Inter-Society Color Council *News*

Issue 475 Summer 2016

Board of Directors Corner

My name is Paul Centore, and I have been invited to submit a Board of Directors' Corner column. I just recently started serving on the board, having been elected in April 2016. I joined the ISCC in 2011. My interest in color began with a practical question that I encountered some years ago as an art student: how to paint shadow colors. This question lay dormant for several years, but I eventually picked it up again in late 2009. Finding a rigorous solution required a fair bit of color science. As I delved more deeply into the subject, I realized that object-color solids had a hitherto unrecognized mathematical form (technically, they're zonohedra). This insight led to further applications in electronic displays and color constancy. As I published some research papers, I became more involved in the color science community (giving talks, attending conferences, and meeting fellow researchers), so an ISCC membership was a natural fit. Currently, my color interests extend well beyond shadows and zonohedra, and the ISCC, with its wide range of interests, is a congenial setting.

My art background has made me particularly interested in a long-simmering issue for the ISCC, which came up at a recent BoD meeting. The ISCC logo contains a triangle, each vertex of which represents a different aspect of color: Science, Art, and Industry. At the ISCC's founding in 1931, these three aspects were intended to cross-fertilize one another. In recent years, however, the emphasis on science and industry has been strong, while the art aspect has gradually become neglected. ("Art," in this context, should be understood broadly, to include not only painting and illustrating, but also graphics, fashion design, interior decoration, and so on.)

The major difference seems to be that scientists and engineers prefer a quantitative, technical approach, while artistic fields prefer an intuitive, non-technical approach. XYZ or Lab coordinates can be off-putting to visual people, because the coordinates give only limited help when trying to picture a color. Furthermore, scientists and engineers tend to think of colors in terms of measurements, while artists and designers (not to mention the general population) react to colors on a non-verbal, non-mathematical level. Perceptual color systems like Munsell or NCS help bridge this gap by combining scientific rigor with empirical testing of human color perception.

One system that is little used today, the ISCC-NBS system, was in fact initiated by the ISCC in the 1930s, to help the pharmaceutical industry describe

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Board of Directors Corner continued

colors. The system deliberately uses common English terms, such as "deep blue" or "light purplish pink," that anybody can understand. Its 267 color names form a small set, but one that is useful for many design projects, especially in their early stages. All terms are rigorously defined as subsets, or "blocks," of the Munsell system, which, since 1943, has been rigorously defined in terms of CIE coordinates. The ISCC-NBS system would be especially useful in web applications, where color variation is the rule, because of different monitors (usually not color-calibrated), monitor settings, and viewing conditions. Reviving and promoting this system might make the ISCC more relevant to graphical design in a digital setting.

Another promising development, discussed at the last BoD meeting, is that the ISCC is planning a meeting in 2018 to mark the centennial of Albert Munsell's death. The venue is still uncertain, but a likely candidate is Boston because it is the city where Munsell taught painting. This effort was spearheaded by Marie Meyer, who herself has made a significant contribution to color for artists by measuring artist's pastels spectrophotometrically, and finding their Munsell notations. Planning is still in its early stages, with speakers and the program yet to be determined. The Munsell system is used worldwide, so many international attendees should be expected. As usual, help is needed, and planning works best with a wide variety of input; the best contact for now is isccoffice@iscc.org. Since Munsell intended his system for painting and visual applications, input and attendance from artists and designers would be especially welcome. This meeting is a good opportunity to reach out to non-technical visual fields, to learn and address their color needs. With the right kind of effort, the Art vertex of the ISCC triangle can become as strong as the vertices for Science and Industry.

Paul Centore, *Freelance Color Scientist*

September ISCC Webinar

The ISCC will be holding its next webinar on Thursday, September 22nd from 2:00-3:00PM EDT. This presentation will be given by Nurhan Becidyan. Nurhan has been in the color business for over 40 years. He started his career first in the Paper Industry as a Technical Director of a tissue mill in Turkey, and then joined Sandoz Ltd. (now Clariant Corp.) of Switzerland as a sales engineer in 1976. He

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September ISCC Webinar continued

worked for Sandoz (Clariant) in Turkey, Egypt and Switzerland before being transferred to the U.S.A. in 1982.

In 1986 he joined United Mineral & Chemical Corporation, an import and distribution company that acts as exclusive agents to many offshore colorant and chemical companies. He retired from UMC mid-2015 as CEO and President, and is currently a management consultant.

Nurhan had been 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) all these years. He is currently a member of the Board of Directors of ISCC. He was also the Chairman of the Cadmium Pigments Subcommittee CPMA for many years and has been an active member of ASTM D12 (Color and Appearance) Committee in the fields of Fluorescence and Phosphorescence. He also still acts as a technical consultant to some of UMC's principals.

Nurhan has an undergraduate degree in Chemical Engineering from Robert College, School of Engineering of Istanbul, Turkey and a graduate degree in Pulp and Paper Engineering from the Institute of Paper Chemistry of Appleton, Wisconsin (currently called Institute of Paper Science & Technology of Georgia Tech in Atlanta, GA).

His main color interests are in phosphorescence and fluorescence (both visible and UV/IR activated) and applications of color for security industries.

The title of Nurhan's presentation is *The Chemistry and Physics of Special Effect Pigments and Colorants.* Here is the abstract:

"The security printing industry continuously tries to find ways to make the items they print or produce safe from forgery attempts. The proliferation of color copiers has enabled almost perfect forgeries much easier to make.

"One of the methods utilized to foil counterfeiters is the use of luminescent (fluorescent or phosphorescent) pigments with very specific attributes that make forgeries either impossible or extremely difficult. The theory behind it is that copiers are unable to copy the color of fluorescent or phosphorescent pigments which are excited either by UV or IR irradiation.

"This paper will present, with actual examples, the distinctive features of various fluorescent, phosphorescent pigments, Optically Variable Pigments (OVP's) Photochromic and Thermochromic Colorants and how they help foil the forgery attempts."

For details on how you can participate in this webinar, please visit:
http://iscc.org/resources/SeminarSeries.php .

ISCC Annual Meeting 2016 San Diego

We are excited to announce that the 2016 Annual Meeting will be co-located with the Imaging Science and Technology (IS&T) Color and Imaging Conference (CIC), in San Diego, California. CIC will be November 7-11, and **our Annual Meeting will be within CIC as a Friday morning workshop, November 11.**

While the workshop will serve as our Annual Meeting, it will be open to any regular CIC attendees. There is also a workshop-only registration for those who do not wish to attend the entire week. The morning workshop will be followed by the ISCC Business and Awards Meeting and then a luncheon. We encourage ISCC members to attend the ISCC workshop as well as the CIC workshops and presentations.

