



Inter-Society Color Council News

Issue 481

Winter 2018

Board of Directors Corner

Greetings, fellow ISCC members. My name is Steve Linberg, and I was honored to join the ISCC



Board of Directors for a three-year term starting in January 2017. I am a painter and software engineer, and the Munsell Color System is one of my core areas of interest. I use it in my own work, and teach it to

artists with my colleague and mentor, Graydon Parrish via The Classical Lab, and at the Wethersfield Academy for the Arts, where I teach classical drawing and other fine art subjects.

I approached the subject of color with great trepidation during my period of MFA study at one of the major art schools in the US in the mid-2000s. My prior efforts to self-teach color mixing and application had not been very successful, and I was hoping that study at the MFA level would bring clarity to a central aspect of painting that was obviously essential, but that I was not yet able to master.

While on this path of study, I learned of the contemporary fine artist, Graydon Parrish, after seeing his work in a book on classical drawing. I learned that he used the Munsell Color System to complete his work “The Cycle of Terror and Tragedy,” an epic allegorical painting featuring 11 life-sized figures on a canvas nearly 18 feet long. He realized early in the production of this painting, which took four years to complete, that he would need a system of precise color control to ensure corner-to-corner consistency. He had some exposure to Munsell through his instructor, Michael Aviano, in the lineage of Frank J. Reilly of the Art Students League in New York City and did a great deal of his own research in the use of the Munsell system in classical painting. I subsequently had the enormous good fortune to study privately with Graydon and learn directly from him. I continued my own study of Munsell and color science via the academic and scientific works of luminaries such as Rolf Kuehni, Mark Fairchild, Roy Berns, and others who are, of course, very well-known to ISCC members, color scientists, and color science enthusiasts such as myself.

Through my own study, I worked on expanding the precision of the X-Rite ColorMunki spectrophotometer, which I used to test the accuracy of my own paint mixes and to analyze the local colors of various objects for paintings (and of course flesh). Under The Classical Lab, which Graydon and I formed to promote our teaching of Munsell to fine artists, I developed the iOS application “Munsell DG” in

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ISCC EXECUTIVE OFFICERS

Terms end 2018

President	Mr. Jerald Dimas Color Communications, Inc. 4000 W. Filmore Street Chicago, IL 60624 USA 773-475-2575 jerdim@ccicolor.com
Secretary	Ms. Ann Laidlaw ACL Color Consulting LLC 136 E. Hill St Decatur, GA 30030 336-420-1998 acl99colors@yahoo.com
Treasurer	Dr. C. Cameron Miller Nat'l Inst. of Standards and Technology 100 Bureau Drive, Stop 8442 Gaithersburg, MD 20899 301-845-4767 fax: 301-975-4713 c.miller@nist.gov
President Elect	Dr. Renzo Shamey North Carolina State University College of Textiles rshamey@ncsu.edu
Past President	Mr. John Conant Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976 USA 978-663-9500 fax: 978-663-4918 jconant@aerodyne.com

ISCC BOARD OF DIRECTORS

Terms end 2018

Ms. Jodi Baker	Konica Minolta Sensing Americas, Inc. 101 Williams Drive Ramsey, NJ 07446 201-749-2659 Jodi.Baker@konicaminolta.com
Mr. Nurhan Becidyan	Retired CEO & President United Mineral & Chemical Corporation 557 Forest Avenue Paramus, NJ 07652 201-262-8262 nurhanbecidyan@gmail.com
Dr. Paul Centore	www.munsellcolourscienceforpainters.com/ Groton, CT paul@isletech.net

Terms end 2019

Mr. Simon Thayil	e.dye Simonthayil09@gmail.com
Mr. Steve Linberg	171 State Street Amherst, MA 01002 steve@slinberg.com
Ms. Maggie Maggio	maggiemaggio@gmail.com
Dr. Anthony Stanton	Carnegie Mellon University stanton@andrew.cmu.edu

Terms end 2020

Dr. Jean Hoskin	sjhoskin1@gmail.com
Ms. Rachel Schwen	The Sherwin-Williams Company 612-375-7801 rschwen@valspar.com
Mr. John Seymour	John the Math Guy, LLC John@JohnTheMathGuy.com

Board of Director's Corner continued

2012, in conjunction with X-Rite, as a digital version of the Munsell Book of Color. We continue to consult with X-Rite on various projects and products aimed at increasing the accessibility of Munsell to the fine art world.

ISCC board member Paul Centore invited me to apply to the ISCC Board in 2016. I had reached out to Dr. Centore in recent years after encountering some of his own work in the Munsell system, notably around issues relating to translating Munsell to and from RGB, CIELAB and other digital color spaces. We discovered many shared interests in the use of Munsell in the fine arts.

As a native of Boston still living in the area, I have been working with fellow board member Maggie Maggio to help plan the upcoming Munsell Centennial Color Symposium. Graydon Parrish and I will be presenting an introductory discussion and color mixing demonstration at the symposium, as well as a follow-up weekend workshop for painters at the nearby Academy of Realist Art. I look forward to continuing to help bring about this exciting event, and to hopefully meeting many ISCC members in person over the course of the week.

Steve Linberg, *ISCC Board of Directors*

Election Results

The ISCC Board of Directors is proud to announce the election results from the balloting procedure that took place in December 2017.

Our Treasurer continues to be Cameron Miller.



His term will end at the end of 2018 like the other officers.

Our three new Board of Director members are S Jean Hoskin, Rachel Schwen, and John Seymour. Their term of service began in January 2018 and will end in December 2020



Left to right: Jean Hoskin, Rachel Schwen, John Seymour

If you look in the left-hand column of this page, you will find contact information for all our officers and directors.

Congratulations to our new officer and directors!

Reminder: 2018 ISCC Award Nominations Due Feb. 15

As noted in *ISCC News #480*, nominations for the 2018 Macbeth Award and the Nickerson Service Award are due by **February 15, 2018!**

Nominations should be submitted using the form found at:

www.iscc-archive.org/UniversalNominationForm.pdf

For the **Macbeth Award**, this form can be filled out, scanned and emailed to joanne.zwinkels@nrc-cnrc.gc.ca or printed, completed and sent to:

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

For the **Nickerson Service Award**, this universal nomination form can be filled out, scanned and emailed to ACL99colors@yahoo.com or printed, completed and sent to:

Ann Laidlaw, ISCC Nickerson Service Award Chair
136 E. Hill St
Decatur GA 30030
t +1 336-420-1998

Note: Nominations received after February 15, 2018 will be retained for future consideration.

Welcome Six New Sustaining Members

ISCC is delighted to welcome six new sustaining members! A sustaining member is any person, society, association or organization interested in color and wanting to participate in the activities of the Council in order to support its aims and purposes.



X-Rite recently became a sustaining member. X-Rite is a company that “blends the art and science of color while focusing on providing complete end-to-end color management solutions to their clients.” X-Rite is the parent company for Pantone® and Munsell Color. For more information on X-Rite, please visit www.xrite.com.



ISCC is pleased to welcome Golden Artist Colors, Inc. as a new sustaining member. Golden is an American paint manufacturing company that specializes in artists’ oil paints, watercolors, and “deco-

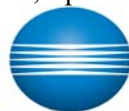
orative and architectural paints and mediums.” For more information on Golden Artist Colors, please visit www.goldenpaints.com.



We are happy that GTI Graphic Technology, Inc. recently joined ISCC as a new sustaining member. GTI uses a customer-first approach which has helped them become one of the “leading suppliers of tight tolerance lighting systems and services for critical color viewing, color communication and color matching assessment.” For more information on GTI, please visit www.gtilite.com.



Another new ISCC sustaining member is Kolormondo. “Kolormondo is a Swedish patented design innovation that presents color in a 3D globe.” Interior and graphic designers, product developers and home decorators use its color tool. For more information on Kolormondo, please visit www.kolormondo.com.



KONICA MINOLTA

SENSING AMERICAS, INC.

ISCC is pleased to announce that Konica Minolta Sensing Americas, Inc. became a new sustaining member. Konica Minolta “provides advanced optical technology that precisely measures the elements of color and light.” For more information, please visit <https://sensing.konicaminolta.us/>.



The last new sustaining member to join ISCC is The Color Wheel Company™. This company “manufactures and sells a selection of color wheels, color mixing guides and color tools for artists, crafters and homeowners to promote understanding of color theory, color relationships and color mixing.” For more information on The Color Wheel Company™, please visit <http://colorwheelco.com/>.

ISCC is proud to announce that all of these six sustaining members are sponsors of our upcoming 2018 Munsell Centennial Symposium as can be seen from the <https://munsell2018.org/> website.

For a complete listing of all ISCC sustaining members, please see page 23 of this newsletter.

Summary of January 2018 Webinar

On September 17, Professor Roy Berns from the Munsell Color Science Laboratory at the Rochester Institute of Technology delivered our first 2018 webinar. It was entitled "Color Science and the Visual Arts". The presentation lasted about 75 minutes, including a short presentation by Maggie Maggio to promote the Munsell 2018 Symposium. This webinar was the best attended yet, with 103 people registering, and 71 attending. The attendees were also very international, with folks from nearby Mexico and Canada, as well as Hungary, Russia, Italy, Greece, Iran, and others.

Roy's talk described many traditional and complex topics in color science, but presented the material and examples in a way that was very approachable for artists and other non-scientists to follow. Roy achieved his goal of showing how color science can be used in the understanding, reproduction, and conservation of artwork. His communication tools featuring images of paintings, drawings and some original artwork as well as processed images were very effective. From the number and diversity of the questions, it is clear that the attendees were engaged from the start to the finish of this talk.

