 4-6, 2015. The presenter was Dr. Françoise Viénot, Museum National d'History Naturelle, France, entitled "Color Vision Fundamentals: A Model for the Future of Colorimetry". This webinar presented special challenges logistically, since Dr. Viénot requested that it be opened only to ISCC membership. The attendance was understandably down from the September webinar with open invitation, but still about a dozen interested members were present.

Save the Date: Friday, Nov. 11, 2016

Please attend an ISCC morning workshop on Friday, Nov. 11, 2016 during the week long (Nov. 7-11) Color and Imaging Conference (CIC 24) at the Westgate Hotel in San Diego, CA. The Annual ISCC Business and Awards Meeting will follow the workshop. Stay tuned for further details on the Friday morning ISCC workshop and Annual Meeting in the next issue of this newsletter. More details on CIC 24 can be found in this newsletter on page 3. It promises to be a completely colorful week!

ISCC's Third Webinar

ISCC's third webinar will be held on Tuesday March 8, 2-3PM EST. The presenter will be well known to the ISCC membership: current president



John Conant, of Aerodyne Research. John has been an applied physicist with Aerodyne Research, Inc. since 1977. After many years of infrared studies, he transitioned into the Visible arena, applying many of the same skills to color problems. Much of his

work involves the development and application of software models to solve remote sensing problems, with a healthy dose of user training. His current projects include development of a cloud optical depth sensor, and the modeling of urban and suburban outdoor lighting.

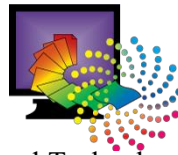
The title of John's presentation is *The Right Paint Color to Help Hide a Helicopter*. Here is the abstract for John's webinar:

Repainting aircraft and performing field tests of their detectability is an expensive task, so many military helicopters have been using the same dark-green paint in desert environments as they had in forested areas. Previous studies had shown that detailed camo patterns are often not needed since most aircraft are detected audibly unless at a far range. Our task was to recommend paint colors against different background types.

In this webinar, I will illustrate the lighting complexities of the problem and will describe a model-based solution to paint selection. This approach includes quantitative spectral computations of sun/earth/sky/ lighting with variable haze, 3D aircraft reflections with BRDF, estimation of statistical background variability, and application of a color distance metric.

A large set of standard government paint colors were down-selected and tested further. The recommended paints were subsequently tested in the field with human observers and applied to some of the fleet.

This webinar will be open to ISCC members as well as anyone else who wishes to participate. Formal details regarding how to participate in this webinar will be emailed to membership and others as the March 8 date approaches.



Color and Imaging Conference (CIC 24)

The Society for Imaging Science and Technology is holding this year's Color and Imaging Conference (CIC 24) from November 7 – 11, 2016 at the Westgate Hotel in San Diego, CA. This conference features a mix of industrial and academic participants from many countries using a single track format that makes it easy to engage with all speakers. The conference also features short courses taught by global experts, topical workshops, an exhibit, and a busy social program. ISCC is a cooperating society and will be hosting a workshop on Friday morning, November 11th. The ISCC Business and Awards Meeting will follow the workshop.

Mobile color is the special topic for this conference. Papers on all aspects of mobile capture, display, color processing and human perception are welcome. Additionally, papers on material appearance and color, color theory, color perception, multispectral imaging, color in devices, color in illumination and lighting, image quality and specific color applications are invited. Short courses and workshops are also being sought. To propose a workshop or a short course, please contact color@imaging.org.

Authors have two options for paper submissions; The first is a traditional conference paper, which will be published in the conference proceedings only. Conference papers are to be received via the conference review site. The second is a paper that will also appear in the Journal of Imaging Science and Technology (JIST). Journal papers are to be received by the JIST review site. Both types of papers will be presented at CIC 24. Three best paper awards will be given: Best CIC Student Paper Award, Best CIC Paper Award, CIC Cactus Award for Best Interactive Paper.

The CIC Exhibit takes place Wednesday-Thursday, Nov. 9-10, 2016. It provides the opportunity to showcase your company to an audience of world-class color systems experts.

Here are some important dates to remember:

Call for Papers Proposal	April 10
Call for Workshops Proposal	February 22
Manuscripts Due	September 6
Early Registration Ends	October 10
Hotel Reservations	October 15
Conference Starts	November 7

For more information on CIC 24, please go to http://www.imaging.org/site/IST/Conferences/Color_and_Imaging/IST/Conferences/CIC/CIC_Home.aspx?hkey=d2cf3f19-87b4-4164-8274-c40180e9dfa7

Nominating Committee Report

The ISCC Nominating Committee would like to announce four candidates for four Board of Director positions. Ballots for voting will go out at the beginning of March. Their terms of service will go from the beginning of April, 2016 until the end of the 2018 calendar year.

Jodi Baker has 20 years experience in product development and technical support in the Graphic



Arts and Digital Imaging Industry working for Kodak, Xerox, RIT and ABDick. She also has conducted and developed color seminars and training for sales, support and end users. She received her Master of Science Degree from Rochester Institute of Technology in the School of Printing. Currently, she works in the technical support group

at Konica Minolta as an Applications Engineer for color measurement products. Jodi looks forward to bridging two areas of interest in her career and education through serving on the ISCC Board. Her undergraduate education is in art and her career has focused on technology related to printing, imaging and color. Jodi wants to promote and facilitate more effective communication regarding color measurement and color programs that benefit art, design and education industries.

