



# Inter-Society Color Council News

Issue 484

Fall 2018

## Board of Directors Corner

I am John Seymour. I am pleased and honored to have been invited to join the Board of the ISCC in 2018. The pleasure comes from having a chance to meet a more diverse crowd of color enthusiasts. My color background comes from the print industry. I



### Table of Contents

Board of Directors Corner .....	1
ISCC Board of Directors .....	2
ISCC 2018 Nominations Committee Report .....	2
Great Fall Webinar Series.....	5
Call for Nominations for 2019 Godlove Award .....	6
Call for Nominations for 2019 Nickerson Award.....	6
TAGA/ISCC 2019 Joint Conference .....	7
TAGA Student Design Challenge.....	7
AATCC SGIA Digital Printing Conference 3.0 .....	8
Call for Papers ICA Belgium Colour Symposium....	8
2019 “Fashion for All Student” Design Competition	8
Attention ISCC Members .....	8
AIC Lisboa 2018 .....	9
A Blast from the Past: ISCC Newsletter 50 Years Ago, Number 197 Nov - Dec 1968.....	10
In Memory of Robert W. G. Hunt .....	11
Refractions: seemingly random musings on color	
<i>The Dark Spectrum</i> .....	12
CIE Colorimetry Publication 4 <sup>th</sup> Edition .....	13
AIC 2019 Save the Date .....	13
Hue Angles: <i>Visualizing Four-Dimensional Colorimetry</i> .....	14
Color Research and Application: Special Issue .....	15
Call for ISCC Communicators.....	17
Cooper Hewitt Museum Presents .....	17
Editor’s Note: Munsell Centennial Issue Part 2.....	11
ISCC Calendar.....	18
ISCC Sustaining Members & Member Bodies.....	19

have been a long-time member of TAGA (Technical Association of the Graphic Arts) and served on their Board. I have spoken at numerous conferences in the print industry and have served many years in print standards committees. Through these opportunities, I have had a chance to meet a number of color professionals, many of whom are not in the print industry.

My involvement with ISCC has given me the opportunity to meet color experts and enthusiasts from different fields whom I would not have met otherwise. I attended the 2018 ISCC/AIC Munsell Centennial Color Conference in Boston and had a continual sense of “where else could I have met ....” I look forward to meeting more color enthusiasts at the ISCC/TAGA joint conference in Minneapolis in March of 2019. (I am on the Board for both organizations, so I pretty much have to attend!)

My interest in color (with a lowercase *c*) probably started in Kindergarten when I was awestruck at opening my very first crayon box. My involvement with Color (with a capital *C*) started in 1992 when I joined the research group of QuadTech, doing advanced product development. My work was primarily on systems which measure and control the color of tiny areas on a web of paper moving through a printing press at speeds of up to 40 MPH. Along with the talented engineers with whom I worked, I estimate that my ideas gave birth to one trillion color measurements!

Twenty-four years, twenty-seven patents, and multiple successful products later, I decided to widen my horizons to include other industries where a color scientist and applied mathematician could be useful. In June of 2012, I hung out a shingle as John the Math Guy, publishing a blog (<http://johnthemathguy.blogspot.com/>) “about applied math, computation, color science, printing, history of science, and whatever else I feel like writing about at the time.” To date, the blog has had 123,000 views.

In 2016, I had enough business to step out on the ice and consult full time. It has been rewarding for me to continue to contribute more broadly to the print industry, but also to have made small contributions to the plastics, textile and cosmetics industries,