Roy gave a fascinating webinar with the appreciative audience learning from his expertise. Thank you so much Roy!

The complete recording of Roy's webinar is available on the ISCC web page. Under the "Members" menu, select "Members Only Content." Not a member yet? Please join now: www.iscc.org/join-us/

February 2018 Webinar

Our second webinar of 2018 will be held on February 21st from 2 to 3 PM EST. This special webinar will be given by our new Board member, John Seymour.

John is an applied mathematician and color scientist, working as a consultant since 2012 under the name "John the Math Guy". John currently holds twenty-five US patents, has authored over forty technical papers, and has a creative "learn by doing" side that augments his academic study of color. He is an expert on the Committee for Graphic Arts Technologies Standards and ISO TC 130, and currently serves as Vice President of Papers for Technical Association of the Graphic Arts. He writes a blog



which is described as "applied math and color science with a liberal sprinkling of goofy humor."

John believes in *edutainment*, which is the idea that effective teaching happens when technical information is embedded in a solid base of humor. For eight semesters, John taught a very popular Introductory Algebra class at University of Wisconsin, Milwaukee, helping hundreds of students overcome their math anxiety. His unique teaching style has made him a popular speaker at technical conferences.

The title of John's webinar is *Albert Munsell, the Father of Color Science?* Albert Munsell (1858 - 1918) has been called the Father of Color Science. Does he deserve this accolade? John Seymour investigates this question using his unique brand of "edutainment". Prepare to laugh and to learn as John recounts the accomplishments of Albert Munsell.

Please join us on February 21st at 2 PM to enjoy this webinar. Details on how to register for this webinar will be sent out soon!

March Webinar on AIC International Colour Day



INTERNATIONAL COLOUR DAY

21 MARCH

ESTABLISHED BY AIC - INTERNATIONAL COLOUR ASSOCIATION

The ISCC has chosen to celebrate the AIC International Colour Day by hosting a webinar on March 21, 2018. On this day, AIC would like all member countries around the world to create memorable color activities and share them. March 21st was chosen as the day for this celebration because it is an equinox, where night (hours of darkness) and day (hours of light) are approximately equally long in all human cultures around the world.

The 2018 ISCC International Colour Day will be
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March Webinar International Colour Day continued

a webinar given by David Briggs on March 21st from 4 to 5 PM EDT. Dr David Briggs is a painter and

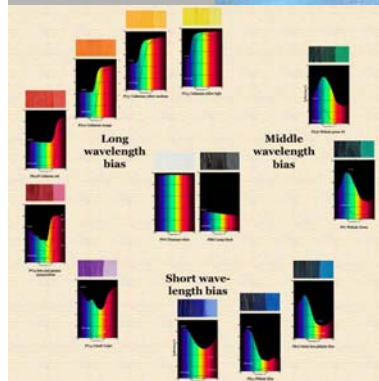
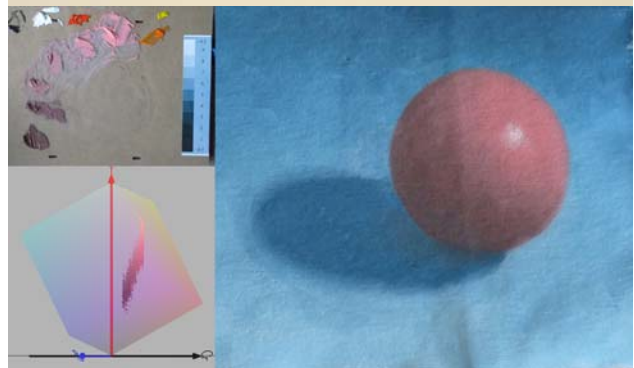
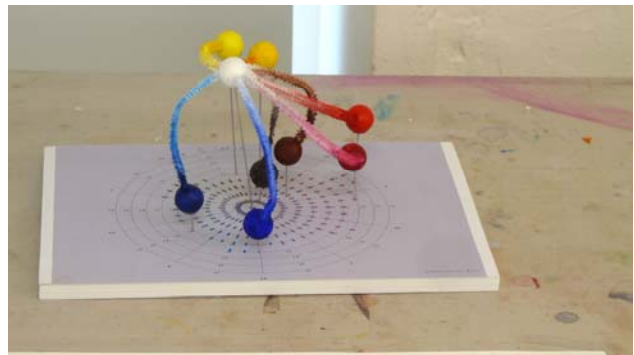
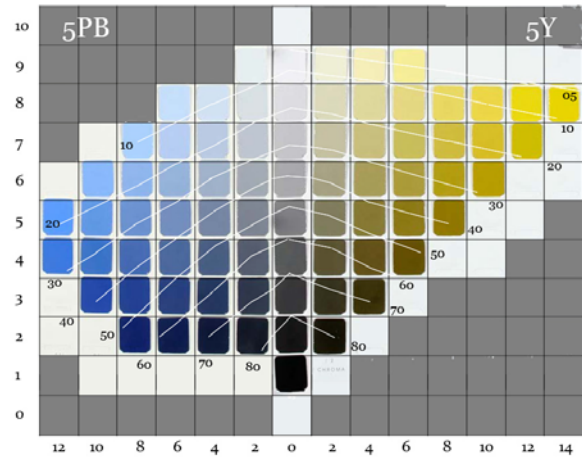


teacher at the Julian Ashton Art School and the National Art School in Sydney, Australia. He has been teaching classes on colour for painters for nearly twenty years, including a long-running intensive five-day workshop, *Colour, Light*

and *Vision*, and an undergraduate lecture course on the history of artistic colour theory and practice, *Theories of Colour*. David is the Chairperson of the New South Wales Division of the Colour Society of Australia and has contributed to publications including a chapter on colour spaces in the forthcoming *Routledge Handbook of Philosophy of Colour*. Some of his efforts to present current scientific understanding of colour in ways that are accessible and useful to painters can be seen on his website *The Dimensions of Colour*: <http://www.huevaluechroma.com/>.

The title of David's webinar is *The New Anatomy of Colour*. Building on Albert Munsell's crystallization of the framework of *hue*, *value* (or *lightness*) and *chroma*, the science of colour appearance has developed a lucid systematics of perceived colour that includes in addition the attributes of *brightness*, *colourfulness*, *saturation* and *brilliance* (along with its inverse, *blackness*). Unfortunately, these later developments remain poorly understood by non-specialists, and are hardly known among painters, who could benefit greatly from applying them as a framework for solving colour problems. This webinar will use slides and animations from David's teaching materials to show how these seven attributes can be explained in ways that are intelligible to students, and how each attribute can be presented as a *way of perceiving* a particular property of lights or objects, instead of resorting to explanations invoking coloured wavelengths and receptors that "detect colours", which only serve to undermine understanding of the fundamental nature of colour.

Here are a few examples of slides that participants will see during the webinar:



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March Webinar International Colour Day continued

So please celebrate AIC International Colour Day with ISCC on March 21, 2018 from 4-5 PM EDT as we enjoy a webinar given by David Briggs! Details on how to participate in this webinar will be sent out in early March.

April 2018 Webinar

Our third webinar of 2018 will be given by Paul Centore on April 25 from 3-4 PM EDT. Paul currently serves on the ISCC Board of Directors. He



works with colour from both an artistic and a scientific viewpoint. Having earned a doctorate in mathematics, Paul naturally applies scientific tools to his Munsell endeavors. In particular,

he has written an extensive amount of open-source Matlab/Octave code that incorporates the 1943 Munsell renotation standard. One use of the code is to analyze measurements of artist's materials, such as pastels, to identify their colour properties, and provide guidelines for artists and manufacturers. Another use is to calculate the results of paint mixtures, to determine what paints to mix to produce a desired colour. Dr. Centore teaches math at Eastern Connecticut State University and continues his colour science and Munsell endeavors from his home in southeastern Connecticut.

The title of Paul's webinar is "*A Practical Introduction to the Munsell System for Artists*". The following is an abstract for Paul's webinar:

"The painter Albert Munsell developed his colour system as a teaching aid for artists. This webinar introduces the system from scratch, without assuming any prior knowledge. The Munsell properties of hue, value, and chroma are described with concrete examples, and their use in creating artwork is illustrated. The main benefits of the system for a painter are increased clarity and awareness of alternatives when making colour decisions, leading to greater colour control and effectiveness."

So please mark your calendars for April 25th from 3-4 PM EDT to enjoy this webinar on the Munsell System. Details on how you can participate

in this webinar will be sent out in early April.

Stay Tuned for May Webinar

ISCC will also be holding a webinar in the month of May. Details about date, time, speaker and topic will be forthcoming in the next newsletter. This May webinar will complete our 2018 series of webinars that we are giving to highlight Albert Munsell and his accomplishments in anticipation and preparation for the 2018 Munsell Centennial Color Symposium in June.

Behind the Scenes: "Webmaster"

This occasional feature will describe the activities that are handled by some of the Council volunteers. The goal is threefold: first, we hope to inform the membership of all the "Behind the Scenes" work that takes place. Second, we want to keep potential volunteers informed as to what would be required of them should they choose to volunteer for a given function. And third, we are creating an informal record of these activities for future generations of ISCC leadership. If you would like more information on any volunteer positions, please let us know and we will put together a description for a future newsletter.