Paul Centore works as a freelance color scientist in Connecticut. His original interest in color began

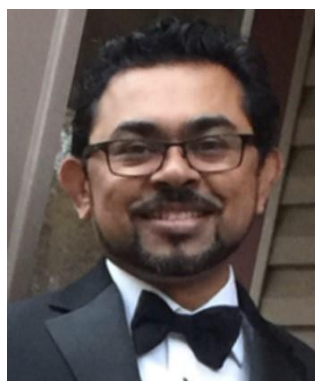


while studying art, but only resulted in research some years after. At the same time he was studying art, he was also studying pure mathematics. After getting a PhD in math from the University of Toronto,

in 1998, he worked professionally as a mathemati-

cian for 16 years. In about 2009, he started looking seriously at the colour questions from his art student days. The result was some papers on shadow colours, and a (still growing) set of open-source Matlab routines, now called the Munsell and Kubelka-Munk Toolbox, and available on his website. The shadow colour investigations led to some insights into the geometrical structure of colour, which had applications in electronic displays and colour constancy. He has published 13 refereed journal articles, and an affordable, yet accurate, Munsell book. He continues to work in the colour field, currently executing projects involving fashion palettes, spectro measurements for printing, and colorant formulation for plastics. As an ISCC director, he would be particularly interested in using his art background to help form stronger ties with the art and design communities, which are currently underrepresented in the society.

Simon Thayil is the Director of Color at Under Armour. His background is in chemistry, biochemis-



try, and the application of color science involving paint, plastics, textiles, inks, and ceramics. Simon has the privilege of learning about, and applying color science, in color management roles throughout his career that has mostly involved consumer products within the au-

tomotive, retail, and wholesale industries. So, given that history, Simon considers himself a technical person...mostly.

Whilst fulfilling his role, Simon has learned that success depends on communication, teamwork, and a thorough understanding of industrial manufacturing processes. It isn't enough to know the right process and procedures; It's critically important that all involved in the specifier - producer relationship have clear expectations, knowledge, and skills to produce precise and accurate color results efficiently.

It has been Simon's honor and privilege to write procedures, to help educate and empower the supply chain while implementing processes that result in the expedient delivery of color critical consumer products.

The ISCC is an organization that is comprised of members whose experiences with color management span across a varied number of manufacturing industries. What unites this organization is a fundamental attribute of everything around us - color. More

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Nominating Committee Report continued

specifically, what unites us is the desire to learn how this fundamental attribute must be managed.

Simon believes that the membership at large would benefit from sharing experiences with each other, whereupon this activity could help close the gaps that still exist. One such example is that most color specifications begin using additive light theory on a display, but end in the subtractive color world when a physical object needs to be produced. New technologies now hold the promise of bridging these gaps.

The ISCC, through its stated aims and purposes, provides the forum for the members to come together and solve problems arising in science, art, history, and industry for the benefit of the public at large. Simon likes that mission, and believes that he is uniquely positioned to aid in its fulfillment.

Nurhan Becidyan received his M.S. in Pulp & Paper Engineering from The Institute of Paper Science & Technology in Atlanta, GA and his B.S. in Chemical Engineering from Robert College in Istanbul, Turkey.

Nurhan has been in the color business for over 44 years. He started first in the Paper Industry as the Technical Director of a tissue mill in Turkey, and



then joined SANDOZ LTD. of Switzerland (now Clariant) as sales engineer in 1976. He worked for Sandoz in Turkey, Egypt and Switzerland before being transferred to the U.S.A. in 1982. During those years, he was involved in selling,

marketing and providing technical service to a multitude of color using industries (paper, leather, plastics, synthetic fibers, printing inks, coatings, aluminum and detergents). In 1986 he joined United Mineral & Chemical Corporation (UMC) in the capacity of General Manager. In 1994 he was promoted to the position of CEO & President of UMC, which is an international import, export and distribution company that acts as exclusive agents to many offshore colorant and chemical companies. He also acted as technical consultant to UMC's off-shore suppliers both in the Far East & Europe. In July

2016 he retired and is currently a management and technical consultant.

Nurhan has been a member of TAPPI, CPMA (Chairman of Cadmium Pigments Committee), New York Coatings Club, ACMI, ISCC (where he served on the Board of Directors from 2005-2008 and ASTM D12 (Color and Appearance) Committee – active in the fields of Fluorescence and Phosphorescence.

Ballots for these four Board of Director candidates (Jodi Baker, Paul Centore, Simon Thayil, and Nurhan Becidyan) will go out to the voting membership at the beginning of March. Once elected, the new Directors will begin serving their terms at the beginning of April, 2016. Their terms will end at the end of the 2018 calendar year.

Terry F. Godlove, Sr. Obituary

Terry Francis Godlove, Sr. died peacefully at his home in Silver Spring Maryland on August 20, 2015. He was born June 23, 1927, and raised in Kenilworth, Washington, DC. Terry was the son of our dear color science friend, Dr. Isaac H. Godlove. After spending a year at the University of Maryland and two years in the Navy, he graduated from Lafayette College in 1950, and received his Ph.D. in nuclear physics and accelerator technology from Yale University in 1955. He joined the



<http://www.ipr.umd.edu/faculty/godlove>

Naval Research Laboratory in 1955. In 1962 he became the branch head of the former LINAC Branch (55 MeV electron linear accelerator); from 1975-1977 he was a branch head in the Plasma Physics Division. He worked at the U.S. Department of Energy as a program manager with emphasis on the heavy ion inertial fusion program from 1977-1986 and as a private consultant from 1987-1999. From 2000 until his death he was visiting senior research scientist at the University of Maryland, where he contributed to the building of the University of Maryland Electron Ring (UMER). Active life-long as an elder in the Presbyterian Church, he is survived by his loving wife of 63 years, Dorothy Miller Godlove, his two children, Terry, Jr., and Karen Godlove Malley, and four grandchildren. The ISCC Godlove Award was established in 1956 by Terry's stepmother, Margaret N. Godlove, in memory of Terry's father, Dr. I. H. Godlove. Terry was responsible for significant monetary endowment funds to keep the