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Terms end 2018	<b>ISCC EXECUTIVE OFFICERS</b>	
	President	Mr. Jerald Dimas Color Communications, Inc. 4000 W. Filmore Street Chicago, IL 60624 USA 773-475-2575 <a href="mailto:jerdim@ccicolor.com">jerdim@ccicolor.com</a>
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Terms end 2019	Past President	Mr. John Conant Aerodyne Research, Inc. 45 Manning Road Billerica, MA 01821-3976 USA 978-663-9500 fax: 978-663-4918 <a href="mailto:jconant@aerodyne.com">jconant@aerodyne.com</a>
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	Mr. Steve Linberg	171 State Street Amherst, MA 01002 <a href="mailto:steve@slinberg.com">steve@slinberg.com</a>
	Ms. Maggie Maggio	<a href="mailto:maggiemaggio@gmail.com">maggiemaggio@gmail.com</a>
Terms end 2020	Dr. Anthony Stanton	Carnegie Mellon University <a href="mailto:stanton@andrew.cmu.edu">stanton@andrew.cmu.edu</a>
	Dr. Jean Hoskin	<a href="mailto:sjhoskin1@gmail.com">sjhoskin1@gmail.com</a>
	Ms. Rachel Schwen	The Sherwin-Williams Company 612-375-7801 <a href="mailto:rschwen@valspar.com">rschwen@valspar.com</a>
	Mr. John Seymour	John the Math Guy, LLC <a href="mailto:John@JohnTheMathGuy.com">John@JohnTheMathGuy.com</a>

*Board of Director's Corner continued*

as well as to art education. I look forward to making those contributions more significant in the years to come.

Over the past year, I have been pioneering a new approach to statistical process control of color. I hope that this will be my next big contribution to the color industry.

John Seymour, *ISCC Board of Directors*

## ISCC 2018 Nominations Committee Report

It is that time of year when we must announce to all members the candidates running for ISCC Executive Officers and Board of Director positions starting in 2019. Many thanks to the Nominating Committee chaired by John Conant, our Past President, for this report and all their hard work in putting together an excellent slate of highly qualified candidates.

**From the By-Laws:** The report of the Nominating Committee shall be sent to all voting members at least thirty (30) days before the date on which ballots are provided to the voting delegates. Additional nominations may be made at the request of five (5) voting members, provided they are forwarded to the Secretary within twenty (20) days after the report of the Nominating Committee is sent out. The Secretary shall give notice of all additional nominations to all voting members at least ten (10) days before the ballot is provided to the membership at large.

This year's candidate slate from the Nominating Committee begins with the Executive Officers.

### President-Elect (term: Jan. 2019 – Dec. 2020)

David R. Wyble is president and founder of Avian Rochester, LLC. Since 2011, Avian Rochester has been delivering color standards, traditional and custom measurements, and consulting services to the



color industry. Prior to founding Avian Rochester, Wyble was a color scientist within the Munsell Color Science Laboratory, at the Rochester Institute of Technology (RIT), and before that a Member of Research & Technology Staff at Xerox Corporation. He holds a B.S. in Computer Science and M.S. and Ph.D. degrees in Color Science from RIT and Chiba University, respectively. He has served two terms on the

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*ISCC Nominations Committee Report continued*

ISCC Board of Directors, most recently ending in 2017. He has served as the Chair of the ISCC Web Committee for nearly 20 years. Also during that time, he served in a variety of other roles, including: Chair, Interest Group 1; Education Chair; General Chair, ISCC Annual meetings (2009 and 2016); Technical co-chair, ISCC/CORM Joint Meeting, 2010. He is also a member of the Society for Imaging Science and Technology, ASTM, and the Council for Optical Radiation Measurements.

**Secretary (term: Jan. 2019 – Dec. 2020)**

Jean Hoskin is the candidate for Secretary. With color expertise that balances theory and application, art and science, Jean Hoskin retired from Macy's Merchandising Group as Director of Color Services in 2016. Since her retirement, she has been consulting, writing, painting, and traveling.



Majoring in textiles, Jean holds a B.S. from Iowa State University and an M.A. from Michigan State University. Her Ph.D. from the University of Tennessee included Textile Design, Testing, Dyeing & Printing combined with Aesthetic philosophy.

Jean began her career in teaching at the University of Kentucky developing courses that included Color Theory for apparel and interior design students. She also taught Costume and Textile History and maintains her interest in ethnic textiles as a member of the Textile Society of America. Her creative/research focus was on color testing and textile art.

Sandwiched between university teaching and retail, Jean managed textile screen-printing for Kentucky Textiles where she was responsible for design, color matching, and pre-press. Promoted to creative design, Jean managed apparel design, color and material development.