The theme of the ISCC workshop will be *Life of a Color*. We have tentatively scheduled four presentations spanning much of the breadth of ISCC membership. It will begin with a description of the creative design process:

Leslie Harrington (CAUS) will present *The Design of a Color*

Leslie will walk through how a brand color is originally selected, and then the associated strategic decisions: how to align the color with a product/brand's attributes/voice; what are the customer segmentations and geographical positioning; and finally trend influences and competitive landscape.

Once a color has been defined, we need to make sure that everyone is looking at the same color:

Max Derhak (Onyx Graphics) will present *The Management of a Color*

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ISCC Annual Meeting 2016 San Diego continued

Color management is the process by which colors are represented, communicated, transformed and reproduced using a device independent color representation. Traditional color management has used only CIEXYZ colorimetry based on a single observer and single illuminant. Max will describe a system that accounts for a complete color process from light sources onto objects captured through color matching, and provides the means to add perceptual aspects of color.

Now that color is accurately communicated, the industrial processes can begin:

Ann Laidlaw (ACL Color Consulting LLC) will present *The Manufacturing of a Color:* The color of a consumer product may begin as inspiration or whimsy. Ann follows the path of a color from the creative process through development, approval, and manufacturing. The use of robust electronic and physical color standards and consistent procedures is crucial to managing accurate color with on-time deliveries, especially when products are fabricated from multiple materials and when multiple products are merchandized together.

Finally, for all of the above to have any effect in the world, the color must be seen by an individual:

Mark Fairchild (RIT) will present *The Perception of a Color.*

Mark will trace the fate of a photon from the surface of an object to the point a color appearance is experienced in the brain.

There are a number of unique aspects of this meeting. First, since the meeting is wholly within the Color Imaging Conference, the main-CIC attendees are also encouraged to attend. This will present an opportunity for ISCC to tell its story to individuals who perhaps have never even heard of us! Also, we feel that the presentations and resulting discussions more completely represent the ISCC constituency than perhaps has been achieved in recent years. Addressing the breadth of our membership is always a goal, but has proven an elusive one for many years. So artists, designers, scientists, industrialists and educators with an interest in color, come one come all to this unique ISCC workshop on *Life of a Color*.

Look for more information in future newsletters and in ISCC email communications. For registration information, please visit the following web address: https://www.imaging.org/ist/Events/ConferenceDescription.cfm?Meeting=2016CLR24&activesection=Conferences.

We hope to have many of you participate in this great opportunity to increase awareness of ISCC.

David R Wyble, *Avian Rochester, LLC.*
2016 Annual Meeting Chair and Workshop Organizer
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2016 Macbeth Award Announcement

The Macbeth Award Chairman, Dr. Danny Rich, is pleased to announce that the 2016 Macbeth Award of the Inter-Society Color Council will be given to Dr. Max Derhak of the company, Onyx Graphics of Salt Lake City, Utah. (*Please see a picture of Max at the top of this page.*)

Max has been nominated for his efforts in bringing to the public a method of color management based, not just on the theoretical CIE illuminant D50 colorimetry, but on the spectral properties of the color stimulus functions. This provides a greater flexibility to those modeling the process color output of devices such digital printers and presses and provides a framework for the inclusion of many special colors, known as spot colors or brand colors. Max took much of the technology from his PhD research and incorporated it into the latest tools from the International Color Consortium (ICC) having been announced previously and appropriately named iccMAX.

Maxim Derhak is employed by Onyx Graphics, Inc. In 2015, he completed his Ph.D. degree from the Munsell Color Science Laboratory at Rochester Institute of Technology (RIT). Max is the Principal Scientist at Onyx Graphics where he leads the Color and Technologies team. Steeped in color, Max also serves as Vice-Chair of the ICC and Chair of the ICC Architecture Working Group, is leading the development of the upcoming ICC Version 5 specification (ICCLabs) and maintains the open source SampleICC and IccXML projects.

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2016 Macbeth Award Announcement continued

Holding a B.S. in Computer Science, M.S. and Ph.D. in Imaging Science from RIT, Max has become an expert in the color imaging world. Max has been a Runner up Cactus Award winner for poster/paper presented at IS&T Color Imaging Conference in 2004. Max is a member of the Inter-Society Color Council, the International Color Consortium and the Society for Imaging Science and Technology.

Max Derhak will receive the 2016 ISCC Macbeth Award on Friday, November 11th at the ISCC Business and Awards Luncheon after the ISCC workshop during CIC 24.

CIC 24 Update

The Society for Imaging Science and Technology will be holding its 24th Color Imaging Conference (CIC 24) in San Diego, California from November 7 – 11 at the Westgate Hotel. The special topic of this meeting is mobile color.

The welcome and opening keynote address is entitled "*Full Color Computational Imaging with Diffractive Optics*", by Wolfgang Heidrich from King Abdullah University of Science and Technology (KAUST) in Saudi Arabia. The session titles for the first day of papers (Wednesday) are Colorful Viewing, Beyond the Rainbow, and Colorful Matter. The Thursday keynote speaker is Gerald H. Jacobs from the University of California, Santa Barbara. His talk is entitled "*The Evolution of Primate Color Vision*". The Thursday session titles are Do You See What I See? and Illuminating Color. The Thursday session also features the two-minute interactive paper previews followed by the interactive session. The Thursday evening talk sponsored by HP, Inc. is "*The Confluence of Art and Technology: 3D Printing at LAIKA's Award Winning Animation Studio*" given by Brian McLean and Rob Ducey of Laika Animation Studios. Friday features three workshops: W1 is Camera Color Characterization, W2 is The Life of a Color sponsored by ISCC and detailed on page 3 of this newsletter and W3 is Color Science for 3D Printing: From Mondrian to Miró. The closing keynote address on Friday is "*Google Street View: Unique Challenges of Collecting Imagery at Global Scale*" given by Luc Vincent and Rom Clement of Google, Inc.. Friday afternoon will also feature CIC Awards and a final session on Wrangling Color.

More information on this CIC 24 meeting including detailed program and registration details can be found at https://www.imaging.org.

Archiving 2017 – Call for Papers

The IS&T Archiving Conference (May 15-18 Riga, Latvia) brings together an international community of imaging experts and technicians as well as curators, managers, and researchers from libraries, archives, museums, records management repositories, information technology institutions, and commercial enterprises to explore and discuss the field of digitization of cultural heritage and archiving. The conference presents the latest research results on digitization and curation, provides a forum to explore new strategies and policies, and reports on successful projects that can serve as benchmarks in the field. Archiving 2017 is a blend of short courses, invited focal papers, keynote talks, and peer-reviewed oral and interactive display presentations, offering attendees a unique opportunity for gaining and exchanging knowledge and building networks among professionals.