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Terry F. Godlove, Sr. Obituary continued

Godlove Award going through the years. Although Terry was not a color scientist, we used to see him at ISCC meetings when the Godlove Award was being given to recipients for outstanding lifetime achievement in color science. Terry is fondly remembered by ISCC members for his generosity in sustaining the Godlove Award to preserve his father's legacy for all these years. May he rest in peace!

Adapted from The Washington Post

A New Quarterly Newsletter Column

We are pleased to announce that, as of this issue, there will be a new quarterly column in the Newsletter from Carl Jennings, who hails us from the Uni-



versity of Hawai'i. Carl is Associate Professor of Art and Creative Thinking at the University of Hawai'i at Kapi'olani, where he also serves as the head of painting and drawing. In addition to teaching he is also a practicing artist whose work has been exhibited nationally and internationally and has been

acquired by both private and public institutions worldwide (www.cjennings.com) His interests include the interface of art, philosophy, science and sustainable thinking as well as the nature of creativity, perception and color theory. The title of Carl's column is "Refractions: Seeming Random Musings on Color". His first article featured in this issue is entitled "Men in Black: Chromophobia in Western Culture". Please go to page 9 to enjoy the first in a series of many enlightening articles to come from our friend, Carl Jennings.

International Colour Day – March 21

AIC has designated March 21st as International Colour Day. March 21st is the "equinox" when the lengths of the day and night are approximately the same. AIC, www.aic-colour.org, notes that this



INTERNATIONAL COLOUR DAY
21 MARCH
ESTABLISHED BY AIC - INTERNATIONAL COLOUR ASSOCIATION

symbolically reflects the equal role of light and darkness in all human cultures. AIC hopes that each country will have some activity to observe on this International Colour Day. Some of the countries that arrange activities for this day are Argentina, Australia, Brazil,

Chile, Thailand, and the Netherlands. For more information on AIC's International Colour Day please see-

https://en.wikipedia.org/wiki/International_Colour_Day.

ISCC participated in 2014 and we encourage our members to contact us at isccoffice@iscc.org if you have any ideas on how ISCC can participate in International Colour Day this year. We would like to have the United States represented in this celebration.

AIC 2016 Interim Meeting

The Chilean Color Association is hosting the AIC 2016 Interim Meeting in Santiago, Chile from October 18th-22nd. The



aim of this meeting is to share experiences regarding the use of color in images, objects and space, from different perspectives and disciplines, thus contributing to a better user experience, improving usability,

and also to improve life quality in our cities. The conference theme is "Color in Urban Life: Images, Objects and Spaces". Topics that will be addressed during the week long meeting are Color and the Environment, Architectural Color Design, Color in Product Design, Color in Communication Design, Color and Well-Being, Color in Urban Cultures, Color Aesthetics, Color Perception and Color Education. **The Call for Papers deadline has been extended to February 18th.** In order to submit your extended abstracts, please visit: <http://www.aic2016.org/submission>. Also registration is now available! For more information on the registration categories and fees, please visit: <http://www.aic2016.org/registration/>.

Santiago is Chile's Capital city. In this city, on every street and in each neighborhood, ancient traditions coexist with 21st century life. Santiago is Chile's political, economic and cultural center, in addition to being one of South America's main financial hubs. For those who love entertainment, culture, shopping, and related activities, the city offers all the best alternatives, as well as the necessary infrastructure, an excellent Mediterranean-like weather, and the hospitality and professionalism of its people.

ISCC members, consider submitting a paper or just attend a week long meeting in sunny Chile. For more information, please contact, info@aic2016.org.

A Blast from the Past: ISCC Newsletter 50 Years Ago

Number 180-181 – January - April 1966 not yet on ISCC website

This first issue from the year 1966 is 28 pages long. For those of you who are nostalgic about the wonderful topical meetings ISCC used to have in colonial Williamsburg, I decided to reprint Dusty Rhodes' summary of the 1966 Williamsburg Conference on *Instrumental Approaches to Colorant Formulation*.

"Most of the people I talked to during the three-day conference at historic colonial Williamsburg, Virginia, concluded that the conference on Instrumental Formulation was a great success. Although snow storms threatened to impede or paralyze transportation in the south, practically everyone who made application appeared for the conference. This included Americans from 23 states, and 16 foreigners from six countries.

Because of the time of year, and because of the previous week of very bad weather, there were few tourists at Williamsburg. The accommodations were pleasant and comfortable and the meeting was held with practically no interference from other groups. The interval in the afternoon gave individuals plenty of opportunity to follow up on topics of interest.

I was particularly struck by the opening remarks by the Conference Honorary Chairman, Dr. Deane Judd. Although the rule of the conference stated that no quotation from the conference could be published without explicit permission of the author, I succeeded in getting Dr. Judd's permission to publish his comments on the Newsletter. He said, 'I have the honor and privilege of saying a few words by way of introduction to this three-day conference on Instrumental Approaches to Colorant Formulation. These few words will remind you of things you already know.

'People like color. Furthermore, they like it so much, they will pay for it. There are several important industries that sell to people that thousands of color they like.