In 1995, Jean jumped from manufacturing to retail, beginning as color manager for Lane Bryant at Limited Inc. in Columbus, OH. The major responsibility was color approval of materials using instrumental color measurement and communication. Next at May Merchandising Company in St Louis, MO she developed an international color management program that included exciting travel to manufacturing sites in Asia. In 2006, she moved to Macy's in

New York, where as Director of Color Services she implemented a global color approval process. Jean co-managed an international team of 35 and was responsible for training, color systems and industry trends. The New York and International teams provided a variety of following functions, such as color trends, color standards development, CAD matches, pre-production and production color approval, plus results reporting for color selling.

Always a teacher, Jean is a frequent presenter on innovation and process improvement at professional meetings. She is a member of American Association of Textile Chemists and Colorists (AATCC), Inter-Society Color Council, and Surface Design Association. She is the current President of International Association of Color Consultants-North America and is a former Board member of Color Marketing Group. Her article "Following the Creative Path of Color Theory" was published in the Fall 2017 issue of the *Surface Design Journal*.

**Treasurer (term: Jan. 2019 – Dec. 2020)**

Dr. Frank O'Donnell is the candidate for Treasurer. He is a Research Fellow in the Performance Coatings Group of Sherwin-Williams. He has worked at Sherwin-Williams for thirty years, ten



years in the Automotive division, fifteen years in their Architectural Group and for the last five years for the Performance Coatings group. He has worked on a variety of color related projects including color matching programs, multiangle spectrophotometry and evaluation of a

variety of color instrumentation and lighting. Prior to Sherwin-Williams, Frank worked at an inkjet company called Diconix and prior to that he taught High School Chemistry.

Frank has been active in the ISCC since 1980. From 1996 to 2000, he was Chairman of Interest Group 1. From 2004 to 2007, he was a member of the ISCC Board of Directors. From 2008 to 2014, he was President Elect, President and Past President of the ISCC. At various times, Frank has been active in AATCC, the Detroit Colour Council, American Society for Testing and Materials (ASTM), and a Fellow of the British Gemological Association.

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*ISCC Nominations Committee Report continued***Directors (term: Jan. 2019 – Dec. 2020)**

Dr. Danny Rich is a candidate for the Board of Directors. He directs the Sun Chemical Corporate Color Research Laboratory in the Daniel J. Carlick



Technical Center in Carlstadt, New Jersey. He received his B.S. in Physics from the University of Idaho (1973), his M.S. in Physics from Virginia Polytechnic Institute and State University (1977), and his Ph.D. in

(Color Science) from Rensselaer Polytechnic Institute (1980) under Dr. Fred W. Billmeyer, Jr. Dr. Rich is Division Editor of CIE Division 8 on Imaging and has been a member of numerous CIE Technical Committees. Dr. Rich is a member of the Committee for Graphics Arts Technology Standards (CGATS), the ANSI technical advisory group on graphic reproduction, the Illuminating Engineering Society of North America (IESNA), ISO Technical Committee TC6 on Optical Properties of Paper, ISO Technical Committee TC130 on Graphic Arts, the National Printing Ink Research Institute (NPIRI). He is a senior member of the Optical Society of America (OSA), the Society of Imaging Science & Technology (IS&T), the Society for Information Display (SID) and the U. S. National Committee of the International Commission on Illumination (USNC/CIE). Dr. Rich holds 14 US patents, 11 World patents and 21 applications. He has served the ISCC as a member of the Board of Directors, as Secretary and as President (President-Elect and Past-President).

Dr. Lina María Cárdenas is another candidate for the Board of Directors. She received a Bachelor's degree in Textile Design (2002) from Universidad de los Andes in Colombia, South America. Later, she earned a Ph.D. in Fiber and Polymer Science (2009) from North Carolina State University (NCSU, Raleigh, USA). Her Doctoral and Postdoctoral research focused on