Prospective authors are invited to submit abstracts describing original work for presentation at the 2017 conference in technical areas related to the general fields of:

- New developments in digitization technologies and workflows for two- and three-dimensional (2D/3D) materials as well as audio visual (A/V) materials
- Digitization equipment and software
- Techniques, e.g. multispectral imaging, 3D imaging
- Multispectral image processing
- Large scale/mass digitization
- Quality assurance, e.g. targets, software, automation and integration in workflows
- Formats for preservation and access
- Embedded metadata
- Standards and guidelines related to digitization practices
- Archiving, curation, and management of digitized and born digital materials, e.g. images; A/V materials; digital art policies, strategies, plans, risk management
- Management of metadata
- Dissemination and use, e.g. rights management, crowd sourcing, data mining
- Business and cost models for digitization and archiving

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Archiving 2017 – Call for Papers continued

All submitted proposals are peer reviewed by the program committee to assure that the program provides significant, timely, and authoritative information. All papers presented at Archiving 2017 are published in the conference proceedings, indexed with various services, filed with the US Library of Congress, and made available as downloadable PDFs through the IS&T digital library. Papers presented at the conference should be authoritative and complete in regard to advancing the state of knowledge in the area of digitization and archiving. The conference language is English.

ISCC: A Cooperating Society for Archiving 2017

This announcement is to let our membership know that the Board of Directors has voted for ISCC to become a cooperating society for Imaging Science and Technology's (IS&T's) 2017 Archiving Conference. This conference will be held from May 15-18, 2017 in Riga Latvia. Please see http://www.imaging.org/archiving for more information.

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 keynote speakers are:

- Louisa Hutton, an architect and founding partner of Sauerbruch Hutton
- Verena Schindler, an art and architectural historian; also chair of AIC Study Group on Environmental Design
- Natacha Le Duff, a cultural mediator for Berlin and GDR museum
- Felipe Taborda, a graphic designer from Rio de Janiero, Brazil

- "La Nueva Gráfica Chilena, a Chilean graphic collective that will be presenting the work developed over the past years that brings together a compilation and a deep research about Latin-American's graphics designs and visuality. These works are connected to the diversity of actions and events of Latin- American's parties and celebration. Spontaneous and popular graphics designs developed by self-taught authors blooming in the streets of the continent. The common point in this research has been the particular presence and use of color in these expressions, setting a unique skin that becomes identity."

The venue, Centro de Extensión UC, is a space for culture, conveyance and integration of knowledge. The venue is located within the main building of Universidad Católica de Chile, on the most important avenue of Santiago city, "Alameda Bernardo O'Higgins", which provides direct access to the interconnected transportation network.

ISCC members are encouraged to attend this week long meeting in sunny Santiago, Chile. The preliminary programme is set and can be found along with more meeting information at www.aic2016.org.

13th AIC Congress

2017 JEJU

Color & Health

AIC 2017 Congress – Call for Papers

The 13th Congress of the AIC will be held in

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AIC 2017 Congress– Call for Papers continued

Jeju, Korea at the International Convention Center from October 16th – 20th. The AIC 2017 organizing committee invites submissions of papers or posters or interactive presentations on any aspect of color. This Congress provides a unique forum bringing together researchers, academics, artists, architects, industrialists, engineers, designers, lighting experts and business leaders from all over the world.

The following list of topics is provided as a guide, but we welcome submissions in any area related to color:

Color & Health - well-being; visual comfort; lifestyle; biodiversity; waste; pollution; the design of hospitals; assisted living facilities; medical offices; laboratories; aging & defective color vision; therapy; physiological reaction; psychological reaction

Color & Environment - environmental color design; landscape & horticalture; color in nature; urban agriculture

Architectural Color Design - interior design; architecture; urban planning & design

Color in Art - arts & crafts; photography; film & video; performance; new media

Color Psychology - color & form; perception; chromatic harmonies; emotional interactions; perceptual illusions; color combination; phenomenology of color

Color Education - color naming & categorization; color order systems; teaching aids

Color in Cultures - color & identity; graffiti; cultural heritage; conservation; preservation; history

Color & Light - color constancy; color adaptation; color appearance models; lighting design; LEDs; lighting system; OLEDs; color rendering indices; metamerism; museum lightings; new technologies

Color Science & Technology - color measurement; photometry; quality control; digital color management; reproduction; image processing; color imaging; virtual reality; color in 3D printing; color physiology; color vision; multispectral imaging

Color in Product Design - materials, texture & surface; transparency & translucency; reflection & glossiness; ergonomics; customer behavior; furniture; product design; packaging; graphic design; typography; marketing

Color in Communication - branding; color in signage; communication design; digital data visualization; color trends; usability; color meaning; language; color naming

Color Application – fashion ; textiles ; cosmetics, food, medicine

In order to participate, please submit an abstract in English of maximum length one page (between 300 and 500 words), to the submission website, which can be accessed via the Congress website **www.aic2017.org** The abstract submission deadline is **January 31, 2017**. Further instructions regarding submissions can be viewed on the Congress website. Selected authors will have the opportunity to publish as extended version of their paper in a special issue of the Journal of the International Colour Association (JAIC).

AATCC LED Summit: A Light Changing Experience

The AATCC is sponsoring this LED Summit from August 25th – 26th at the Sheraton Imperial Hotel in Durham, NC. In a study titled *Impact of Color in Marketing*, researchers found that up to 90% of snap judgments made about products can be based on color alone. Lighting plays a major role in how color is perceived and different light sources affect how the colors of objects and products are viewed. Environmental and economic benefits of reducing energy consumption is a key driver in the move to LED light sources. How do we as retailers, brands and suppliers ensure that our products are created and beautifully displayed under these new LED light sources?

This conference was developed to foster discussion and understanding of the rapidly changing lighting environment. The interactive program is designed to bring together members of the retail industry to include marketing, design, engineers and quality assurance as well as lighting suppliers, color control providers and instrument manufacturers.

This two-day program will focus on: all being able to speak the same "light" language, the why and how of new lighting, lighting reality – industry case studies, new light and how it will impact quality assurance and the supply chain, and steps to consider when establishing and selecting new lights.