'One industry produces these colors by combinations of three lights: a red, a green and a blue. The principles of combination is juxtaposed dots, the law is that the tri-stimulus values of a mixtures are the intensity weighted average of the dots. This is the color television industry. Another industry produces these colors by combinations of three transparent filters: a cyan, a magenta, and a lemon yellow. The principle of combination is that the light passes through each of these layers before it reaches the eye of the customer. The law of combination is that the

transmittance of the combination is the product of transmittance for a given wave length of the three individual layers: cyan, magenta, and lemon yellow. Stated another way, the logarithm of the reciprocals of the transmittances add up to that for the three-layer combination. There is a short name for this quantity – optical density. The industry is color photography. Its colorimetric law is still rather simple. The formulation of the colorant is almost automatic. We will hear little or nothing about color photography during the next three days.

'The industries that we will hear about employ bulk mixture of a relatively few colorants: three or more dyes, four or more pigments, to produce a variety of colors people like. The principle of combination is absorption of light combined with multiple scattering. These are the coatings industries: paint, printing, ink, vitreous enamels, etc., and the plastics, paper, and textile industries. The law of combination is complicated, a simplified statement of the law was derived by Kubelka and Munk. The additive variables are the absorption coefficient, K and a scattering coefficient, S , weighed by the concentration of the constituents, the ratio: K/S for mixtures in an opaque layer is equal to $(1-R)^2/2R$ according to this simplified model.

'Unfortunately, the assumptions leading to the Kubelka-Munk formulation are never met by actual coatings, dyeings, papers, plastic viewed by actual customers. Tantalizingly, the errors are often small. Should we develop more accurate models? Should we use a simple model as a first step and proceed by trial and error? The absolute truth is usually too complicated to be of industrial interest. You can go broke with the truth if it comes in a complicated package. Each company must seek a compromise between simplicity and accuracy. In particular, a system which, at great expense, always yields the recipe for the desired color with errors too small to be measured must be rejected...'

"With these prophetic comments Dr. Judd accurately anticipated the key question of the conference. Some of the conferees lined up on one side of the question, and some on the other, and much lively discussion centered about this topic. W. L. R."

Authors published papers in journals of their choice and ISCC collected reprints into a packet that was sent to all attendees.

Paula J. Alessi, *ISCC News Editor*

Meet Your Fellow ISCC Members

I asked Maggie Maggio to tell us a little bit about herself. Her emphasis will be on *Teaching 21st Century Color*.

The traditional ways of sorting, naming and mixing colors were developed before we had computers at our fingertips. As we shift more and more careers into the digital age, is it time to start teaching color in new ways? Now that even two year olds are playing with color on smart phones, should we introduce them to both the primaries of light and the primaries of pigment? At what point do we shift to an integrated RGB |CMY system instead of the traditional RYB system? When do we start teaching kids about 21st Century Color?

As a color educator, I spend most of my time teaching students how to “unlearn” the traditional



color theory they were taught in preschool. I start my adult color classes with prisms and lights and explain that magenta is not on the rainbow. That blows their minds! We end with mixing colors using cyan, magenta and yellow polymer clay, a plastic based clay that

comes in many colors that they mix right in their hands. After years of making mud using cadmium red, yellow and ultramarine blue, many students say the same thing, “CMY is so much easier! Why didn’t we learn this in grade school?”

Two years ago, after twenty-five years of splitting my time between architecture, art and teaching, I decided to try to answer these questions. I closed my architectural office and began researching how color is taught to children all around the world. As I learned more and more about early color education, I started to understand why so many of my adult students say they are afraid of color. When their kindergarten teacher told them to mix red and blue to get purple and they got brown, they didn’t blame the system, they blamed themselves. They decided they were not good at color. They quit.

Did you know that color is one of the four key concepts that children are expected to know before starting school? Toddlers all over the world are taught numbers, letters, colors and shapes. We learn to count so that we can learn math. We learn to say our ABC’s (or the equivalent in other languages) to help us learn to read. We learn the names of colors and shapes to give us a solid foundation for under-

standing and describing the physical world. Colors and shapes are the universal language of visual communication.

I think we are at a crossroads. The gap between what is taught in kindergarten and what kids need to know about color is growing. We can continue to teach children about color using red, yellow, and blue finger paints or we can take advantage of modern technologies and integrate the art and science of color into age appropriate – and fun – new ways to teach color to both children and adults.

It won’t happen overnight. There are many steps to take to make it possible for teachers to adopt 21st Century Color. Before taking the idea to educators, affordable materials need to be available. Before the materials can be produced, new standards need to be developed. Before new standards are adopted, we need some consensus on color specifications and labeling for educational products. What color do we call blue in the 21st century? Do we need to add cyan and magenta to the list of basic color terms?

I believe the time is ripe to start making the transition to 21st Century Color. I recently tested three new CMY mixing sets in paints, two in dyes, and three in ink. [The Light Blox Kit](#) is the best resource for teaching color and light that I’ve ever seen. The Color Wheel Company already has a [CMY wheel and coloring book](#) and we are working together on CMY color kits for kids. [Nicoline Kinch’s Kolormondo](#) globe and app are good examples of easy to use, afford-



able tools for teaching 21st century color. For every educational product that is RYB based, we need it’s counterpart in RGB|CMY. That’s a lot of opportunities for designers and manufacturers!

For the next few years, I’m partnering with the children’s arts non-profit, VIBE of Portland to test innovative ways to teach color basics using prisms, LED’s, computers and traditional media. Our goal is to design a state-of-the-art 21st century color curriculum to align with STEM and STEAM programs. If you are interested in advising or collaborating on this project I’d love to connect



with you!