The ISCC has maintained an internet presence since the early years of the World Wide Web. Until



1998, that presence was handled by Rich Riffel. In that year, the responsibility was transferred to RIT, and I, Dave Wyble, took over the activity. In the early years, the work was quite straightforward for anyone with text editing

skills and a little knowledge of html. One important aspect that was never part of the Webmaster's responsibility has been creative design. I always made it clear that I am a computer guy, not a graphic designer! That philosophy is maintained in even the latest reincarnation. But there have always been creative folks around to lend their experienced eye.

The ISCC web pages are currently easier than ever to maintain. We use a tool called Wild Apricot, which allows one to edit the pages as easy as opening a document, typing, and saving your work. We still need a few folks knowledgeable enough to go

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Behind the Scenes: "Webmaster"

"under the hood" but most of the effort of maintaining the information is just that simple. Much of the time the static information online is sufficient. Crunch time comes as we approach Annual Meetings or other important events. There will be uploading PDFs of papers and presentation, conference schedules, and other related edits. There are annual maintenance things too, such as updating the Board of Directors membership page, and making sure the latest awards recipients are given full credit. Other than that, mostly it requires a little patience to listen to the Board's suggestions and do our best to implement them. And there are always suggestions!

Dave Wyble, *Avian Rochester, LLC*



The Portuguese Colour Association is hosting the 2018 AIC Interim Meeting in Lisbon, Portugal from September 25-29. The venue is The Calouste Gulbenkian Foundation, which is a green park located in the center of the city with direct connections to the airport and all other forms of transportation within the city. There are several hotels in the area, where you can find reasonably priced accommodations. For more information, please visit <http://www.aic2018.org/useful-information.html>.

The theme of the meeting is Colour and Human Comfort. The short abstract submission deadline was January 31, 2018. Authors submitting abstracts will be notified of whether their paper will be an oral or poster presentation by **March 31, 2018**. Some of the invited speakers will be:

- Byron Mikellides, Oxford Brookes Emeritus Professor, School of Architecture
- José Luis Caivano, Architecture Faculty at University of Buenos Aires
- Luísa Capucho Arruda, Fine Arts Faculty at University of Lisbon
- João Brehm, Painter and Cinematographer
- Tomás Taveira, Architect

Early bird registration will be available soon and will remain open until July 31, 2018. The early bird registration price for a full participant is €400 and a student is €275. These fees include the Proceedings book, welcome reception, all lunches and breaks. The accompanying person fee is €90. There is an optional Gala Dinner Party for €50 on Thursday night, September 27, 2018. There is an optional half day excursion in Lisbon or full day excursion in Sin-

tra on Saturday, September 29. The excursion fee is €100.

We encourage all ISCC members to mark their calendars for September 25-29, 2018 and attend this exciting AIC Interim Meeting in Lisbon, the City of Light! For more information, please visit www.aic2018.org.



Call for Papers for 2018 SPE ANTEC Conference

The Society of Plastics Engineers Color Appearance Division (SPE/CAD) is holding the ANTEC 2018 Plastics Technology Conference in Orlando, Florida from May 7 – 10 at the Orange County Convention Center.

This is still a Call for Papers for the conference. ISCC members are encouraged to submit by contacting Doreen.Becker@ampacet.com or AnnSmeltzer@clariant.com



ISCC to be a Cooperating Society for CIC 26

As in years past, ISCC will be a Cooperating Society for this year's Color Imaging Conference (CIC 26). The conference will take place from November 12-16 in Vancouver, BC, Canada. The venue is the Pinnacle Harbourfront Hotel.

You are invited to submit technical papers in such topics as Color Perception, Capture and Display, Material and/or Color Appearance, Color in Illumination and Lighting, Color Theory, Image Quality, Multispectral Imaging, or Specific Color Applications. The submissions deadline is **April 15, 2018**.

There is also a Call for Workshops that will take place on Tuesday, November 13. Each workshop will be two hours long. Suggested topics for timely workshops would be related to AR/VR/MR (Augmented, Virtual, and Mixed Reality), Temporal Color Perception, Material Appearance, 360° Capture, Gaming, Cinema, Cultural Heritage Applications, Medical Applications, or Machine Learning. The Workshop submission deadline is also **April 15, 2018**.

For more information, please visit https://www.imaging.org/site/IST/Conferences/Color_and_Imaging/IST/Conferences/CIC/CIC_Home.aspx.

Joint ISCC - AIC Special Event



The Munsell Centennial Color Symposium



Celebrating the Past | Envisioning the Future

June 11-15, 2018

**Massachusetts College of Art and Design
(MassArt) | Boston, MA USA**

We would like to bring you up to date on The Munsell Centennial Color Symposium. **Registration has opened!** If you have not done so, please visit <https://munsell2018.org/registration/> and register now! The early bird registration fees are available until **March 1st**. So don't delay!

Full Week Registration Details

You can register for a full week All-Inclusive package or an A La Carte package. The full week All-Inclusive package gives you reserved seating at the evening Awards Banquet and the ISCC Annual Business Meeting and Luncheon plus your choice of Tuesday and Friday breakout sessions, which include 90-Minute Tutorials, three-Hour Workshops and half-day Field Trips. The A La Carte registration package includes the same Monday, Wednesday, Thursday General Sessions, Poster Sessions, and AIC Study Group Meetings as the All-Inclusive package, but the registrant must pay for their own Tuesday and Friday breakout sessions (\$30 for each 90-Minute Tutorial and 3-Hour Workshop and \$60 for each half-day field trip) as well as their own Awards Banquet (\$60 per person) and ISCC Annual Business Awards Meeting and Luncheon (\$20 per person). The early bird registration fee for ISCC members interested in the All-Inclusive package is \$550. The early bird registration fee for ISCC members interested in the A La Carte package is \$400. If you are not an ISCC member, the registration fees go up by \$100. (So, consider becoming an ISCC member by going to www.iscc.org/join-us/.)

If you register after March 1, all fees go up by \$100 with the exception of students. Students automatically get the All-Inclusive package for a

registration fee of \$200 before March 1st and \$250 after March 1st.

For more registration details, please visit <https://munsell2018.org/registration/>.

One-Day Registrations Now Available

To ensure that everyone has a chance to participate in this historic event, the organizing committee has added the option for one-day registrations for Monday, Wednesday and Thursday. One-day registrations will give you a seat in the Tower Auditorium for the General Session talks and discussions, as well as the chance to network with color professionals from around the world. You will be able to see all the posters and talk with the poster presenters of the day and take advantage of the opportunity to visit both the Munsell 2018 Exhibit and the X-Rite/Pantone/Munsell Color Company showroom. If you are in the Boston area and can take a day off, consider popping in to join your fellow color enthusiasts and explore the latest developments in the world of color.

One Day Registrations \$250 ISCC Members

\$300 Non-Members

Note that one-day registrations will not be available for the breakout session days on Tuesday and Friday. If you are interested in attending the tutorials, workshops, field trips and AIC Study Group meetings that are scheduled on Tuesday and Friday, we recommend registering for the All-Inclusive Package.

Munsell 2018 Program Committee Update

The Munsell 2018 Program Committee received over 60 contributed poster paper submissions in the areas of color for art, science, industry and education. The peer review process for these papers is complete. Authors were notified of their acceptance at the end of January. There were quite a few student author submissions. There will be a student poster competition with Munsell-inspired prizes.

Many of the authors will be submitting their papers to a Special Issue of Color Research and Application with a **June 30, 2018 deadline** for submission. Publication in the special issue will be dependent on successful peer review through the normal journal procedures.

Evening Events at Munsell 2018

In addition to the General Sessions and Poster Sessions on Monday, Wednesday, and Thursday

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Evening Events at Munsell 2018 continued

and the Breakout Sessions on Tuesday and Friday, there are two special evening events scheduled during Munsell week this June: The Welcome Reception and The Munsell Centennial Awards Banquet.

Sunday June 10 – The Welcome Reception

Munsell 2018 will open with a reception on Sunday evening in the Atrium of the Massachusetts College of Art and Design. The Welcome Reception will include the opportunity to check in for the Symposium before Monday morning and will coincide with the opening of the Munsell 2018 Exhibit in Doran Gallery adjacent to the Atrium.

The Munsell Exhibit**Color Connections: Tracing the Influence of Albert H. Munsell**

This special exhibit will explore the diverse influence of the Munsell Color System in art, science and industry from the time Munsell was a student at the Massachusetts Normal Art School in the 1800's to the present day. The exhibit will feature artifacts from the collections of MassArt, as well as the Munsell Color Science Lab at Rochester Institute of Technology. The reception will be sponsored by X-Rite/Pantone as well as the Munsell Color Company.

For more information, please visit:

<https://munsell2018.org/sunday-welcome>

Tuesday June 12 – The Munsell Centennial Awards Banquet

On Tuesday evening we will honor three pioneering members of ISCC with the Munsell Centennial Award for a lifetime dedicated to color in the areas of art, science, industry, education and the promotion of color literacy.

The ISCC Munsell Centennial Awards are a one-time only honor to recognize the color contributions of Rolf Kuehni (in the area of science), Joy Turner Luke (in the areas of art and education) and Cal McCamy (in the area of industry). The MC for this historic evening will be the Symposium Co-Chair, Paula Alessi.

The keynote talk, “*The Color Name Conundrum*” will be presented by our new Director, John Seymour (John the Math Guy). The banquet and presentations will take place in the historic Pozen Center at MassArt. For more information, please visit: <https://munsell2018.org/day-2-awards-banquet/>

We look forward to sharing this special one-time event with you in June!

Munsell Organizing Committee

The Munsell Centennial Color Symposium Call for Artwork

The Journal *Color Research and Application* will publish a special edition for the Munsell Centennial.