Confirmed presentations include:

- *Color & Lighting: Fundamentals for Communication*– Roland Connelly, RoLyn Group Color Consultants
- *Why LED, Why Now* – Tom Boyle, GE Lighting
- *An Improved Method for Characterizing Color Rendering: IES TM-30-15*– Michael Royer, Pacific Northwest National Laboratory

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AATCC LED Summit continued

- *Greater Opportunities for High Quality Illumination with LED Solutions* – Eric Haugaard, Cree Inc.
- *Replicating Daylight and Other High Quality Light Sources* – Steve Paolini, Telelumen LLC
- *Retail Realities* – Casey Cammack, Ralph Lauren
- *"Light, More Light!" said the dying Goethe* – Keith Hoover, Under Armour
- *Issues with Light Booths & Light Sources* – Nick Lena, GTI Graphic Technology, Inc.
- *LED Adoption: Preparing to Retrofit your Supply Chain* – Stephen Robertson, X-Rite
- *So What Just Happened? Overview of Changes in Color Control Related to LED Lighting in Retail* – Ann Laidlaw, ACL Color Consulting LLC, Consultant to X-Rite

Individuals registering on or before August 10 pay US$785 (US$525 for AATCC individual and corporate members) After August 10 the registration fee increases to US$575 for AATCC members and US$835 for nonmembers. AATCC student members receive complimentary registration (does not include food & beverage functions) if space permits. Availability confirmed 10 days out from the event. The nonmember student registration fee is US$125 (includes food & beverage functions).

Refunds will be honored if cancellations are received on or before August 17, 2016. No refunds will be given after August 17. A US$75 cancellation fee will be charged.

Overnight accommodations are available at the Sheraton Imperial Hotel located at 4700 Emperor Blvd., I-40 at Exit 282 (Page Rd.), Durham, NC 27703 USA, +1.919.941.5050. To reserve your room, contact the hotel directly and request the AATCC rate of US$120/night. The group rate will be available until 5:00 pm (EDT) on August 1, 2016, or until the group block is sold-out, whichever comes first. Once the room block is filled the group rate will NOT be honored.

Blue Wine???

Do you recall the Hue Angles article that Leslie Harrington wrote for us in *ISCC News* #469 (Winter 2015) entitled "Cobalt blue – from runway to road"? This article highlighted cobalt blue as the new mega color for 2015.

Well how would you feel about drinking blue wine as sweet as a rose wine? A Spanish startup company known as Gïk decided to market a blue wine hyping it as a 'blasphemous drink" aimed at millennials, who might be more open to drinking such an innovative refreshment.

Charles Spence, an experimental psychologist professor from Oxford said that "in the '80s and '90s, 'We had a generation of marketers telling us that blue colour would never work' for beverages, as it was perceived as 'unnatural. Then came **blue raspberry Slush Puppies** and **Gatorade**, he said, not to mention **blue Magellan gin** (tinted with iris flowers). Blue is revolting to humans only when applied to things such as meat or fish", Spence said.

To make the blue wine, Gïk starts with a base

consisting of a mixture of red and white grape skins from Spanish vineyards and they add indigo and anthocyanin pigments to it. An artificial sweetener is added to give it a sweet taste similar to that of a rosé wine.

The wine creators tout their product by saying 'Drinking Gïk is not just about drinking blue wine, you are drinking innovation. You are drinking creation. You are breaking the rules and creating your own ones. You are reinventing traditions.' Oxford's Professor John Spence has a different opinion: 'Adding colour to wine will undoubtedly change taste," he said, "and I would bet it will fail.'

If you have a chance to give it a try, let us know your opinion of drinking blue wine. For more information, please see:
http://www.slate.com/blogs/the_eye/2016/06/23/gik_wants_to_sell_blue_wine_as_the_drink_of_hipster_millennials.html.

Chemists Discover a New Shade of Blue by Accident

Chemists at Oregon State University were doing an experiment to study the electronic properties of manganese oxide. Upon heating the manganese oxide with other chemicals to a very hot temperature of

1200°C or 2000 °F, they obtained "YInMn blue". This pigment is so special because it is very stable under acidic and hot conditions. Since it does not release cyanide as Prussian blue and Cobalt blue do, it is not a carcinogenic pigment! Please read more about this at http://www.iflscience.com/chemistry/this-new-shade-of-blue-was-accidentally-discovered-by-chemists/.

ISCC Archives from Hagley Museum
Correspondence between Dorothy Nickerson and Fred Billmeyer

The Hagley Museum and Library in Wilmington, DE is home to the ISCC artifact collection that used to reside at the Cooper Hewitt Museum in New York City. Also after Dorothy Nickerson passed away, Joy Turner Luke donated all of Dorothy's color collection to the Hagley. Recall that in the fall of 2014, Paula Alessi and Joy Turner Luke spent two days going through most of the 112 linear feet of the Dorothy Nickerson's collection. In an effort to try to share some of Dorothy's collection with the membership, we will start with the correspondence section, which features Dorothy's letters to and from other prominent color scientists. The letters were scanned with an Epson Scanner.

In this newsletter, we will begin with the correspondence between Dorothy Nickerson and Fred W. Billmeyer, Jr.. Ten total documents were scanned on October 9,2014. As of August 1, 2016, six are reported here and posted on our website at http://iscc.org/resources/hagley_nickerson_billmeyer.php. The rest will be reported and posted at a later date. Please keep in mind that this is not a complete collection of all of Dorothy s correspondence. There are missing letters and sometimes things seem out of place. However, we are doing our best to present the membership with a glimpse of the most precious documents from Dorothy's collection for your information and enjoyment.

This letter from Dorothy to Fred (6/5/72) talks about a Munsell color file that Bob Marcus picked up from her. The letter truly is a gem because it contains her hand-written notes referring to some Munsell samples as "tomato colors, soil colors, hay colors, cotton colors, milk and yolk colors, meat and fat colors". There is even a reference to a "slanting hue series".

This letter from Fred to Dorothy (4/5/77) describes the dire need for help to save the color science program in the Chemistry department at Rensselaer beyond 1984, the year for Billmeyer's mandatory retirement. Billmeyer implored Dorothy to write to Rensselaer's Chemistry Department head, Prof. Kevin Potts, with her reasons why she thought the program should continue.

Dorothy didn't waste any time writing her letter to Professor Potts (4/12/77). Her letter is also included in the file. This letter is beautifully written. It talks about the necessity for a program in color science to stay at Rensselaer to keep "developing leaders in colorimetry of the caliber of the late Deane B. Judd and R. S. Evans and of present leaders like W. D. Wright, E. I Stearns, Gunter Wyszecki, Henry Hemmendinger, and their very own Prof. Billmeyer."

This letter from Fred to Dorothy (12/14/79) poses the question "Is the Munsell System right-handed or left-handed?" Munsell, himself sketched the hue circle with hue numbers increasing and hues progressing from R to P in a clockwise direction when looking down on it from above (left-handed). Yet the Munsell Book of Color is right-handed when it is spread open. Fred asks Dorothy is there should be a convention. Unfortunately, we didn't find Dorothy's response to this letter yet.