color perception and psychophysical experiments. After her Postdoctoral experience, she moved to Chile, South America where she has been involved in teaching and research. Initially, she spent two years as an assistant professor at the Universidad de Chile where she was in charge of undergraduate research. In 2017, she joined the Design School at the Pontificia Universidad Católica (Santiago, Chile) where she currently serves as an Assistant Professor of Color Science and Textiles. She also is part of the Lighting and Color Design Laboratory, and currently, she does research in observer variability as part of a grant funded by Conicyt through a Fondecyt (government initiative to promote research among different programs). Additionally, she represents the Design area in the CNA committee (National Commission of Accreditation) for graduate programs and serves as a member of a CONICYT committee of human capital. Dr. Cárdenas has authored several reviewed/technical publications, both in Spanish and English, and has participated in several consulting projects related to dyeing, color management, and color communication. Finally, she is a member of the ISCC and the AATCC.

Amy Woolf is another candidate for the Board of Directors. In 2004, during a major renovation to her home, Amy Woolf not only realized the importance of choosing the right paint color but also the complexity of the process. Unable to find a professional color consultant to help her, she began reading and researching and eventually found the International Association of Color Consultants-North America and began her training. She consults with residential clients on both interiors and exteriors, and on commercial projects including multi-family housing, restaurants, retail and corporate workplaces. She works onsite in New England and virtually with clients across the United States and as far away as London, UK. She is a five-year winner of the Best of Houzz Service Award.



The last candidate for Board of Directors is Luanne Stovall. Luanne Stovall (MFA Tufts University) is an artist specializing in color, with a passion for modern design and the creative practice. Luanne

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*ISCC Nominations Committee Report continued*

embraces color as a vital communication tool for visual literacy and believes we are embarking on a 21st Century Color Evolution. She is collaborating with colleagues in science, industry, design, and the arts to upgrade STEM into the STEAM (Science, Technology, Engineering, Art, Math) Supermodel - activating all resources to build a sustainable future.

Luanne is a lecturer in the School of Architecture and the College of Fine Arts at the University of Texas in Austin, where she has taught Living Color, Advanced Color: Strategies & Solutions, and the



Color Modules for Art & Art History Core Foundations students. She has given

color lectures, workshops, and courses in many locations including UT Austin; Wellesley College; School of the Museum of Fine Arts, Boston; Sloan School of Business, MIT; The Contemporary Austin; and the American Institute of Architects (AIA). Currently, she is developing *The New Color* as a multidisciplinary upper level course at UT Austin (Spring 2019) and writing *The New Color, a 21st Century Field Guide* as a multidisciplinary color education model.

Luanne's paintings and color cut-outs are in public and private collections including the Blanton Museum of Art; Art Museum of South Texas, Corpus Christi; El Paso Museum of Art; Neiman Marcus Signature Store, Boston; Estee Lauder Collection; and Moakley Cancer Care Center in Boston.

That completes the nomination slate of candidates for ISCC Executive Officers and Board of Directors. **The voting ballots will be mailed/emailed to ISCC members by December 1, 2018.** Voters will have one month to cast their ballot. Voting results will be available on **January 4, 2019.**

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## Great Fall Webinar Series

We hosted September and October webinars, and had a great response to both. On September 16, Dr. Mark Fairchild, from Rochester Institute of Technology, presented "Color Appearance, Color Order, & Other Color Systems." This webinar was a repeat of his sold-out breakout session given at the

Munsell Centennial Color Symposium in June. We had about 60 attendees, including over 20 from outside the U.S. This webinar was scheduled for 90 minutes, since the Symposium breakout session was



also 90 minutes. Mark set the stage for the talk with an introduction of the various perceptual attributes of color, and as might be expected, the balance of the talk remained in the realm of color perception. This included

color systems and spaces, such as Munsell and various RGB-based spaces, and of course CIELAB and CIECAM. After the presentation, Dr. Fairchild handled several questions from interested attendees. The full recording of this webinar is available to ISCC members on the Members Only page.