New Cover for CR&A

This edition will include the papers presented at the Munsell Centennial Color Symposium as well as selected entries from this Call for Artwork.

The artwork selected for the journal will be printed and displayed during the poster sessions at the Symposium.

The cover of the special Munsell Centennial edition will feature the artwork of the top student award winner(s). (The artwork will fill the black space that appears on the new cover.)

Important Dates for Artwork Call

- Submission Deadline – April 30, 2018
- Notification Deadline – May 4, 2018
- High Resolution Images Deadline – May 10, 2018
- Artwork displayed at Poster Sessions – June 11-15, 2018

Submission Guidelines

- The ISCC invites submissions of artwork focused on the theme of “**21st Century COLOR**”. Artwork submissions on topics that will enhance the themes of the invited presentations are especially encouraged.
- Artists, designers, teachers, students and color enthusiasts from all over the world are eligible to submit.
- Artwork may be produced in **any medium** but must be submitted digitally.
- Submittals should be **square format at a minimum of 1080 x 1080 pixels** and maximum file size of 3.5 MB. High-resolution images will be requested only if the artwork is selected for publication and display.
- Each submission can include **up to five pieces** by the same artist/artist team. Up to three pieces may be juried into the journal.
- Entries will be displayed on the Munsell 2018 Instagram page with permission of the artist. *continued on next page*

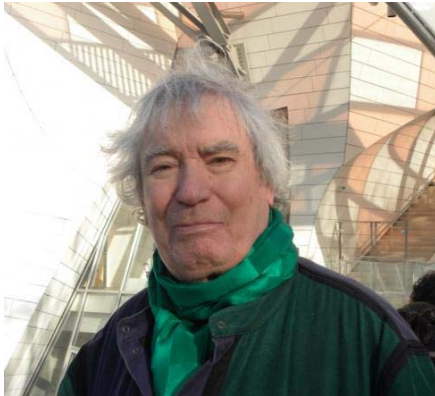
*Munsell Symposium Call for Artwork continued***Selection of Artwork**

- A jury will select a limited number of pieces to be published in the special Munsell Centennial edition of the journal of *Color Research and Application*.
- The artwork selected for the journal will be printed and displayed during the Poster Sessions at the Symposium. High-resolution images will be requested for this purpose once the selection process is complete.
- **Student artists and designers, please be sure to indicate your student status.**
- **The artwork of the top student award winner (or winners) will be published on the cover of the journal.**
- Email artwork@munsell2018.org if you have any questions.

In Memory of Michel Cler

It is with deep grief and profound sadness that I announce the passing of Michel Cler. I worked with him for so many years, sharing colour in all its multiple facets ranging from the utmost ethereal philosophical issues to ultimately concrete practical matters.

Architect and colour consultant, MICHEL CLER (1938–2017) received his diploma from the École Spéciale d'Architecture (DESA), Paris, France. He was founder and Director of Atelier Cler



in Paris, France. Since 1970, it has been known as the Atelier France and Michel Cler. Conceiving and creating chromatic ambiances for urban spaces,

the Atelier's work includes designing and realizing colour projects in Hong Kong, Guadeloupe, Vietnam, the French West Indies, and especially in France. Essential aspects of his chromatic studies include the analysis of spatial and site-specific features; evaluation of mineral and vegetal elements as well as determining different qualities of light; and, understanding the effects and relevance for colour of the local culture.

Michel Cler was an internationally renowned

colour expert. His capacity to analyze, evaluate, and synthesize current colour aspects and architectural trends in the process of passionately addressing theoretical and practical colour issues was accentuated by his innovative sensibility, natural sense of observation and creativity and his excellent talent for communication. He was a pivotal figure of the emerging profession of colour consulting in France. Works of Atelier France and Michel Cler are included in the Centre Pompidou's collection and have been exhibited in Paris (2011–2013) and Roubaix (2017).

Michel was a great man. He will be missed by colour enthusiasts around the world.

Verena M. Schindler, *Co-chair of AIC Study Group on Environmental Colour Design*

Oceanside – Sherwin Williams Official Color of 2018

You may ask what color is “Oceanside”? Sherwin Williams describes their 2018 color of the year as a “collision of rich blue with a jewel-toned green.”



<https://www.sherwin-williams.com/architects-specifiers-designers/inspiration/color-forecast/2018-color-forecast/2018-color-of-the-year-oceanside>

A complex, deep color that offers a sense of the familiar with a hint of the unknown, Oceanside, bridges together a harmonious balance of blues and greens that can be found in what's old and new.”



Oceanside SW-6496 is very multi-dimensional as it can be used effectively for indoor as well as outdoor spaces.

“Its green-meets-blue tone can boost creative thinking and clarity of thought” making it perfect for the home office setting. So, think about trying Oceanside on your front door or in your den.

A Tribute to Calvin S. McCamy

In the last newsletter (*ISCC News #480*) we reported on the passing of Calvin Samuel McCamy



at age 93 on November 12, 2017 in Frederick, MD. In this issue we would like to pay tribute to Cal with facts and memories from his ISCC friends.

Mike Brill shared the following:

“Cal was an optical scientist who contrib-

uted greatly to color technology and standardization, most notably in useful nomographs, test hardware and methodologies, and closed-form approximations. At the National Bureau of Standards, he became Chief of the Photographic Research Section and then the Image Optics and Photography Section (1958-1970), where he conducted research on precise measurement of transmission and reflection, image structure, satellite photography, photography at extreme reduction, optical information theory, optical filters, color perception, and preservation of microfilms. He designed hands-on experiments for the U.S. Science Exhibit at the Seattle World's Fair. In particular, he published a nomograph based on the theory of light-balancing filters for camera exposure of color films. [1]

As Director and Vice President for Research of the Macbeth Division of Kollmorgen (1970-1990) he conducted research on optical design, precise transmission measurements, color measurement, optical filter design, simulation of daylight, geometric attributes of appearance, densitometry in photography and color printing, color order systems, color standards, and related mathematics. He designed the Macbeth ColorChecker Color Rendition Chart™ [2] used internationally to evaluate color imaging systems of all kinds. He also invented an annular illuminator [3] that would ensure azimuthally uniform illumination (hence more reproducible measurements) in a 45/0 spectrophotometer.

He was a member of the National Research Council. At the request of Congress, in 1978 he analyzed photographs and x-rays from amateur photographer, Abraham Zapruder related to the assassination of President John F. Kennedy and testified before the House Select Committee on Assassinations. His method of analyzing images of firearms is used routinely by the FBI.

He was active in national and international standardization of photography, color printing, and color science, since 1957, chairing committees of the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), the International Commission on Illumination (CIE), and the International Organization for Standardization (ISO). He wrote the spectral specifications for optical character recognition for the banking industry and the Universal Product Code for the grocery and other retail industries.

Cal ended his career as a color consultant starting in 1990. His avocations included photography, astronomy, and playing a 240-stop digital organ he built.”

Ann Laidlaw wrote:

“I knew Cal for years (since ~ 1985) through the color science community and ISCC in particular. I always learned something new when I talked with him, and it was clear that he relished the technical scientific challenges of color, lighting, and vision. He exhibited tremendous patience with newbies like me in the color industry. Even trivial topics were interesting when he described them -- I especially remember his interesting examples of the visual complexities of ‘pits’ and ‘tips’ (light dots surrounded by dark areas, and vice versa).”

Roland Connelly communicated the following:

“One of the most interesting conversations I had with Cal was at an AATCC meeting in Greenville, SC. We were sitting at an outdoor table at a restaurant in downtown Greenville. Cal was relating the amazing story of his involvement and the cloak and dagger aspects of the creation of the US’s first spy satellites. His knowledge of optics was critical in the development of the camera systems. It was like reading a movie script and the way that Cal could relate the story kept us spellbound.”

Harold van Aken, a colleague, said:

“Cal was my sounding board for concepts and ideas about color and color measurement at the risk of being captured for hours of discussion and history. One time sticks in my memory when Cal asked me to go to NIST with him. We went to learn about the “inverse Square bar” when we were trying to get very accurate densitometer standards. We left Newburgh NY early in the morning planning to spend the afternoon and the next day to do some measurements on the “bar”. Cal was driving and started telling me the history of “everything” that went on for several

continued on next page

A Tribute to Calvin S. McCamy continued

hours. I looked out the window and saw a sign “Myrtle Beach 18 miles” and interrupted Cal’s story and told him we didn’t get on the turnpike 2 hours ago. With no maps or GPS we found our way west until we found the Turnpike and arrived a couple of hours late. When we arrived, Cal was “warmly” welcomed by all the young ladies to my surprise.”

Danny Rich reflected on his relationship with Cal:

“Cal McCamy was a friend, a mentor and a long-time member of the Inter-Society Color Council. I first met Cal when I was a student at RPI. I was immediately drawn to him as, unlike many of the pioneers in color technology, Cal was soft spoken, measured and thoughtful. He had been a teacher and was quite skilled at not just answering your questions but getting you to answer them for yourself, by helping you work through the steps to understanding the situation. He was also a great story teller and his reminiscences about events from the past were always captivating. I had visited him in his office in New Windsor, the former Macbeth headquarters, and never failed to spend some moments with him at an AIC or CIE meeting, though he was privileged to attend far more of those than I. I shall certainly miss seeing him at those gatherings of those who study optical metrology and color technology.”