This letter from Fred to Dorothy (9/27/82) refers to a letter that both of them received from A. Stenius regarding a "new Swedish Standard", the Natural Colour System (NCS). It contains one page of data as an example. Those data consist of CIE tristimulus values and chromaticity coordinates obtained from sample measurements followed by similar values for the closest possible obtainable real NCS sample. Stenius confidentially reveals that he was opposed to publication of such a table because of "careless procedures of measurement".

This file, Munsell Preface was in Dorothy's

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A Blast from the Past: ISCC Newsletter 50 Years Ago

Number 183 – July - August 1966 on ISCC website

This 1966 issue is 18 pages long. This issue contains some really fascinating articles that are worth sharing with our membership.

All ISCC members are strongly encouraged to read a precious story entitled "The Painting" by Helen E. Buckley. This short story was first published in the School Arts Magazine. It is too long to be reproduced here, but it is worth your look at http://www.iscc.org/Newsletters/ISCCNews183.pdf. A little boy decides he is going to paint the sky. The first obvious color he chooses is blue. Upon further thought, the little boy decides that sometimes "before night at sunset the sky is pink and a little purple". Then the little boy thought about what the sky looks like in winter. It is white as the snowflakes fall. Next he thought about the sky on a summer day during a thunder and lightning storm. This made him choose black "with flashes of red and orange". As the rain came down, he saw "long green lines across the sky". As the "colors ran together, a rainbow" began to form. Finally, he thought about a bright sunny day and was compelled to draw a big round yellow sun. What the boy ended up with was a painting of "all the skies he knows about". I searched for the painting in hopes of reproducing it for you here, but I couldn't find it. For now we can only imagine what the little boy's painting of all the skies he knew looks like.

At the ISCC-SPE Joint Session (Montreal ANTEC) on March 8, 1966, Dr. Roland E. Derby, Jr. gave a "talk entitled 'The ISCC: What It Is and How It Works on Old and New Color Problems'. He traced briefly the history and accomplishments of the ISCC since its founding in 1931. Note was made of the 'aims and purposes' of the ISCC, namely, to stimulate and coordinate work being done by various societies and associations leading to the standardization, description and specification of color and to promote the practical application of these results to the color problems arising in science, art, and industry. In addition, the methods of solving problems presented to the ISCC by member-bodies or others were reviewed. Examples of the type of problems presently occupying the attention of the ISCC were displayed by colored slides illustrating such problems as:

1. Standard viewing conditions.
2. Metamerism.
3. Illumination and viewing conditions for product color, design, and styling.
4. Color specifications.
5. Preparation of textile samples for color measurement.
6. Color aptitude testing.
7. The measurement of fluorescent samples."

In an article entitled "Color Preferences Reported Changing in Décor, Fabrics, and Appliances" (Stella Margold – Women's News Service – 5/10/66), we learn about the change in color preferences expected for 1967. Pastel colors were out and bright, vivid colors were in! As less space was becoming available for small apartments, more "light, bright colors were needed to create illusions of space, light and warmth". Colors on the decline were ivory, gray, deep sandalwood, nutria (a brownish color), pink for appliances, lilac, and beige. Colors that would increase in popularity in 1967 were blue, yellow and aqua for appliances with "coppertone" for kitchens. Fern green, gold, and orange would have a strong lasting presence with the "sharp yellow-green from the early '50's making a comeback". Deep vivid violet was also expected to replace lilac in 1967.

Finally, it is worth reproducing a four line poem called "ADVICE TO ARTISTS" by Henderson Wolfe:

> "The artist, whose obscurity
> Is a taste that he may rue
> Should strive for great lucidity
> As microspectrophotometrists do."

Paula J. Alessi, *ISCC News Editor*

Meet Your Fellow ISCC Members

Please see p. 13 for an article on our newest member, Michael Stokes.

Future ISCC Webinars

We are looking for a speaker willing to share a color presentation for our December webinar. If you are interested, please send an abstract to seminars@iscc.org. The presentation should be no more than about 50 minutes long so that we can allow about 10 minutes for questions. The December date and time have not been selected yet because we want our speaker to choose a date and time that is most convenient for him/her. We would love to hear from you!

refractions

seemingly random musings on color

The Good, the Bad, & the Ugly

Can colors be considered good, or bad or ugly? Maybe not in any absolute sense, but there are instances where we might assign such adjectives. Let's start with 'the Good'. There are certainly some colors that can be considered good, or at least better than others, especially when it comes to utilitarian needs: warning signs (on roads, labels etc.) that are grey or brown might not be as good as red or yellow, and advertising and marketing firms continually rely on their ability to choose the correct (good) color to stay in business. But there are also some very specific and unusual instances where the good is not always so obvious - orange cars for example.

Toyota Corolla 1972

According to the data crunching startup Kaggle[1], if you are in the market for a used car, and your highest priority is not to get a lemon, then you can do no better than choosing an orange car! Why? Because people who buy new orange cars, tend to select the color for very personal and expressive reasons: they want orange. This kind of attachment statistically means that they will be more likely to maintain and take care of their cars than the average person. In the world of used cars, orange is definitely good. But what about being intrinsically good? That's not so easy. However, if we substitute the word *favorite* for *good*, (assuming that if a color is your favorite you must think it is good) then we begin to get some answers.

The Russian conceptual artists Komar and Melamid created art by surveying people and collecting data, which they then used to make artworks. In one project, the *Most Wanted Painting* series[2], they made the ideal paintings for each country based on the respondents' preferences for color, style, subject matter etc. One of the things they discovered was an overwhelming preference for the color blue; *every* country chose blue as number one! So, blue is probably a strong candidate for an intrinsically 'good' color.

United States: Most Wanted Painting. Komar and Melamid 1995

Next, what about 'the Bad'? Like good, this can be a matter of context – but what if it's not? For centuries color has been associated with music and the musical scale. It received its most popular conception in Newton's belief that since there were seven notes in the musical scale, there *needed to be* seven colors in the spectrum, hence his addition of *indigo* - to maintain universal harmony[3].