Our October webinar was presented by Dr. Andrew Stockman. Dr. Stockman, from the University College London, received the 2018 Macbeth Award from the ISCC. This webinar is in response to the Macbeth Award presentation and is standing in for the formal lecture often presented by that award's recipient. Did we say both fall webinars had a great response? They certainly did, but this one broke all the records, with over 200 registrants and 100 attendees. (We do not really know how many folks might have attended, because our subscription only permits 100 attendees.) Dr. Stockman's presentation was entitled "Cone fundamentals, color matching



functions, luminous efficiency and individual differences," and reflected much of the work to which he has devoted his career in color vision research. Like the previous webinar, the discussion was mainly about how we see color, but Andrew

talked more about the mechanisms that underlie the actual detection of color. These mechanisms are the physical sensitivities of human color vision, and the chemical properties of the photo-pigments from which these sensitivities arise. Critical to this is the transformation of these sensitivities to the CIE color matching function, which permits the calculation of perceptual metrics from a spectral stimulus.

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*Great Fall Webinar Series continued*

This webinar attracted about 50 international attendees. And the interest was not limited to listening - the question and answer period went on for 15-20 minutes as Dr. Stockman patiently responded to all of the questions. Note that interest has extended beyond the day of the event – as of this writing (two weeks after the webinar) there have been over 100 views of the recording. (Note that at the request of Dr. Stockman, this recording will not be permanently archived. By the time you read this, it is likely unavailable. The presentation slides are available to ISCC members on the Members Only page.)

We would like to extend our sincere thanks to both Mark and Andrew for these thoughtful and informative presentations. The ISCC is a better organization because of people like you!

Do you have a suggested webinar? If so, please let us know – send email to [seminars@iscc.org](mailto:seminars@iscc.org).

Dave Wyble and Ann Laidlaw, *Webinar Co-Chairs*

## Call for Nominations for the 2019 Godlove Award

The Godlove Award was established by Mrs. Margaret N. Godlove in memory of her husband, Dr. I. H. Godlove. The fund was presented to and accepted by the ISCC during the 25th Anniversary Meeting of April 6, 1956. The award is usually, but not necessarily, presented biennially in odd-numbered years.

The Godlove Award is the most prestigious award bestowed by the Inter-Society Color Council, and honors long term contributions in the field of color. Candidates will be judged by their contribution to any of the fields of interest related to color, whether or not it is represented by a Member-Body. A candidate's contribution is to be considered in the light of the objectives of the Council as defined in Article II of the Constitution. This contribution may be direct, it may be in the active practical stimulation of the application of color, or it may be an outstanding dissemination of knowledge of color by writing or lecturing, based upon original contributions of the nominee. The candidate need not have been active in the affairs of the Council, but they must be current or former members of the ISCC. All candidates must have had at least five years experience in their particular field of color.

Godlove Award Nominations should include the following information:

1. The name and full address of the nominee.

2. A sentence or two giving the specific reason for the award's bestowal. This will normally form the basis for the citation presented to the successful nominee.
3. A narrative (up to one-page) of the nominee's contribution and its significance.
4. A curriculum vitae for the nominee, as well as any other material deemed useful.
5. The name of the person or Member Body or Award Committee who prepared the nomination with appropriate contact information.

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

Nominations should be submitted using the form found at:

[www.iscc-archive.org/UniversalNominationForm.pdf](http://www.iscc-archive.org/UniversalNominationForm.pdf)

This form can be filled out, scanned and emailed to [berns@cis.rit.edu](mailto:berns@cis.rit.edu) or printed, completed and sent to:

Dr. Roy Berns, ISCC Godlove Award Chair  
Munsell Color Science Laboratory  
Color Science Building 18  
Rochester Institute of Technology  
54 Lomb Memorial Drive  
Rochester, NY 14623

**The deadline for receipt of nominations is January 15, 2019.**

**Note: Nominations received after January 15, 2019 will be retained for future consideration.**

## Call for Nominations for the 2019 Nickerson Service Award

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

Nominations should contain the same five pieces of information outlined above in the Call for Macbeth Award Nominations.