Roy Berns shared the following fond memories of Cal:

“He was on my dissertation committee when he was at Macbeth. As the story was told to me, he didn’t have any issues with my research and asked Professor Billmeyer about conduct during my defense. Billmeyer said that asking a few relevant questions to see how I handled myself on my feet was fine. When I was alone with the committee, Cal said he had a few questions. He unfurled a scroll of several pieces of paper taped together. I almost fainted. ‘George Washington rode a white horse. Would it always look white under all lighting conditions? Are there conditions when it wouldn’t look white?’ ‘A man walks into a tailor shop and wants a green suit. The tailor yells in the back to have the green lights brought out. Would this work? What is the physiological basis for this practice?’ And on... (My dissertation was about designing a Munsell Book of Color whose appearance did not change with lighting.)

The first time I ate grits, I was with Cal at a conference having breakfast. He explained how grits were made using the manufacture of rayon as an ex-

ample since I have a textiles background. I think of Cal every time I eat grits.

I was an expert witness for 3M. I wrote my report and in time, a rebuttal report by the defendant’s expert was given to 3M’s counsel. They had never heard of this expert and they had done lots of research finding me. They asked if I knew the expert, Calvin McCamy. I said yes and that he was on my dissertation committee. A collective sigh was heard. At my deposition, the defense brought in Cal to sit across from me in order to intimidate me. The lawyer was so methodical and boring that I watched Cal trying not to nod off in between his ‘evil’ stares. We were in the men’s room together and inquired about each other’s wives, etc. to the chagrin of the lawyers.

At RIT, we have a picture of Cal holding a Color Checker that we use when explaining its origin.

Cal will always be one of the color science giants.”

Mark Fairchild had the following reflections:

“I first met Cal when he visited RIT in the early 1980s. I was a 3rd-year student working with Franc Grum in the new Munsell Color Science Laboratory. I knew he was someone important in the field from my studies, but I didn’t understand what a key role he played in forming the lab through his work with the Munsell Foundation. Eventually, I learned much more about both and am forever grateful for Cal’s wonderful contributions.

During that visit, Franc introduced me to Cal and I took him to my little lab/office and nervously showed him the work I was doing on measuring reflectance of printing standards and ocular exposure to flash sources. Cal listened intently, and most politely, like someone who had never heard of color measurement before. He gave me generous, constructive feedback and suggestions. I’m sure he told me some interesting stories about his adventures in photographic science (although I don’t recall details, because I was just happy to somewhat coherently answer his questions) and, as always, despite being ‘the important person visiting the lab’, he put me at ease. He listened intently to what I was doing. He understood that, while it might not have been that important, it was perhaps the most important thing to a young student that day. Cal was mystically transformed from ‘important person’ to ‘friend’ that day; the very first time he met a young kid trying to measure color. I have always remembered that encounter and shared the story many times. The key point being that he was the very first important per-

continued on next page

A Tribute to Calvin S. McCamy continued

son' who listened and took a kid seriously and that made me feel like I might be able to do something important too. By just taking the time to listen and interact mindfully and genuinely, he was a critical inspiration to me and my career.

I've tried to emulate that behavior, and I hope I have performed up to some small fraction of Cal's standard. Even if I haven't, that inspiration from Cal is still being transmitted to the next generation of students in some form.

Over the years, he visited the lab or I met him at conferences, and it was clear he hadn't changed. That, too kept him in a dear place in my heart and always in my fondest memories. While I could go on and on, I will stop with one final highlight. Cal was an ice cream aficionado who could wax poetic on flavor and texture profiles. He occasionally guided some of the RIT gang for ice cream breaks at conferences and was always able steer us to the best shop in any city we might have found ourselves. His ice cream advice was, as expected from his professional character, impeccable.

Cal is very fondly remembered by all who have been involved in color science at RIT and he is acutely missed."

Paula Alessi shared the following:

"In my own way, I really loved Cal for the outstanding person he was. He was a mentor for me for many years. Cal was an incredibly smart man and he helped me solve some of the challenges I faced in my career at Kodak. I used his Macbeth ColorChecker™ for my tests all the time. It helped me analyze where Kodak stood compared to Fuji, Agfa, etc.

As United States CIE Division 1 Voting Representative, I needed input from other US color experts on CIE Technical Reports and Standards. I knew I could always go to Cal and get an honest assessment that I would share up the CIE ranks. Cal and his wife Mabel always looked out for me on travel to international countries for CIE or AIC because many times I had to travel alone. I will never forget one night in Austria during a CIE meeting, I was walking back to my hotel room alone from a late dinner. I encountered Cal and Mabel walking back from the opera. They accompanied me back to my hotel to make sure I was safe and sound before they walked on to their hotel!

Cal and Mabel loved music as much as I did. They really knew how to cut a rug on the dance floor. They were a very cute couple.

Cal had an unbelievable sense of humor. He made me laugh in circumstances when things got heated and I really needed to see the humor in an otherwise tense situation at international meetings.

I was also very impressed with the meticulous way that Cal was always so formally dressed. He looked so dignified. His thinking processes were also very meticulous and fastidious! It is obvious why he was so valuable to the FBI and such standardizing organizations as NBS, CIE and ISO.

Cal will be missed dearly by the whole ISCC family. May he rest in peace with Mabel!"

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2. CS McCamy, H Marcus, JG Davidson, A color-rendition chart, *J Appl Photogr Eng* **2**, 95-99 (1976).
3. CS McCamy, Annular illuminator, US Patent 4,320,442 (1982); US Patent 4,422,135 (1983).

Colour Turn Journal - Call for Papers

We are happy to announce our Call for Papers for the Colour Turn journal. The *Colour Turn* is a peer-reviewed journal that seeks to promote and advance interdisciplinary research into Colour Studies. The first issue will be published electronically on the 21st of March 2018 - on the International Colour Day - via the Open Journal System of the University of Tübingen, Germany. The submission is open throughout the year.

The *Colour Turn* journal invites papers and articles from various perspectives in the field of colour studies and encourages junior as well as senior researchers to submit their work. A broad spectrum of colour research approaches and topics are welcome. The language of the journal is British English.

Please submit your papers at:

submission@colourturn.net

For more information visit our website

<http://colourturn.net>

A Blast from the Past: ISCC Newsletter 50 Years Ago

Number 192 – January - February 1968 on ISCC website - <https://iscc22.wildapricot.org/Newsletter>

We are on to a new year, 1968. The January-February 1968 issue #192 was only 14 pages long. Much to my delight, it featured many articles that dealt with the issue of bridging the relationship between artists and scientists.

Robert Rauschenberg (an artist) and Billy Klüver (a scientist) collaborated to form Experiments in Art and Technology Inc. (E. A. T.). The goal of E. A. T was to “put technology at the



<http://www.theartstory.org/artist-rauschenberg-robert.htm>

<https://www.discogs.com/artist/1310421-Billy-Klüver>

disposal of the artist while, at the same time, exposing the technologist to the imagination of the artist.” In April of 1968, E. A. T. put together six sessions on color, including several speakers who were prominent in the ISCC:

Perception of Color by Ralph Evans

Color Theory by Deane B. Judd

Physiology of Color Vision by John Krauskopf

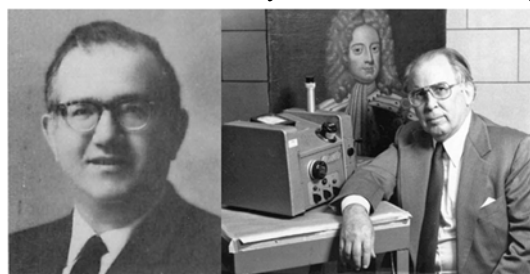
Color Theory by Jerome Y. Lettvin

Brightness, Lightness, Gloss by Richard S. Hunter

Colors, Dyes, Pigments by Robert Feller

I hope that these six sessions helped the artist and scientist audience learn more about how to better communicate with each other in terms of color.

Next, I was surprised to discover that two of our very dear ISCC experts gave presentations at a “Scientific Aspects of Art Conservation” Symposium at the Walters Art Gallery in Baltimore, Maryland.



Max Saltzman (picture on the left) gave a talk entitled “Identification of Colorants in Ancient Textiles”. Robert Feller (picture on the right - <https://www.conservation-us.org/membership/current-members/awards/feller-award/remarks-by-dr-paul-whitmore#.WmuCSainFaQ>) followed Max with a talk on “Research on Durable Thermoplastic Polymers for the Conservation of Works of Art”. It is refreshing to see that 50 years ago, our Council was sharing scientific concepts with artists and others who sought to conserve the original beauty of artwork.

This newsletter also contains a reprint of an article written by Robert Feller called “Felt-tipped markers and the need for standards of lightfastness for artists’ colorants” from *Bulletin of the American Group-IIC*, 8 No. 1 (1967) pp. 24-26. This article summarizes research Bob did for the National Gallery of Art when he was at Carnegie Mellon University. In 1968 felt-tipped markers were being used in creative fine arts applications, but their lightfastness properties were less than desirable. Even a felt-tipped set marked “permanent” was found to be able to withstand water but was not permanent after exposure to light. This is a quick and fascinating read for those of you who are interested.

One final example of artists and scientists working together to solve a problem was the United States Federal Government need for durable and permanent World War II colored mosaic memorial maps. A commission with an architect and silk screen specialists was put together. Porcelain enamel was recommended as the most effective material for these maps. However, specialized furnace firing techniques had to be developed. The materials that were used in such map making were “titanium dioxide, zirconium, antimony, cadmium, selenium, sulphur, cobalt, silicon, and oxygen.” Cobalt was used for ocean colors, but two thin applications into the white base enamel were necessary for better absorption. Optimum absorption conditions and firing temperatures had to be found for each chemical. Then, the ideal superimposition procedures for outlines and lettering were determined. This was a very tedious yet successful project. Much to my dismay, I was unable to find a picture of such a porcelain enamel World War II memorial map. However, please enjoy the closing line of this article: “Design should be the bridge between Science and Art.”