Maggie Maggio, *Smashing Color*
www.cmyclassroom.com

refractions

seemingly random musings on color



Men in Black: Chromophobia in Western Culture

Color is a code, a sign, a message –we use it to communicate and in turn it has the power to shape how we think and feel. For the last 500 years or so, black has been making its way to the front of the line as the color of sophistication, culture, power and self-control. On the streets of Paris, New York, London and Tokyo, black rules supreme. To be civilized, is to eschew color, to resist its temptations and its charms. As Goethe observed of his times, nearly 200 years ago, “... *savage nations, uneducated people, and children have a great predilection for vivid colors... ... people of refinement avoid vivid colours in their dress*”¹. And Charles Blanc, the French Minister of Culture, expressing a sentiment shared by many scholars and art historians, over the perceived opposition between line and color in art, stated in 1848 that, “...*colour is the peculiar characteristic of the lower forms of nature, while drawing [black and white] becomes the medium of expression, more and more dominant, the higher we rise in the scale of being*”².

These quotes reveal a sentiment common in Western culture, and eloquently documented in David Batchelor’s fascinating book on the topic³, a sentiment that sees color as “something for children, savages, minorities and women”: a loathing and a fear of color that he calls - *chromophobia*.

But it wasn’t always this way. In fact the history of the west is nothing if not colorful – but very little of that evidence exists nowadays. Color has either faded with time and the elements, or it has been purposefully removed and whitewashed. The Greek and Roman statues of antiquity – pure and ethereal



Color reconstruction. Archer, Temple of Aphaia on the Greek island of Aegina. 500 B.C.

in their whiteness, are an illusion. They were never white. Instead, they were painted, in great and often

garish detail. The same applies to those great classical monuments of architecture, like the Parthenon. They were richly colored and gilded. Rather than the cerebral and pristine image of Greek philosophers strolling among the olive groves in white tunics at the foot of the Acropolis, all white against the azure blue of the sky, we would do well to remember that Ancient Greece was more like the polychromatic frenzy of an Indian bazaar than anything found in Hollywood or the museums.

And it didn’t stop there – The cathedrals of Europe, those magnificent stone monuments to transcendence, were also richly painted, inside and out.



Wells Cathedral, Somerset, UK.

Top: Wells Cathedral today. Below: Reconstruction of original colors, before the later addition of the towers (courtesy of the BBC)

They too fell victim to the ravages of time, but they also encountered something else – the Reformation. Because of the ideas of Calvin, and especially Zwingli in Switzerland – color was seen as a distraction from God, and so all Protestant churches were systematically stripped of their Catholic ‘sensuality’ and excess.

continued on next page

Men in Black continued

Color was feared and marginalized in the West for two main reasons. It spoke of the primitive, the feminine, the infantile and the pathological – it was thought of as a dangerous distraction and a corrupting influence because it appealed to the emotions rather than to reason. Even Aristotle referred to color as a drug and a poison (*pharmakon*). Secondly, it was considered superficial, not essential. It was about adorning, deceit, and pretending. In fact the Latin for color, *celare*, means to conceal or hide. It was cosmetic and fake. Why do you think they call it ‘makeup’? In short, color was suspect and dangerous.

Which brings us to the taste for black. With the advent of Protestant Europe and the dominance of Dutch mercantilism, black came to signify renunciation, self-control and business. With its aversion to all the superficiality and primitiveness associated with color, black became the uniform of power and control. Through Victorian England, the banking classes, and then high society by way of Chanel’s little black dress – black became the uniform of seriousness, high culture and sophistication⁴.

Go to any opening gala or event at the Museum of Modern Art, even one featuring colorists such as Matisse, Warhol or Ellsworth Kelly and you will find yourself engulfed in a sea of black.

So does this mean that everyone who wears black is afraid of color? Of course not, but it does mean that our cultural preference for black has a pedigree and a history; it didn’t just happen by accident.

¹ Goethe, J. W. 1810 *Theory of Colors*. C. L. Eastlake (Trans.). Dover (2006)

² Blanc, C. 1867. *Grammar of Painting and Engraving*. S.C. Griggs and Co.: Chicago

³ Batchelor, D. 2000 *Chromophobia*. Reaktion Books. London

⁴ Harvey, J. 1995 *Men in Black*. Reaktion Books. London

Carl Jennings
University of Hawai‘i

Have You Ever Seen an Indoor Rainbow?

The following image and text can be found at http://www.slate.com/blogs/the_eye/2016/01/15/gabriel_dawe_s_plexus_al_is_an_indoor_rainbow_made_from_six_miles_of_embroidery.html?wpsrc=share_all_mobile. A spellbinding

winter blues–busting indoor rainbow has appeared on the first floor of the Smithsonian’s Renwick Gallery in Washington. And while to the naked eye it might look like a grace note after a rainstorm or a multicolored beam of sunlight, this dazzling man-made sleight of hand is actually composed of 60 miles of embroidery thread strung up by hand according to a carefully plotted matrix to create the effect.