Nominations should be submitted using the form found at: [www.iscc-archive.org/UniversalNominationForm.pdf](http://www.iscc-archive.org/UniversalNominationForm.pdf)

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*Call for Nickerson Award Nominations continued*

This form can be filled out, scanned and emailed to [acl99colors@yahoo.com](mailto: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

**The deadline for receipt of nominations is January 4, 2019.**

**Note: Nominations received after January 4, 2019 will be retained for 2020. Nominations for the Nickerson Service Award may be considered to be “open” for submissions at any time. Future Nickerson Service Award committees will review nominations on hand for a given award period.**



## TAGA/ISCC 2019 Joint Conference

The TAGA / ISCC 2019 Joint Conference will be held March 17-20, 2019 in Minneapolis, MN at the Millennium Minneapolis. The conference program is not yet available, but here is a preview:

- Sunday, 3/17/2019 – Keynotes
- Monday, 3/18/2019 – Presentation sessions and ISCC Annual Business and Awards Meeting (lunch)
- Tuesday, 3/19/2019 – ISCC Long-Range Planning Meeting

Registration for ISCC members to attend Sunday and Monday is \$495. If you wish to register, please visit <https://www.taga.org/register/>.

There will be additional TAGA presentations on Tuesday, 3/19/2018. TAGA registration for Sunday, Monday, and Tuesday is \$695 for TAGA members (\$895 for TAGA non-members).

There will be a co-located event on Saturday, 3/16/2019: Fritz Horstman, of the Josef and Anni Albers Foundation, will give a workshop on color education. This workshop will have separate registration and will be limited to 40 attendees.

Please mark your calendar now, and plan to join us in Minneapolis for the Workshop, the Joint Conference, and the Long-Range Planning meeting.

## TAGA Student Design Challenge



The Technical Association for the Graphic Arts (TAGA) invites full-time students to submit designs for use as its new association logo and brand identity.

### Participants must:

- Be enrolled as a full-time student in an undergraduate degree program at a post-secondary technical, two- or four-year college or university. Proof of enrollment is required for finalists before travel stipend is awarded.
- Student artists may NOT work in teams or pairs, all submissions are individual.
- By participating in the contest, the artist accepts and agrees to the terms put forth in the official rules for the Technical Association for the Graphic Arts (TAGA) logo competition.
- Complete the entry form found at <https://www.taga.org/designchallenge/>
- Artists may submit up to two unique (2) logo design(s).
- Design requirements: Logo must adapt efficiently to digital and print media and must be scalable for small and large format reproduction in color and grayscale.

The deadline for entries is 11:59 P.M. December 31, 2018.

A judging panel will select one Grand Prize winner to attend the TAGA Annual Conference March 17-20, 2019 in Minneapolis, MN. The Grand Prize winner will be awarded up to \$1000.00\* USD travel stipend to defray travel costs to attend the conference and a complimentary student conference registration. 1st Place \$500.00 USD, 2nd Place \$250.00 USD, 3<sup>rd</sup> \$100 USD. The winning designs will be used as the official logo for the Technical Association for the Graphic Arts.

Winning finalists will be notified by January 15, 2019 via telephone, email or mail.

*\*Dependent on distance, travel expenses, hotel and transportation costs.*



## Digital Printing Conference 3.0

*A forum for collaboration...the conversation continues*

Explore the key trends and technology developments that are bringing the market for digitally-printed textiles to life — from economics to ink — at the **Digital Textile Printing Conference 3.0**.



This conference will be held December 5-6, 2018 at the Sheraton Imperial Hotel in Durham, NC.

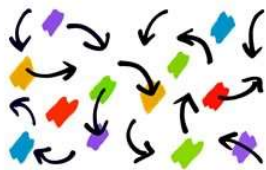
Some of the biggest names in the industry will address the latest industry trends, the newest digital textile ink and printing technology developments, key market drivers, global market conditions, color management and workflow developments, design software, digital manufacturing and integration, micro factories — and more!

One panel will focus on Brand, Color Management, and Digital Workflow and the other on Micro-Factory and Automation. Attendees will have the opportunity to ask questions in these interactive sessions.

This conference will provide an opportunity to connect with industry colleagues and experts, network with businesses similar to yours, and gain valuable knowledge to stay ahead of your competitors.

For more information and to register, please visit [AATCC Digital Printing Conference 2018](http://AATCCDigitalPrintingConference2018).