Paula J. Alessi, *ISCC News Editor*

refractions

seemingly random musings on color



The Seurat Delusion When Theory Overrides Experience



Fig. 1 Georges Seurat. Detail showing divisionist technique, from *A Sunday Afternoon on the Island of the Grande Jatte*, (1886) The Art Institute of Chicago

In the history of painting, the work of Georges Seurat (1859-1891) stands out as being a unique synthesis of both science and art, as articulated for example in his masterpiece *A Sunday Afternoon on the Island of the Grande Jatte* of 1886 (Fig.2). By incorporating the cutting-edge color science of the day, in a new technique referred to as *divisionism* or *pointillism* (Fig.1), Seurat and his followers, the Neo-Impressionists, are credited with creating some of the most luminous and vibrant paintings in the history of art.



Fig. 2 Georges Seurat. *A Sunday Afternoon on the Island of the Grande Jatte* (1886). The Art Institute of Chicago.

However, there is one small problem with this oft cited description – the paintings are neither bright nor luminous, and the technique suffers from a misunderstanding of color science rather than a practical application color theory. More surprising however, is the fact that the lack of luminosity found in the

paintings and the scientific misunderstanding behind them, has not affected their reputation in this respect, as can be seen by the countless books, essays, and exhibitions by historians and experts that continually tout the unique luminosity and ‘scientific’ basis of the work¹.

Central to this dilemma is the concept of *optical color mixing*. Seurat developed a method of juxtaposing small dabs and dots of color on his canvases that, when seen from a distance, would combine in the eye of the viewer to form distinct colors that were more vibrant and luminous than colors combined through traditional mixing on the palette. Through his reading of Charles Blanc’s, *The Grammar of Painting and Engraving* (1867) and Ogden Rood’s, *Modern Chromatics*, (1879) he was introduced to the ideas of Michel Chevreul and Hermann von Helmholtz, especially their theories of simultaneous contrast and additive color mixing. From Rood, he discovered that surface colors can be *additively* combined either by placing them on spinning disks, or juxtaposing them in small dots that at a distance would merge in the viewer’s eye; from Chevreul he learned that complementary, or opposite colors, when placed next to each other, tended to *enhance* each other. The Divisionist technique of juxtaposing small dots of ‘pure’ color is said to create colors that are “brighter or more luminous than can be obtained by a mixture on the palette”², and that because, according to Seurat’s friend and critic Félix Fénéon, whose description of his technique he endorsed³, “these colors, isolated on the canvas, recombine on the retina; we have therefore not a mixture of material colors (pigments), but a mixture of differently colored rays of light... It is also generally understood that the luminosity of optical mixtures is always superior to that of material mixtures”⁴.

The problem is that Seurat had either misread, or misunderstood Blanc and Rood, as no such claims are made in their texts. What Rood was describing was a particular case of additive mixing, known as *partitive* or *additive-averaging* mixing. In such cases, the light from a reflective surface, as in spinning discs or juxtaposed dots, is not only additive, meaning blue and yellow, when combined, will make white not green, but also that the properties of the different colors will be “*averaged* over the area of the object instead of simply being added. An opti-

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Refractions: The Seurat Delusion continued

cal mixture [additive] of two or more paints is certainly *higher in value* than a physical mixture of the same paints, but optical mixtures, as a whole are not lighter or more chromatic than physical mixtures. Indeed, optical mixtures of varied paint colours tend, due to the averaging principle, to lie towards the middle of colour space, i.e. medium value and low to medium chroma.”⁵ Add to this the use of juxtaposed complements by many of the Neo-Impressionists, as seen for example in the work of Paul Signac, (Fig. 3), and you get a neutralizing effect, rather than an increase in luminosity⁶.



Fig. 3 Paul Signac *The Breakfast*, 1887, Otterlo Kröller-Müller Museum. “In a detail from Signac’s *Breakfast* (right), we can see orange dots in the bluish shade of the cup on the tablecloth; similarly, there are red dots amongst the green reflections of the saucer”, Georges Roque, *Chevreul’s Colour Theory and its Consequences for Artists* (2010)

Though complements will additively mix to white, a partitive mixture, due to spatial averaging, reduces the chroma and the lightness contrast relative to the mixture components separately (Fig 4).

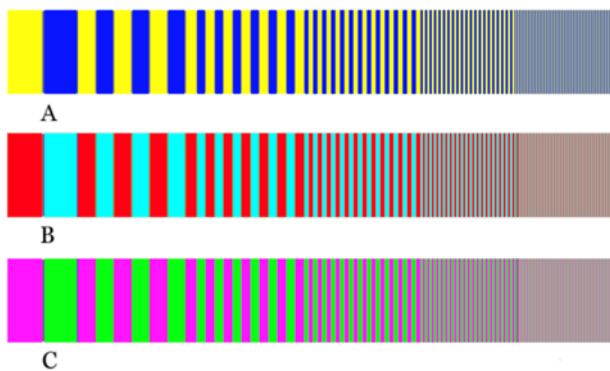


Fig 4. An example, using stripes, of partitive mixing of additive complementary colors. ©David Briggs 2007

<http://www.huevaluechroma.com/044.php>

So rather than developing a method for creating luminous colors that are capable of reproducing the brilliance of sunlight, the divisionist technique of Seurat and his followers actually created a degree of

dullness and greyness in the colors used. In Seurat’s case, this result is even further exacerbated through his use of unstable colors, such as zinc yellow, that have darkened and dulled considerably over time. To see an interesting digital reconstruction of Seurat’s masterpiece, in its original state – I refer you to the work of Roy Berns and his research on the *Grande Jatte* at the Art Institute of Chicago⁷.

Seurat’s work has many other attributes that qualify him as a significant painter in the history of art, but on this account, he and his followers were clearly mistaken. You can forgive a young painter (he died at age 31) for misunderstanding the science of his time, concerned as he was with experimentation and development, but the continued propagation of such falsehoods by art historians and experts is unforgivable. With more than 100 years of hindsight, historians and institutions should know better. What this demonstrates is how received ideas and theory can eclipse what we actually perceive with our eyes. A triumph of theory over experience, that constitutes the real *Seurat Delusion*.

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Refractions: The Seurat Delusion continued

Carl Jennings

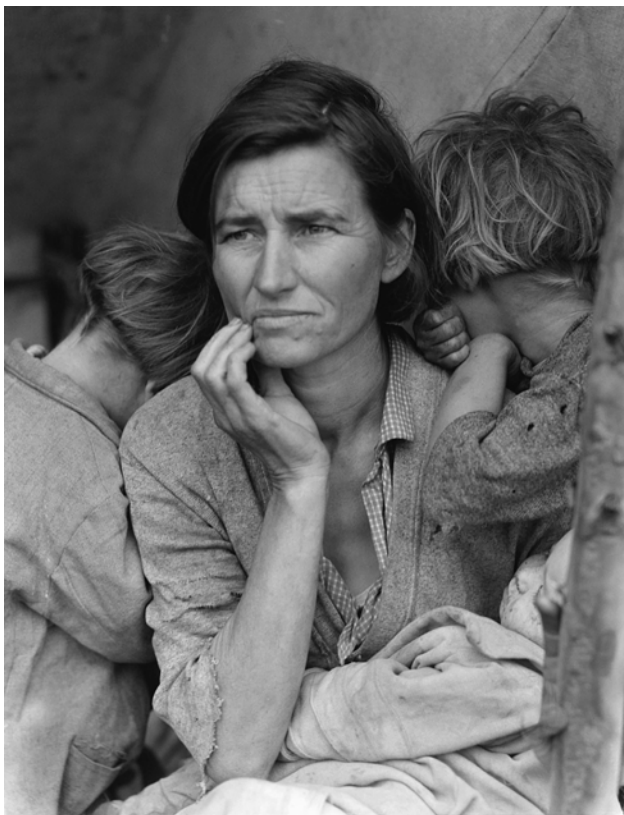
University of Hawai'i

Please visit Carl's blog at

<http://cjenning.wix.com/refractions> for comments and feedback on his articles!

Editor's Note:

In *ISCC News* #480, there was an omission of a very important section from the Refractions article on "Gray Matters: How Gray Changes How We Think" regarding Dorothea Lange's *Migrant Mother*. Here is the correction completing the description of the *Migrant Mother* image:



Migrant Mother. Dorothea Lange. (1936)

Social psychologists have empirically demonstrated that tonal images, because of their 'psychological distance' from perceived reality (the *real* world of color), evoke what are known as *higher-level construals* in people¹. Construals (from the verb to construe) are the ways in which we interpret and understand the world. In psychology, these are divided into higher and lower levels. Higher-level construals are psychologically more distant to us in many ways (temporal, spatial, social etc.) and therefore evoke a more distanced, 'bigger-picture' style of thinking that favors abstraction and broader, more general categories. Lower level construals on the

other hand evoke a style of thinking that is more concrete, descriptive and detail oriented. Consider Dorothea Lange's iconic image of a migrant mother: worried, hungry and desperate, but the pillar of support for her children. As a black and white image, she is seen as the embodiment and essence of a 'mother' - supporting her children. In color however, the image might reveal a red-headed woman with green eyes and bright blue shirt and pink nail polish. This could change the meaning for us as she now becomes a more concrete type of person, related to our own associations of people. The color makes her more specific, and idiosyncratic, and a bit less universal. Tonal images, reduced as they are to shades of grey, are more removed from the concrete, and encourage us to think more in terms of abstractions and generalities.