The artist, Gabriel Dawe, says that his textile-based, site-specific installations “explore the connection between fashion and architecture,” and his “fascination with the sky and its subtle gradations of color and light.” Both fashion and architecture have “the capacity to offer shelter to the body,” he writes. “When we get cold, we wear a sweater. When it’s raining we can go inside a building. By reversing scale and material to create an actual structure made of thread, the sheltering quality goes through a transformation, from protecting the body on a physical level, to soothing the human spirit in a subtle, yet powerful way.” The gradations of color are designed to mimic the way that color and light coalesce in the sky. “The fineness of the thread makes these installations ethereal, almost immaterial,” Dawe writes, adding that his “symbolic quest” to give density to light offers viewers “an approximation of things otherwise inaccessible to us—a glimmer of hope that brings us closer to the transcendent, to show that there can be beauty in this messed up world we live in.”



Membership Renewal Deadline March 31, 2016!

Many thanks to our Treasurer, Cameron Miller for sending out membership renewal notices!

Please renew your 2016 membership by mailing it in or paying online (www.iscc.org) through PayPal.

The membership renewal deadline is March 31, 2016.

If you do not renew your membership by this date, you will experience an interruption in the receipt of your electronic or hardcopy newsletter.

HUE ANGLES

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

Think Pink

Rose Quartz may be Pantone's 2016 color of the year (along with pale *Serenity* blue), but pink has been steadily emerging as a color of influence for many seasons.



<http://www.vancouverstun.com/homes/Colin+Justin+make+pink+statement+kitchen/6386287/story.html?lsa=aeb3-34f3>

Pink is inherently warm and gentle, combining the passion of red with the purity of white. Research suggests that the color elicits a calming physiological response [1]. Accordingly, it has been employed in prisons and hospitals to create a soothing atmosphere. [Note: other research [2] suggests that the effect of pink on behavior in prisons may be an artifact of the "Hawthorne Effect", whereby prisoners react to a newly painted cell---irrespective of color---only for a while until the newness wears off.]

Based in part on its mixed parentage, it has come to represent diversity. Specifically, the color's arc strongly correlates with key societal trends surrounding gender issues. From as recently as the early 20th century, pink was a color ascribed to males. Social trends – and possibly Nazi politics – created a pendulum swing, and by the 1940's, pale pink had come to be associated with the fairer sex – particularly for babies. Innovative designers such as Elsa Schiaparelli helped bring the shade into fashion for women with the brand's signature color, "shocking pink". In the 1950's pink had clearly become associated with women. It was prescribed as distinctly feminine, reflecting the rigid society norms of the time toward gender roles.

The color continued to hold favor with women through the 1960's into the early 1970's, an era fueled by women "libbers" who were taking charge



<http://blog.hemmings.com/index.php/2014/02/04/pink-cadillac-from-pink-cadillac-heads-to-auction/>

behind the wheel of their pink-tinted Mary Kay Cadillacs. Surprisingly, pink found a way to bridge

the gap between the housewife and the emancipated woman. A desire for brilliant, strong color dominated in the 1970's and 1980's and pink fell dormant. Women were concerned with looking serious and professional and the association with the softer side of femininity meant the color took a back seat during this period. As the 1980's came to an end, defined gender roles began to shift and neon pink and magenta were adopted for their high impact personalities.

Pink entered the fashion realm once again in the late 1990's. In 1999, Gwyneth Paltrow sparked a trend on the red carpet, donning a pale bubblegum Ralph Lauren gown to the Academy Awards. She repositioned the color as cool, extricating it from its association with little girls.



http://www.huffingtonpost.com/2012/02/24/best-oscar-dress-of-all-time_n_1299608.html

Haute Couture has continued to follow suit. Recent examples include designer Raf Simons statement-making runway show in the Fall of 2012 for Italian luxury brand Jill Sander. For his final collection with Sander, Simons combined pink in all tints and tones. It was a wonderful celebration of the hue and further propelled the color into the public realm.

The recent popularity of Apple's rosy iPhone 6s is another indicator of the hue's burgeoning popularity. Straying from the electronic industry's penchant for neutrals, Apple carefully veiled the introduction of its pink tone under the guise of "rose gold". But, anyone who has seen the gadget can attest to its blatant metallic pink appearance. Regardless of its title, the color has seen great success - among both women and men - garnering the longest wait lists of all the 6S hues.

Food and beverage trends have also not been immune to pink's resurgence. Rosé sales have been on a steady incline. In the summer of 2014, there

continued on next page

Hue Angles continued

was a shortage of the pink wine in “the Hamptons,” New York’s trendy holiday region. As a direct result, millennial social media icon Josh Ostrovsky, who goes by the handle *@TheFatJewish*, launched his own line of wine calling it “White Girl Rosé”. Despite its non-pc name, the company has done exceedingly well, launching a rosé craze that has crossed into fashion, including the creation of a pink clothing line emblazoned with quips about rosé by Wild Fox Couture.



<http://www.coolhunting.com/food-drink/white-girl-rose-the-fat-jew>

Women have once again embraced the color across the board – and this time it includes the workforce. As women have asserted their position in the workforce (and beyond), they have become confident in their identity, celebrating individuality and creative spirit. Instead of rejecting classically feminine colors, people are embracing them.

There appears to be no sign of the color fading, and, as such, it would be wise to take advice from the infamous *Funny Face* fashion editor, Maggie Prescott, and “think pink!”

[1] Schauss, A.G.: Tranquilizing Effect of Color Reduces Aggressive Behavior and Potential Violence (1979). *Journal of Orthomolecular Psychiatry* 8,218-220,1979.

[2] Pellegrini, R., Schauss, A.G., and Miller, M. E. (1981): Room color and aggression in a criminal detention holding cell. A test of the “tranquilizing pink” hypothesis, *Journal of Orthomolecular Psychiatry* 10 (3), 174-181, 1981.