## Call for Papers – ICA-Belgium Colour Symposium



The Interdisciplinary Color Association (ICA) Belgium is hosting a Colour Symposium that will connect colour in design, art and science. It will be held in Ghent from May

23-25, 2019 at KU Leuven Ghent Technology Campus. Start preparing now to present your work at this unique colour event.

The ICA-Belgium Committee seeks high-quality papers describing original, groundbreaking research, methods, experiments, projects or likewise in the field of colour. Topics include all interdisciplinary approaches and applications concerning colour, from

philosophy to physics, from language to environment, from science to art, from theory to practice, from industry to education etc.

You are invited to submit an abstract for either a 30-minute presentation or a poster presentation. Please note that the official language of the Colour Symposium is English.

All abstracts must be submitted before **January 15, 2019**. Submission details can be found at <https://coloursymposium.org/call-for-papers/>.



## Macy's Joins AATCC and Runway of Dreams Foundation 2019 "Fashion for All" Student Design Competition

The 2019 theme challenges students to design a prom look (male or female) that reimagines fashion and function for a person within the disability spectrum who has ONE of the below conditions:

- non-ambulatory
- limb difference
- cognitive disability
- ambulatory with fine motor challenges
- dwarfism

Macy's will award the winner of the competition with a gift card, a day of shopping/wardrobing with MyStylist for a gala outfit including a session with a make-up artist, and the opportunity to shadow a Macy's senior level designer to experience a professional working in fashion.

Runway of Dreams Foundation will also award a minimum of US\$5,000 scholarship to the first-place winner, US\$2500 scholarship to the second-place winner and US\$1000 scholarship to the third-place winner. Phase I entries will be due by noon US EST December 7, 2018. Finalists will be notified by January 18, 2019. Finalist entries are due by noon US EST March 8, 2019. Winners will be notified by May 2019.

If you would like to enter this competition, please visit [fashionforall](http://fashionforall).

### Attention ISCC Members

2019 is fast approaching. You will receive your 2019 ISCC membership invoice very soon. Please be looking for it online in your email account!



# AIC LISBOA 2018

colour & human comfort



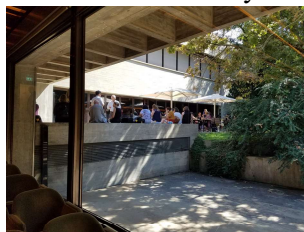
The Portuguese Colour Association hosted the 2018 AIC Interim Meeting in Lisbon, Portugal from September 25-29. The venue was The Calouste Gulbenkian Foundation, which is a green park located in the center of the city.

The meeting opened Sunday evening with a Welcome Party that featured a delightful

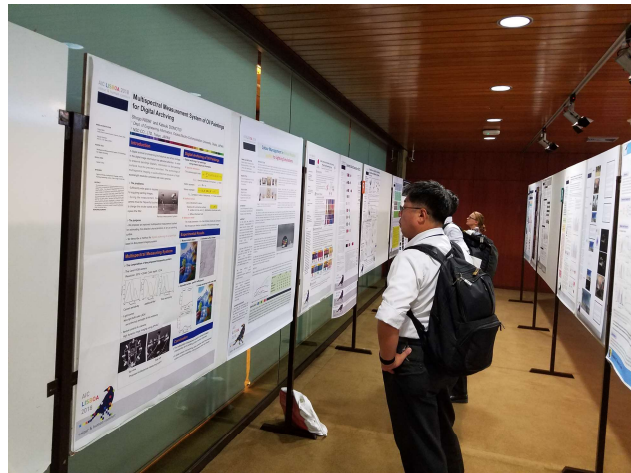


concert by a Coral Group, Musaico. The students were very talented as they serenaded us with beautiful native Portuguese songs acapella. A light supper provided our first taste of the delicious Portuguese food, especially the cod fish.

The meeting was very successful with about 200 attendees from 37 countries. Oral and poster papers were presented on the following topics: Colour in the Built Environment, Colour and Culture, Colour and Health, Colour in Arts and Design, Colour and Lighting, Digital Colour, Colour and Landscape, Colour and Psychology, and Colorimetry. The large auditorium on the left was the perfect location for the oral presentations. The outdoor patio on the right was the ideal location for enjoying the breaks and lunch during the summer-like weather. The daily



poster sessions were held in another section of the same building. All oral and poster sessions were very well attended!