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If you would like to review the complete article, please go to Carl's blog at <http://cjenning.wix.com/refractions>.

Carl Jennings

University of Hawai'i

Pantone Color for 2018

Pantone has named Ultra Violet 18-3838 as their 2018 color of the year. This color "communicates originality, ingenuity, and visionary thinking that



<https://www.pantone.com/color-of-the-year-2018>

points us toward the future." Purples are also a symbol of "counterculture, unconventionality and artistic brilliance", as evidenced by their use in pop culture. Historically violet colors have mystical and spiritual connotations. Leatrice Eiseman, executive Director for Pantone Color Institute states: "We are living in a time that requires inventiveness and imagination. The creatively inspired

Ultra Violet blue-based purple takes our awareness and potential to a higher level. From exploring new technologies and the greater galaxy to artistic expression and spiritual reflection, intuitive Ultra Violet lights the way for what is yet to come."

HUE ANGLES

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

We'll Always Have Parrots

My significant other and I have two parrots, an African grey and a yellow-naped Amazon. They are 24 years old and very feisty--i.e., apt to bite fingers and toes. They will also be around long after we have departed this Earth, for they live to be at least 55 or 60. So that is why I have said "we'll always have parrots" in "parrot" of Rick in *Casablanca*.



Left to right: Alex and Poobah

And the parrots will always have colors: Yellow and green (with a white eye ring) for the Amazon, and various lightnesses of gray and red for the African grey. But the colors may vary according to the aqueous environment: A grey feather immersed in water will stay grey but darken slightly. Orange, yellow, and red will also hold their color in water. But green (and blue, I am told) will change. In particular, green turns brown when immersed in water. Clearly there are at least two mechanisms for the color: diffraction/iridescence for colors that change on immersion in water (change of refractive environment), and conventional pigment reflectance for colors that don't change on exposure to water. For more on bird-feather color, see

<https://academy.allaboutbirds.org/how-birds-make-colorful-feathers/>.

Many experiments are possible, including immersion of the whole bird. Sometimes I imagine I understand how Edgar Allan Poe could have been a bit freaked out by his raven because it was likely to outlive him. But, as Ilsa heard at that immortal moment in *Casablanca*, it is more likely that "we'll always have parrots."

Michael H. Brill, *Datacolor*



IN THIS ISSUE, February 2018

In the field of color measurement, knowing the uncertainty of the measurement has been an important and sometimes difficult challenge. We open our first issue of the year with the article "Uncertainty evaluation and propagation for spectral measurement" by Franko Schmähling, Gerd Wübbeler, Udo Krüger, Benjamin Ruggaber, Franz Schmidt, Richard D. Taubert, Armin Sperling and Clemens Elster. One of the difficulties in determining the uncertainties in color values is that measurement at one wavelength can be highly correlated to those at another. These researchers have developed a generally applicable Monte Carlo procedure for evaluating the uncertainty of spectral measurements. Their procedure naturally accounts for these crucial correlations in the spectral power distribution. In their article not only do they present the procedure, but they use the

example of determination of the spectral power distribution of colored LEDs from array spectroradiometer measurements, together with the derived CIE 1931 color coordinates.

Next, we have two articles in the general field of whiteness. The use of optical brighteners (also known as fluorescent whitening agents) is almost universal in the production of paper, and also widely used in textiles. The addition of optical brighteners results in the material having two separate components contributing to the total spectral radiance factor of the material: the commonly measured spectral reflectance factor and the luminescent spectral radiance factor. Thus, accurate colorimetric measurements of such materials either require bi-spectral spectrophotometers, or specially calibrated operations. Kenji Imura and Yoshiro Nagai present a "Multi-wavelength excitation method for measuring FWA-treated paper." The method uses commercially available LEDs, which enables sufficiently accurate colorimetric measurements of FWA-treated papers or prints when illuminated by the specified illuminant.

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Not only the instrumental measurement of optically brightened materials needs special consideration, but also the choice of sources in a light booth for product color verification is important. Often there is a specification given in terms of the CIE Whiteness Index, which is based on daylight or actually CIE standard illuminant D65. However, it is not possible to have a real source in a light booth that is exactly equal to CIE D65, some attempts are better than others. Minchen Wei and Siyuan Chen report on their study examining the “Impact of spectral power distribution of daylight simulators on whiteness specification for surface colors.” After finding large variations in both CIE whiteness (up to 16 points) and tint (of about 1.6 points) when specimens are observed under the D65 simulators, they drew the following conclusions: 1) if using the CIE whiteness and tint formulas, it is recommended to revise the limits set by the ISO 23603/CIE S012 and the BS 950 standards, rather than by the CIE Metamerism Index and 2) it is also necessary to fine-tune the coefficients in the CIE whiteness and tint formulas for non-perfect D65 simulators and any other light source.

We move on to the field of color imaging for our next two articles. The use of mobile display devices such as cell phones and tablets has become so wide spread in all types of lighting environments that we must consider this group as a separate class of displays. Eric Kirchner, Ivo van der Lans, Esther Perales and Francisco Martínez-Verdú have developed a new model for the characterization and evaluation of the displays on mobile devices, which they first had tested on liquid crystal display (LCD) phones. Their model, abbreviated the MCDIM Model, takes into consideration not only the display characterization model that is specific for the display, but also the ambient illuminance level. In this issue they have extended the research to “Improving color reproduction accuracy of an OLED-based mobile display.” Using their model for both LCD and OLED type displays, is useful not only to developers and manufacturers of these devices, but also to students conducting psychophysical tests using such displays.

High quality color images are not only important on mobile devices for their sales, but also in many other fields. Our next article focuses on the cultural heritage documentation and cataloging. Decades ago, cameras were used to produce pictures and images that were pleasing to the viewer and reminding the viewer of what they remembered about the subject, but they were not necessarily accurate colori-

metrically to the real perception of the scene. However, now cameras are used for much more, for example in the case of documentation of artwork, historical buildings, and many other fields we need images that accurately reproduce the colorimetric characteristic of the item under study. In our next article Adolfo Molada-Tebar, José Luis Lerma and Ángel Marqués-Mateu describe a rigorous procedure, for the colorimetric characterization of cameras, making it possible for users obtain output images in the sRGB space that is independent of the sensor of the camera. This software allows users to control the entire digital image processing and the colorimetric data workflow, including the rigorous processing of raw data. In their article, “Camera characterization for improving colour archaeological documentation,” they not only describe the process, but then they apply the methodology to a picture targeting Levantine rock art motifs in Remigia Cave (Spain) with positive results.

When discussing color vision deficiencies, tritanopia and tritanomaly involve the lack of or variations in the short wavelength cone in the eye (sometimes called the blue cone). For this reason, tritans may have confusion between bluish and greenish hues, as well as yellowish and reddish hues. Probably due to its relative rareness as compared to other types of color vision deficiencies, there has been less attention given to the diagnosis of this color vision deficiency. Ross Littlewood Franzco and Francine Hyde Doba present a new relatively quick diagnostic test in their article, “The C test for tritan discrimination.” They have also found the test useful in some optic nerve and retinal diseases.

Can the color that surrounds you while you work really calm you, enhance your performance, or improve your concentration and attention? There have been studies reported in past literature claiming some of these attributes in certain situations. Christoph von Castell, Daniela Stelzmann, Daniel Oberfeld, Robin Welsch and Heiko Hecht decided to explore these questions with three specific colors: Cool Down Pink, Relaxing Blue, and Energetic Red. They performed an experiment having volunteers do a series of cognitive tasks while working in booths painted with one of these specific colors or a neutral white. Besides assessing the volunteers’ performances on the tasks, they measured their emotional dimensions of arousal, valence, and dominance, and report the results in their article, “Cognitive performance and emotion are indifferent to ambient color.”

While in this journal we often have articles concerning the accurate colorimetric representation of

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materials, scenes, or products, there are a number of applications in which the colors produced in images are edited to produce a different effect. In our next article EunJin Kim and Hyeon-Jeong Suk discuss “Image color adjustment for harmony with a target color.” Learning from designers, their study aims at investigating appropriate technical approaches to adjust an image for harmony with a target color, such as a corporate logo, and developing an image adjustment method that automates the color editing of a given image for harmonious and aesthetic design outcomes. By observing the designers, they focused on the main color features the designers manipulated and the approaches they used to adjust color features for harmonious outcomes. From that preliminary exploration, they produced an image color adjustment algorithm to achieve harmony with a target color in the context of visual design using primarily hue adjustment with a minimal amount of color changes that is particularly preferable for adjusting images of nonliving objects.

A second article involving designers examines the development of the use of color in novice designers’ training. While color has many aesthetic uses, often there are also functional applications. Colors may be used as a code to convey information, or safety warnings, but do the selected colors mean the same thing to all people? Research has shown that while many people had common interpretations such as red meaning stop or danger, men and women also have different associations for some of the colors used. Also, there may be cultural differences. Annie W.Y. Ng and Alan H.S. Chan decided to study how novice designers developed their color associations for the concepts used for ‘warnings’, ‘action required’, and ‘signs and equipment status’ during the early years of their design education. They report their results in “Similarities and differences between male and female novice designers on color-concept associations for warnings, action required, and signs and equipment status messages.” This article will help novice designers and others to optimize gender-neutral design outcomes in terms of color coding and to avoid selecting colors based on their own personal associations or preferences in daily design problems.