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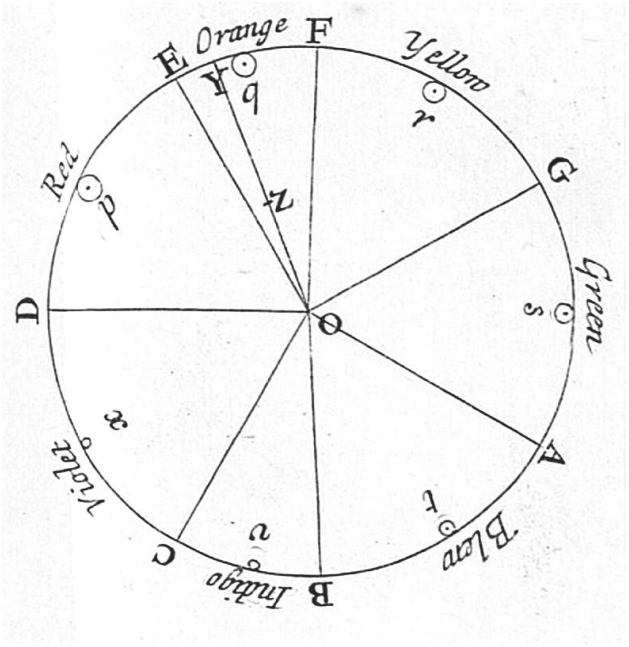
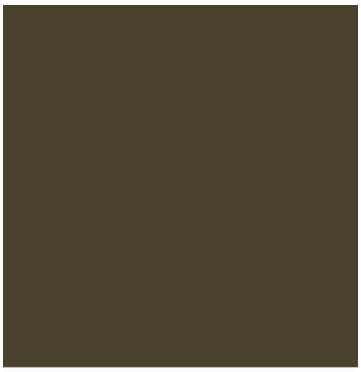
The Good, the Bad, & the Ugly continued



Newton's Color Wheel. *Opticks* 1704

As far back as Pythagoras, harmony has played a crucial role in music, where it was recognized that some notes and intervals sounded good together (consonant), whereas others sounded bad (dissonant). Within the tradition of western music there exists the notorious "Devil's Chord," or the augmented fourth (such as F and B), an interval of notes considered to be downright sinister or diabolical. Since color in classical design often relies on *intervals* of the color wheel to describe harmonic color schemes (triadic, complementary, analogous etc.), how would the Devil's Chord map onto a color wheel? Would it create an equally evil color combination? I don't know exactly, and will therefore leave it to the more musically informed to tease out the details of an augmented fourth in relation to the color wheel. But as a first guess, we might consider the opposite or complementary colors – colors that when mixed, will (theoretically) cancel out all color, or when placed side by side are sometimes considered to be jarring and difficult to look at. It is an interesting idea. Maybe we don't have to mine the depths of harmonic theory to recognize that the avocado colored phones, brown curtains and pumpkin fridges of the 70's were equally devilish together!

Which finally brings us to 'the Ugly'. According to a marketing and research campaign in Australia, which polled over 1,000 people, it was decided that Pantone's 448C '*opaque couché*' was to be designated the world's ugliest color[4].



The color has been described as a 'sewage-tinged hue' and even the color of 'death'. It was discovered in an attempt to discourage smoking by finding the most unappealing color for cigarette packaging. They are happy to report that sales are indeed down, but not everyone was happy. Leatrice Eiseman, a spokesperson for Pantone, denied that there is such a thing as the world's ugliest color, saying, "We consider all colors equally."

But ugly and good need not be antithetical – and I'll bet a secondhand car with the color of Pantone 448 C runs like a gem!

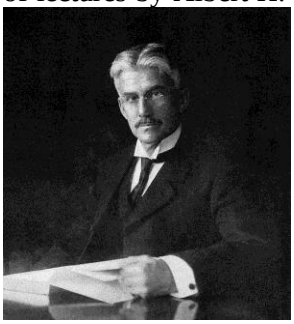
1. http://bits.blogs.nytimes.com/2012/03/28/bizarre-insights-from-big-data/?_r=0
2. http://awp.diaart.org/km/painting.html
3. McLaren, K. 2007. Newton's Indigo, *Color Research and Application*. Vol.10 (4) pp. 225-229
4. http://www.today.com/home/color-me-ugly-world-s-most-horrible-color-shade-described-t97346

Carl Jennings
University of Hawai'i

Please visit Carl's blog at http://cjenning.wix.com/refractions for comments and feedback on his articles!

ISCC Archives from Hagley Museum continued

folder marked Billmeyer, yet it does not mention Billmeyer in any way. It is a preface to a 1904 series of lectures by Albert H. Munsell giving timely ideas about relationships among colors and how they might be ordered into some type of system.



Many thanks to Dave Wyble for his work on putting an historical archive section on our website. For more information on the Hagley Museum, please visit http://iscc.org/resources/hagley.php.

HUE ANGLES

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

Here is the latest word from Michael Stokes, architect of sRGB, a founder of ICC, Interest Group II chair of ISCC, …, and ten years absent from the field of color.

From Color Science to Privacy

I grew up in my family's slide duplication and photofinishing business back when E4 processing was still new, and Kodachrome, FujiChrome and AgfaChrome were widely available. The business grew to the point my parents bought entire emulsion runs of motion picture and internegative stock from Kodak to ensure consistent quality. Our computer system tracked every action taken of each slide or component of each order, and we offered an unconditional money-back guarantee. I was responsible for the quality and production aspects of the business, so I spent what seemed like endless time trying to understand why it was so difficult to craft color reproduction processes that were consistent and accurate.

In the late 1980s, I joined RIT's Color Science Master's program and soon my frustration transformed in wonder and awe that we were able to reproduce color reasonably well given the many complex aspects involved. I was fortunate enough to have a successful color career at Apple, then at Hewlett-Packard, and finally at Microsoft as their Color Architect. Over this period, I helped to lead industry efforts such as the founding of the ICC, standardization of sRGB and scRGB, evolution of ColorSync and ICM, as well as taking part in the founding of CIE's Imaging Science Division. I often explained the goal of my efforts as trying to reverse engineer a large part of the human brain to effectively model it across a complex system of components from many stakeholders who didn't always get along.

I joined Microsoft in 1999 in hopes of implementing the best-in-class color reproduction software development systems. By 2006 we had successfully implemented advanced hybrid solutions that supported sRGB, scRGB, and ICCv4 as well as CIECAM color vision modeling. This was a part of Windows Vista, which was known to have significant challenges.

It soon became clear that advanced color systems were not the most pressing need for the company, and I transferred to Microsoft's newly established Health Solutions Group (HSG). As part of this transition, the company required that I no longer participate in the color field and have no communications regarding color with my many friends and colleagues that I had established over many years. It was a difficult personal decision, but in the end, I chose to put my family's financial stability first. I am sincerely and deeply sorry for the negative impact this has had on my communications and relationships with many dear color friends and colleagues.

My original job description focused on health standards and patents, in which I had significant experience from my color science background having worked with IEC, CIE and ISO as well as accumulating over 50 patents. Within two weeks, my role grew to include a focus on security and privacy. I had security experience having designed and written color and imaging components in the Windows kernel software. Privacy was completely new.