Roseanna Roberts, roseannaroberts.com
CAUS and color trend consultant

Roseanna Roberts has over 10 years’ experience in color development and trend analysis. She has worked in many of the world’s creative epicenters, including London, Toronto and Melbourne. Since moving to New York in 2010, she has worked as the director of color trends at The Color Association of the United States. Roberts continues to work with CAUS, as well as providing customized expert insight to corporate brands as a color trend consultant. Roseanna@roseannaroberts.com

PICS2016 Abstract Submission has been extended to February 14th. Please see the website for more details <http://pics2016.uk/#registration>.

**IN THIS ISSUE, April 2016**

In 1961, I. Nimeroff and his co-authors [Nimeroff I, Rosenblatt, J. R., and Dannemiller, M. C., Variability of Spectral Tristimulus Values, J. Res. NBS 65, 475-483 (1961)] presented a description of what is necessary to determine the extent to which a normal observer tends to make different matches on repeated attempts and the extent to which a normal observer’s matches will vary from one person to another. However, until recently it was not possible to measure reliably this variability over a large enough sample representative of the human population. Now the time has come. In this issue Mark D. Fairchild and Rod Heckaman quantified the observer metamerism by applying the results from recent vision researchers and the estimates of the cone fundamentals for an average normal observer as a function of age and field size with corrections for the aging of the lens and the density of the macula reported by CIE Technical Committee 1-36. See their discussion and results in the article, “Measuring Observer Metamerism: The Nimeroff Approach”.

Over the years, researchers and industry have found it convenient to use colorimetry derived from measured spectral data. However, the instruments did not measure the spectral data at the prescribed 1 nm intervals, so several methods (or variations of method) of calculating the tristimulus values have been used with larger intervals between the measurements. In “Testing the Accuracy of Methods for the Computation of CIE Tristimulus Values Using Weighting Tables,” Changjun Li, M. Ronnier Luo, Manuel Melgosa, and Michael R. Pointer reconsider the least squares method for the computation of weighting tables for the calculation of tristimulus values. In the article they not only recommend the least squares method, but also compare the performance of seven methods for both 10 nm and 20 nm wavelength measurement intervals, using both continuous and fluorescent CIE illuminants.

In the discussion of evaluating the color rendering of light sources, there have been many suggestions on the best way to proceed. One of the most important colors to be rendered well is the human skin color. In our next article, Tadashi Yano and Kenjiro Hashimoto propose an evaluation method based on preferred complexion as one of color-rendering methods of light sources. They developed an equation to calculate a preference index of skin

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CR&A In This Issue April 2016 continued

color in order to, evaluate quantitatively the degrees of preferred complexion. They discovered that this metric, as an independent index, was quite different from the other indices that had been suggested to evaluate the performances of various light sources, but very useful to determine more comfortable lighting environments in general. "Preference Index for Japanese Complexion under Illuminations" details the development of the preference index of skin color (PS) and the comparisons to current color rendering index and six other methods.

Our next article discusses "Gloss Evaluation and Prediction of Achromatic Low-Gloss Textured Surfaces from the Automotive Industry." While highly glossy surfaces have traditionally been used to highlight the sleek design of automobiles, recently there has been a new emphasis on unique low gloss materials in the interior of cars for various technical, sensory and marketing reasons. Here, Caterina Passaro, Stephanie Baron, Jean-Serge Bidoret, David Delafosse, and Olivier Eterradosi discuss their study to create a gloss prediction model of low-gloss textured surfaces that is texture-invariant. They introduce two gloss prediction models, using either glossmeter or gonio-spectrophotometer measurements. These models incorporated texture information while they maintain a psychophysical realism and adequate statistical performance.

Our next two articles deal with visual images officially, but could be applied to many types of works of art also. When looking at images, it is not only the individual colors, and the interactions with their immediate surround to which the observer responds, but rather it is the size, color, texture, value or orientation all together seen as a whole or gestalt. In "An Analytic Measure of Perceptual Factors for Color Composition," Guosheng Hu, Ai Sheng, Yizhong Zhang, Zhigeng Pan, and Mingmin Zhang introduce a three-dimensional model for image composition analysis that can both quantify the effect of color gestalt and rebuild image composition to produce certain color effects for various color combinations. They then confirm the model's usefulness with an interactive toolkit, which they designed.

In the second article Raúl Parada analyzes the factors that create a sensation of balance or unbalance of a color image. In images, similar to the concept of physical equilibria in nature, balance occurs when the visual weight and the center of gravity of the image coincide. His study explores how the qualities of appearance of three-dimensional objects affect visual weight and how it can vary due to

changes in light, motion of objects or the perspective of the image. In "Study of Balance of Images Using Visual Weight," Parada describes the software he developed composed of tools used in the analysis of balance and composition of images. The tools in this software are also a help in the study of the variability of the appearance of an image over time, which leads to the future work of detecting balanced digital video images, and how to balance and automatically center complex digital images.

Do you have a preference for certain colors? For certain shapes? How about do you prefer complex shapes or simple ones? Are these preferences related? Na Chen, Kanji Tanaka, Daisuke Matsuyoshi, and Katsumi Watanabe were curious about these concepts. So in "Cross Preferences for Colors and Shapes," they studied the shape, shape complexity (size and rotation), and color preferences of more than 130 college students. They describe the analysis of their experiment in which the preferences of a given participant for colors and shapes were correlated with those of other participants. The similarity between individual preference judgments for colors and shapes were measured and used to construct the sample compositions. Their results indicate that individual preferences for colors and shapes might be correlated and intertwined suggesting that the semantic information associated with colors and shapes underlies the cross preference.