Our next article, “Colour meaning and consumer expectations”, follows in a similar vein. Seahwa Won and Stephen Westland discuss the application of the product color development process during the initial phase of product design. They chose the example of designing the packaging for a dishwashing

liquid. Using the case study approach, they describe the steps in developing a comprehensive design for packaging of a product to meet not only the manufacturer’s goals of attracting the customer’s attention and highlighting the manufacturer’s logo, but also molding the consumers expectations of the product. So that both the manufacturer and the customer are satisfied.

Staying with the idea of influencing consumers, Ellen Van Droogenbroeck, Leo Van Hove and Steven Cordemans discuss the question, “Do red prices also work online? An extension of Puccinelli et al. (2013).” Puccinelli and co-authors found that in print fliers when the prices appear in red as compared to black consumers perceived savings, but unlike female consumers, men think they are being offered a better deal when prices are presented in red than when they are presented in black and the advertisement puts them in a better frame of mind. In the study presented in this issue, the authors extended the Puccinelli research to online advertising and also changed the location of the study from the United States to Belgium. They found that for men, prices online marked in red enhance their perception of the price savings, but perhaps not by the same mechanism. Both studies found that women were not significantly affected by red pricing.

Let us stick with red for our next article but move to another use. Tengxiao Zhang, Shiyu Feng, Buxin Han and Si Sun, researched the use of color in national flags. They found red was the most frequently used color and remembered that red has certain aggressive connotations. In trying to understand the reason for the more prominent choice of red, they also examined the flags of international collaborative organizations and found red was not generally used by these organization. This supported the idea presented in the title of their article, “Red color in flags: A signal for competition.”

Moving from flag color to facial color, it has been suggested that facial color not only changes with advancing age, but also with the times. In the article, “Long-term changes in Japanese women’s facial skin color,” Kumiko Kikuchi, Chika Katagiri, Hironobu Yoshikawa, Yoko Mizokami and Hirohisa Yaguchi report on a very extensive study of the facial color. Three thousand one hundred eighty one Japanese women from near Tokyo were enrolled in a study measuring their facial color; the data was collected in datasets designated 1991, 2001, 2005, and 2015. Using spectrophotometric measurements, besides calculating the color, and transforming to Munsell values, the authors were also able to

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calculate the concentrations of melanin and hemoglobin. From these data they were able to calculate the changes in color due to changes in the skin itself. These findings of skin color changes in the 1990s are also thought to be attributable to fashion trends in skin tone (from a change of popularity of tanning booths to a whitening boom and societal awareness of ultraviolet (UV) light-induced skin damage in Japan).

For our final article of this issue we move to the field of textiles. In the seemingly never-ending attempt to get textiles from design through production to market in a faster more efficient manner, there is a need for improved simulations of woven fabrics made of individual colored threads. These simulations should be based on accurate color prediction models in the computer aided design (CAD) systems which will reduce or even eliminate the need for physical sampling, a time-consuming and costly process. To this end, in "Color prediction modeling of single- and double-layered woven fabrics," Youngjoo Chae, Tao Hua and John H. Xin report on their three-dimensional structural and colorimetric modeling of various three-dimensional woven fabrics for accurate color predictions. They report that their models were able to cut in half the errors in the color predictions.

For me, there is a certain joy and excitement at the beginning of each year opening the first new issue of the next volume of *Color Research and Application*. However, this got tempered when it became necessary to close the issue with the "In Memoriam" that Verena M. Schindler wrote for Michel Cler, who died in 2017, but whose work lives on for all of us.

Ellen Carter

Editor, Color Research and Application

In Memory of Claudio Oleari

The Associazione Italiana Colore, with all its members would like to express its deepest condolences for the premature death of Claudio Oleari on 23 January 2018, together with all who have known him, read his books, listened to his conferences or lectures.

He was an Eminent physics scholar and an Associate Professor at the University of Parma, at the Department of Physics and Earth Sciences. He dedicated his life to the activities of teaching with the same passion and interest that he dedicated to the researches in the context of colour, applying physics



to perception and fixing its role in colorimetry. Moreover in 1995 he started the Gruppo in Colorimetria e Reflectoscopia which later became the Associazione Italiana Colore

His availability for colleagues and students and his ability to listen and advise are proverbial: his kindness will be always remembered

by everyone who has known him. These qualities are clearly demonstrated by the message of his profile at the University of Parma "My office is at the Department of Physics (Campus, viale Usberti 7/A), phone 0521-905214, email address: claudio.oleari@fis.unipr.it. You can send me email for any request or question related to my course. I'm almost always in my office and I'm always available except when otherwise busy. Just call to check if I'm busy. I always reply to emails." He conducted, within the Italiana Association, many valuable informational activities and created many connections which remain as a rich bibliography, always having in mind the need to invest in research and training both in Italy and abroad.

His death leaves a void difficult to fill and the world of colour loses an intellectual and an attentive and informed scholar

Gruppo del Colore – Associazione Italiana Colore

Remembering Dr. Ernst Rohner

Ernst Rohner was a pioneer in the science of colorimetry and a key figure in the history of Datacolor. A creative, collaborative, and influential colleague, Dr. Rohner passed away on January 25, 2018 at the age of 91. Please see the following hyperlink for more about his life.

<http://www.datacolor.com/business-solutions/blog-business-solutions/remembering-dr-ernst-rohner-datacolor/>

Attention ISCC Members

We hope you have all had a chance to renew your ISCC membership for 2018. The invoices were sent to you online in the beginning of January. Thanks to Jodi Baker for making this happen through our new online membership management system!

Calendar

2018

- Mar 5-7 Integrating Vision and Language Conference** Tartu, Estonia, Contact: Gholamreza Anbarjafari
Info: shb@icv.tuit.ut.ee
- Mar 6-8 Lux Pacifica**, Tokai University, Tokyo, Japan, Info: www.ieij.or.jp/english/event/Lux-pacifica2018.html
- Mar 23-24 Symposium on Colour in Employment**, City University, London, UK, Info: Dr. Marisa Rodriguez-Carmona marisa@city.ac.uk
- Mar 26-28 OSA High Brightness Source and Light-Driven Interactions Congress**, Strasbourg, France, Info: https://www.osa.org/en-us/meetings/osa_meetings/osa_high-brightness_sources_and_light-driv-en_inter/program/?utm_source=Email_reg2cong&utm_medium=Email&utm_campaign=HighBrightness18
- Apr 8-10 IES Research Symposium 2018**, Crowne Plaza Atlanta Midtown, Atlanta, GA, Info: ies@ies.org
- Apr 12 CamoCon 2018** Bristol, UK, Theme: All aspects of defensive coloration and behavior, Info: <http://www.fostersevents.co.uk/venues/orangery-goldney-hall/>
- Apr 28 CIE Division 1 Meeting (in conjunction with Smart Lighting)**, Info: www.cie.co.at
- May 7-10 SPE ANTEC 2018 Plastics Conference**, Orange County Conference Center, Orlando, FL, Info: Doreen.Becker@ampacet.com or AnnSmeltzer@clariant.com
- May 9-11 15th Conference on Computer and Robot Vision**, Toronto, Canada, Info: <http://www.computerrobotvision.org/>
- May 15-16 ASTM E12 Meetings**, NIST, Gaithersburg, MD, Info: www.astm.org
- Jun 11-15 Joint ISCC/AIC Munsell Centennial Celebration**, MassArt, Boston, MA
- Jun 13-15 CIE Division 2 Meeting**, Eindhoven, The Netherlands, info: www.cie.co.at
- Jun 27-29 15th International Conference on Image Analysis and Recognition** Porto, Portugal, info: <http://www.aimiconf.org/iciar18/>
- Aug 9-11 IES Annual Meeting**, Boston, MA, Info: ies@ies.org
- Aug 13-17 CIE Tutorial & Expert Workshop on Research Methods (2 days) + LumeNet Doctoral Workshop**, Copenhagen, Denmark, Info: www.cie.co.at
- Aug 24-26 The Visual Science of Art 2018**, Trieste, Italy Info: <http://www.vsac2018.eu/>
- Sep 11-12 XIV Color Conference**, Florence, Italy, Info: www.gruppodelcolore.it
- Sep 19-20 9th Colour and Visual Computing Symposium**, Gjøvik, Norway, Info: <https://www.ntnu.edu/web/colourlab/cvcs>
- Sep 25-29 AIC Interim Meeting, Colour and Human Comfort**, Portuguese Colour Association, Lisbon, Portugal, Info: <https://www.facebook.com/apcor.org>
- Nov 12-16 26th IS&T Color Imaging Conference**, Vancouver, BC, Canada, Info: https://www.imaging.org/site/IST/Conferences/Color_and_Imaging/IST/Conferences/CIC/CIC_Home.aspx

2019

- Jun 17-22 CIE Quadrennial Meeting**, Washington, D. C., Info: www.cie.co.at

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
GTI Graphic Technology, Inc.	www.gtillite.com	845-562-7066
Golden Artist Colors	www.goldenpaints.com	607-847-6154
Hallmark	www.hallmark.com	816-274-5111
Hunter Associates Laboratory, Inc.	www.hunterlab.com	703-471-6870
Konica Minolta Sensing Americas, Inc.	https://sensing.konicaminolta.us	888-473-2656
Kolor Mondo	http://kolormondo.com	+46(0)70 777 03 35
The Color Wheel Company	http://colorwheelco.com	541-929-7526
X-Rite	https://www.xrite.com	888-800-9580

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 John Conant, jconant@aerodyne.com

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ISCC Member Bodies

At its foundation, the ISCC is composed of many related societies. These societies, our Member Bodies, help the ISCC 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)