It turns out that privacy is very much like color reproduction. The goal is to understand human desires and perceptions around information data flows, controls, and ownership to effectively model these desires and perceptions across a complex system of components from many stakeholders who don't always get along with each other, including regulators, legislators, and consumer advocates.

I was again extremely fortunate to enjoy a second successful career, including testifying before the US Senate Judiciary Committee, visiting numerous national and international regulators including the

continued on next page

From Color Science to Privacy continued

US Senate Judiciary Committee, visiting numerous national and international regulators including the US Food and Drug Administration, US Federal Trade Commission, and CNIL (French Data Protection Authority).

When Microsoft divested HSG into an independent subsidiary jointly owned by General Electric (and now wholly owned by General Electric), I again chose to put my family's financial stability first and stay at Microsoft. I now help manage privacy for many of Microsoft Office client applications including Word, Excel, PowerPoint and OneNote among others. I believe I have one of the best jobs in the company, helping design architectures and processes to empower our users to best achieve their desires.

The major regret I have had in my career was not being able to explain why I "went dark" from all of my color friends. I hope this article sheds some light on those difficult days and deeply appreciate the opportunity that ISCC has provided me. I know I owe two successful careers to my friends and colleagues in color science who taught me so much about color, and even more about life.

Thank you,
Michael Stokes, mistokes-color@outlook.com

COLOR research and application

IN THIS ISSUE, October 2016

We begin and end this issue on the same topic. First, Rolf Kuehni discusses "How Many Object Colors Can We Distinguish?" While this article was posted on line in the journal's Early View section, it generated additional discussion. Therefore we come back to the discussion at the end of this issue. M. Flinkman and H. Laamanen submitted a Communication entitled "How Many Object Colors Can We Distinguish? A Comment on Kuehni," and Michael Brill submitted a comment entitled "Maximum number of discriminable colors in a region of uniform color space." Rolf Kuehni responded to each of these communications.

It has been said by Henry Ford, "Any customer can have a car painted any colour that he wants so long as it is black." He may have been joking, but there are real considerations when making choices of what colors to include in a product line. The choices should include more than just what is the most popular color this year. Patrick Choi, Seth Osborn, and Peter Boatwright present a "Bayesian Analysis of Color Preferences: An Application for Product and Product Line Design." Typically the color line is selected from surveys of customer's preferred colors for the product. However, in their research they show that the best color selection does not follow an additive sequence and that a company can improve on the product line color selections using insights derived from the market research by exploiting the continuous nature of color.

Light emitting diode (LED) sources are current topic of interest in the move to solid state lighting. However, the manufacturing process for LEDs is such that there can be visible color variation in LEDs made even in the same batch. Therefore, it is of interest to sort or bin the individual LEDs into groups within which the LED color appears the same. With this issue in mind Guido Kramer and Christoph Schierz studied "Colour Discrimination Subject to Illuminant and Colour Transition." In this next article they present a new concept for the calculation of tolerance limits for LED binning, which not only involves the chomaticity variation to adjust the bin size, but also the chromatic adaptation to the light.

In 2010, Ralph W. Pridmore published a chromatic adaptation model that was based on calculating constant (or corresponding) hues from invariant wavelength ratios [Color Res Appl 2010; 36: 425-442]. Now in "Color Constancy from Invariant Wavelength Ratios: An Algorithm to Simplify the Chromatic Adaptation Model," he has introduced an algorithm that simplifies the calculations for the model published earlier.

In the past 10 years there has been an increasing interest in nanoparticles. They are used as filler in plastics, as pigments in coatings, and many unique applications in textiles. Thus our next article, "The Relationship Between Refractive Index and Optical Properties of Absorbing Nanoparticles," is very timely. N.Piri, Ali Shams Nateri, and Javad Mokhtari studied nanoparticles to find a relationship between fundamental characteristics of absorbing nanoparticles, namely particle size and complex index of refraction, and the particle's light scattering properties, in order to predict their spectral behavior and color coordinates in CIELAB color space. They found that the reflectance and lightness (L^*) of nanoparticles increases as a result of increase in their size and the real part of complex refractive index, and their color changes with changes in their size and complex refractive index.

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CR&A In This Issue October 2016 continued

For industrial applications this month we have three different application areas: plastics, printing, and textiles. Our first article is in the field of polymers, specifically the coloring of polypropylene. Because of its desirable characteristics (high tensile strength, high abrasion resistance, high chemical strength, low density and low cost), polypropylene is widely used in home furnishings, packaging films, and fibers. However, it is difficult to color with the most common techniques. Therefore, Sonja Haastrup, Donghong Yu, Thomas Broch, and Kim Lambertsen Larsen studied coloration techniques and propose the use of liquid color concentrates in the "Comparison of the Performance of Masterbatch and Liquid Colour Concentrates for Mass Colouration of Polypropylene."

Next we move to the printing industry where Ivana Jurič, Igor Karlović, Dragoljub Novaković, and Ivana Tomić report on a "Comparative Study of Different Methods for the Assessment of Print Mottle." Mottle is undesired unevenness in perceived print density that gives the print a blotched appearance. In their study they assessed three methods for print mottle evaluation: Histogram Mottle Macro, Gray level co-occurrence matrix (GLCM) and M-Score in order to compare them and to determine their relation to perceived non uniformity obtained by visual assessment. They found that GLCM method has the strongest correlation with the visual experience of print mottle, and therefore they recommend that it should be used for print mottle assessment.

There are many times in the formulation or the quality control of colored product that it is necessary to measure a really small color specimen, such as a single strand of yarn. Traditionally in textiles this has been accomplished by winding the yarn around a card many times to produce an area large enough to measure. However, sometimes this is not possible. Our next article deals with the "Color Specification of a Single Strand of Yarn from a Multispectral Image." In this article, Lin Luo, Hui-Liang Shen, Si-Jie Shao, and John H. Xin examine four methods to specify the color of single strands of yard captured from images, in which pixel values vary. They then compare the colors of single strands of yarns specified by the proposed methods with the more traditional method of spectrophotometric measurement of the color of yarn windings. They recommend the method that they identify as "maxima of all pixels" as being the best.

In artwork color plays an important role in creating particular visual effects as well as conveying emotional feelings. Whether it is used for sorting and cataloging of artwork, or for application to design of products such as textiles, it is useful to be able to identify the color theme of an artwork. Shiguang Liu and Luorong Luo use the concept of an emotional color theme and a color emotion theory to develop a novel emotion color theme extraction framework. In our next article they then propose a "Hierarchical Emotional Color Theme Extraction."