In another study of students' responses to color, Aseel Abdulsalam Al-Ayash, Robert Thomas Kane, Dianne Smith, and Paul Green-Armytage looked at the color of private study spaces to determine the effect of color on university students' learning performance, emotions, and heart rate. In "The Influence of Color on Student Emotion, Heart Rate and Performance in Learning Environments" they report that color affected emotions, heart rate and the reading performance. Also hue and whiteness had a significant impact on students' emotions.

The final article in this issue is a look back into history. Eric Kirchner, Saeideh Gorji Kandi, and Hosein Saeedi report on "An Attempt to Reconstruct the Meaning of al-Tusi's Color Words." Khawaja Muhammad ibn Muhammad ibn Hasan Tūsī also known as Nasir al-Din al-Tusi was a mathematician, architect, and scientist with many scholarly writings. He lived in the thirteenth century. However, it was only recently found that he also made important steps in the understanding of the relation between colors and possible arrangements of colors. This article shows the most likely translation for each of the

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CR&A In This Issue April 2016 continued

color terms from al-Tusi, together with the best estimation of the CIE $L^*a^*b^*$ coordinates.

We close the issue briefly mentioning two new CIE Publication: the long-awaited *Publ. 170 Part 2:2015*

Spectral Luminous Efficiency Functions and Chromaticity Diagrams and *S 017-SP1/E:2015*. The *S*

017-SP1 is a supplement to the *CIE International Lighting Vocabulary*. It summarizes the most important terms and definitions in the field of lighting by inorganic semiconductors used in CIE documents.

Ellen Carter

Editor, *Color Research and Application*

Calendar

2016

- Feb 3-5** Computer Vision Winter Workshop, Rimske Toplice, Slovenia, Info: <http://cvww2016.vicos.si>
- Feb 14-18** Electronic Imaging, San Francisco, CA, Info: registration@imaging.org or phone 703-642-9090
- Mar 3-5** CIE 2016 Lighting Quality and Energy Efficiency, Melbourne, Australia, Info: ciecb@cie.co.at
- Mar 7-9** CIE Divisions 2,4, & 5 Meetings, Melbourne, Australia, Info: ciecb@cie.co.at
- Mar 20-23** The 68th TAGA Annual Technical Conference, Memphis, TN, Info: <http://tagaatc.printing.org>
- Apr 3-5** IES Research Symposium III: Light + Color, Gaithersburg, MD, Info: <http://www.ies.org/symposium/index.cfm>
- Apr 19-22** Archiving 2016, National Archives, Washington, D.C., Info: www.imaging.org/archiving
- May 13-18** 16th Annual Vision Sciences Society Meeting, TradeWinds Islands Resort, St. Pete Beach, FL, Info: <http://www.visionciences.org/myvss>
- May 30-Jun1** Multispectral Colour Science, Trois-Rivières, Québec, Canada
Info: <http://icisp-conf.org/mcs2016.php.html>
- May 31-Jun3** 12th International Conference on “Light and Color in Nature”, University of Granada, Granada, Spain, Info: <http://www.ugr.es/local/lcnature2016>
- Jun 29-30** ASTM E12 Color and Appearance, Chicago Marriott, Chicago, IL
- Aug 19-22** Archiving 2016, National Archives, Washington, D.C., Info: www.imaging.org/archiving
- Aug 28-Sep1** 39th European Conference on Visual Perception (ECVP), Barcelona, Spain, Info: <http://www.ub.edu/ecvp>
- Sep 5-9** CIE Expert Symposium on Appearance and CIE Division 1 Meeting, Prague, Czech Republic, Info: ciecb@cie.co.at. Includes:
- Sep 5** Tutorial on Basics of Goniospectrophotometric Reflectance Measurements
 - Sep 5-7** CIE Expert Symposium on Appearance
 - Sep 8** CIE Division 1 TC Meetings
 - Sep 9** CIE Division 1 Main Meeting
- Sep 14-16** 4th Progress in Colour Studies Conference (PICS2016), University College London, London, UK., Info: lindsay.macdonald@ucl.ac.uk
- Oct 18-22** AIC Interim Meeting Color in Urban Life: Images, Objects, and Spaces, Santiago Chile, Info: www.aic2016.org
- Nov 7 -11** 24th Color and Imaging Conference (Special Topic: Mobile Color), San Diego, CA
Info: www.imaging.org/color

2017

- Oct 16-20** AIC 13th Congress, International Convention Center, Jeju, Korea, Info: www.color.or.kr

ISCC Sustaining Members

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

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

We could still use your help!

ISCC has positions in the organization that need filling. We can help identify a place for you depending on your skills and desires. Contact Nomination Chair Scot Fernandez, scot.fernandez@hallmark.com

ISCC News Issue #473, Winter 2016

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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 maintain a relationship with each organization's individual members. We frequently hold joint meetings to further the technical cross-pollination between the organizations.

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

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

American Association of Textile Chemists and Colorists (AATCC)
 American Society for Testing and Materials International (ASTM)
 American Society for Photogrammetry & Remote Sensing (ASPRS)
 The Color Association of the United States, Inc. (CAUS)
 Color Marketing Group (CMG)
 Color Pigments Manufacturing Association (CPMA)
 Council on Optical Radiation Measurements (CORM)
 Detroit Colour Council (DCC)
 Gemological Institute of America (GIA)
 Illumination Engineering Society of North America (IESNA)
 International Colour Association Environmental Colour Design Study Group (AIC – ECD)
 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)