Following the line of emotional associations of colors, Buket Arik, Tetsuya Sato, Gulsah Sarikaya, and Yuksel Ikiz apply this concept and seasonal influences to fashion design. In "Seasonal and Emotional Associations of the Colours and Their Effects on Directing Turkish Fashion," they report on how the color preferences differed as a function of the observer's age and gender. They then compared their results to earlier studies of Spanish and Japanese groups.

Coming full circle in this issue our final article deals with how differently each person sees color. It has long been known that human color vision differs from person to person. Many studies focused on sorting out or detecting what was termed color vision deficiencies. However, even in the group of people with "normal" color vision there is variation. In a different type of project Yuta Asano, Mark D. Fairchild, Laurent Blondé, and Patrick Morvan set out to design a color-matching experiment where observer variability appeared as large as possible in order to detect the inter-observer differences in the color-normal population. Using different color-matching simulations, they found that choice of spectra for the matching primaries had a significant effect on observer variability, and observer variability was large for near-neutral reference colors and relatively small in the lightness direction as compared to chromatic variability. Therefore, they based their "Color Matching Experiment for Highlighting Inter-Observer Variability," on these facts. Do not miss this important article that provides new color-matching data, which are useful for derivation, validation, and analysis of color-matching functions.

Ellen Carter
Editor, Color Research and Application

Some Luck in Identifying the Unknown People in this Image

Rolf Kuehni sent the following image from the 1979 ISCC Williamsburg Conference on Color Discrimination Psychophysics to share with the mem-

continued on next page

Some Luck Identifying Unknown People continued

berships. Thank you to Danny Rich for helping us identify some of the unknown people.

Here are our color science friends listed from left to right: Alan Robertson, Richard Ingalls, Marjorie Ingalls, Rolf Kuehni, 1 Too hard to see the face, 2 German professor (name unknown), Chuck Reilly, 3 the German professor's graduate student (name unknown), David MacAdam, Ralph Stanziola, Klaus Richter, Tarow Indow, 4 is L.F.C. Friele, Danny Rich, 5 Jih-Jie Chang, a multi-dimensional scaling expert from Bell Labs, Danny thinks.

If you know the name of the German professor or his graduate student, please contact me, the Editor of this newsletter at geinhaus@frontiernet.net. An update will appear in *ISCC News*, if the remaining two names are found.

Paula J. Alessi, *ISCC News Editor*

LED and Fiber Optic Technology Colors Formal Wear at the Met Gala

This year at the Metropolitan Museum of Art "Manus x Machina: Fashion in an Age of Technology" event female futuristic formal wear using LED and fiber optic technology was featured. Zach Posen designed this Cinderella-type dress for Claire Danes.

The dress contains fiber optics woven into the silk organza fabric with 30 battery packs sewn into it making it glow in the dark. Posen calls the dress an Illuminating Romantic Yet Futuristic Floating Object (IRYFFO). Claire could not sit on the dress or it would malfunction. The reference for this picture is http://www.eonline.com/eol_images/Entire_Site/201642/rs_1024x759-160502191958-1024-claire-danes-glow-in-the-dark-dress-zac-posen-MET-GALA-Arrivals-2016.

Karolina Kurkova wore a creation that was a collaborative effort between the designer, Marchesa and IBM Watson. The dress incorporated embedded LED technology that would make the dress change colors according to the emotional tone of tweets received from Twitter. Karolina could not sit when wearing the dress either. Some women will do anything to make a fashion statement.

http://www.usmagazine.com/celebrity-style/news/met-gala-2016-karolina-kurkovas-smart-dress-explained-w204842.

Freida Pinto wore a dress designed by Tory Burch by embellishing the front of it with Swarovski crystals. As she moved and different lights hit the crystals, they cycled through various colors, making it a spectacular vision for the eyes. http://quintype-01.imgix.net/thequint%2F2016-05%2F09bdee7e-a61d-4d85-b567-1cf660157974%2F2016%20Metropolitan%20Mus_Webf%20(10).jpg?auto=format&q=60&w=976&fm=pjpg

Calendar

2016

Aug 19-22 **Archiving 2016,** National Archives, Washington, D.C., Info: www.imaging.org/archiving

Aug 25-26 **AATCC LED Summit: A Light Changing Experience,** Sheraton Imperial Hotel, Durham, NC, Info: http://www.aatcc.org/lighting-conf/

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

Sep 19-21 **Seeing Colors: An International Symposium on Color Vision,** University of Regensburg, AudiMax & Vielberth Hall, Regensburg, Germany, Info: seeingcolors@ur.de

Sep 21-23 **Colour in Mind – From Perception to Art,** German Colour Association, Info: http://farbe-imkpof.de

Oct 8-10 **3rd VISART workshop on Computer Vision and Art Analysis @ECCV 2016,** Amsterdam, The Netherlands, Info: http://printart.isr.ist.utl.pt/visart/

Oct 18-22 **AIC Interim Meeting Color in Urban Life: Images, Objects, and Spaces,** Santiago, Chile, Info: www.aic2016.org

Oct31 Nov 1 **CIE/USA Annual Meeting,** Omni San Antonio Hotel At The Colonnade, Reservations: IES rates will apply, $120/night, Reservation Group Code: IES Group Meeting, Reservation Cut-off Date: Sept 19, San Antonio, TX, Info: http://www.cie-usnc.org

Nov 7 -11 **24th Color and Imaging Conference (Special Topic: Mobile Color),** San Diego, CA Info: www.imaging.org/color

Nov 11 **ISCC Workshop (Life of a Color) and Annual Business and Awards Meeting,** co-located with CIC 24, San Diego, CA, Info: http:// www.imaging.org/color

Nov 17 **24th Annual Workshop on Object Perception, Attention, and Memory,** Boston, MA, Info: http://www.opam.net/

Nov 23-24 **3rd International Scientific Conference Colour-Culture-Science,** Krakow, Poland, Info: info@colourday.pl

2017

Jan 29-Feb 2 Electronic Imaging 2017, Burlingame, CA, Info: www.electronicimaging.org

Feb 1-2 **ASTM E-12,** Norfolk Waterside Marriott, Norfolk, VA.

Jun 6-7 **ASTM E-12,** ASTM International Headquarters, West Conshohoken, PA

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

Oct 23-25 **CIE 2017 Midterm Meeting,** Jeju Island, Korea, Info: www.cie.co.at

Oct 26-28 **CIE Division 1 and 2 Meetings,** Jeju Island, Korea, Info: www.cie.co.at

2018

Oct 1-5 **AIC Interim Meeting, Colour and Human Comfort,** Portuguese Colour Association, Lisbon, Por-

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.aviantechnologies.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 #475, Summer 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)