There also was an exhibition room featuring color products from a few companies.



Wednesday night we enjoyed a gala dinner on board the elegant Confeitaria Nacional ship. After a delicious 4-course meal featuring exceptional Portuguese food, we were treated to a Fado concert with a female singer (Fadista) accompanied by a guitar and acoustic bass player. Seeing Lisbon at night really allowed us to enjoy and understand one of the reasons why Lisbon is known as The City of Light. The current AIC President and all former AIC Presidents who were present on the ship posed for a photo opportunity.



Left to right: T.R. Lee (Taiwan), Current AIC President, Former Presidents, Javier Romero (Spain), Berit Bergström (Sweden), Jose Caivano (Argentina), and Paula J. Alessi (USA)

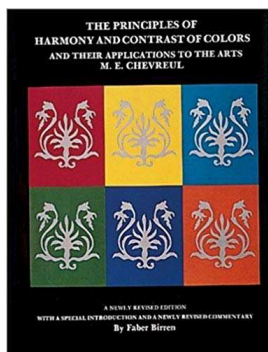
ISCC wishes to congratulate the Portuguese Color Association on their very successful meeting!

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

Number 197 – November - December 1968 on ISCC website - <https://iscc22.wildapricot.org/Newsletter>

The November-December 1968 issue #197 (11 pages long) contains an article on a proposed unique way to get to the very first AIC Congress in Stockholm, Sweden, Color 69. A questionnaire concerning ISCC members taking a charter flight to Stockholm met with enthusiasm. Conflicts concerning the departure date were found. Stay tuned to see if this indeed did happen!

Dorothy Nickerson wrote a very detailed review of Birren and M.E. Chevreul's masterpiece, *The Principles of Harmony and Contrast of Colors and Their Applications to the Arts. Introduction and notes by Faber Birren*. To whet your appetite, here is a short excerpt from Dorothy's review.



"In the section of the Introduction in which Birren discusses Chevreul's works (as well as in Chevreul's introduction to his own book) we find that it was on studying complaints at the Gobelins tapestry works that Chevreul found some of them to be 'well founded as regards lack of stability of the blues and light violets, of gray and brown shades' but not those regarding the blacks. On investigation, Chevreul found that this 'purported lack of strength in the blacks had to do with the phenomena of color contrast and depended on the color with which it was juxtaposed.'" But to summarize these effects in terms of a law that governed them was not immediately possible. His son tells us (p. 23) that his father's mind was constantly on the problem, but that the solution came to him spontaneously while he was attending a public lecture on July 27, 1827, on Hannibal's crossing of the Alps!! On leaving the meeting he immediately explained the terms of the law to his friends Ampere and Cuvier. His friend Ampere exclaimed: 'I am now convinced; it is too simple not to be true.' And from that moment on, his son reports, all of his father's experiments with color were revised, described, and compiled in book form. Yet it was not until 1839, twelve years after the Hannibal lecture, that the first edition was published."

Dorothy ends her review by sharing her personal thoughts on the book: "It is seldom that one comes across a color book so unusual and outstanding in both conception and execution as this one by Faber Birren and M.E. Chevreul."

Surprisingly enough, this issue contains a fascinating report from the American Medical Association on color. The title of this report is "*FOR YOUR HEALTH'S SAKE... BY THE AMERICAN MEDICAL ASSOCIATION --- HOW COLOR AFFECTS US*". It is worth reading the entire article. I will just include some interesting highlights.

### Psychological Effects of Red vs Blue Locker Rooms

An athletic director for a large university redesigned the home football locker rooms to be bright red to fire up his team and the visiting team's locker room to be pale blue to make the opponents a bit more passive. Similarly, Alonzo Stagg, a Chicago coach, had a red room for his players that he used when he wanted to give them fight talks and a blue room for his players to use when they rested.

### Yellows Can Cause Nausea or Air Sickness

Sunlight and warmth are usually associated with most shades of yellow, but some shades of yellow can cause nausea. Research has shown that yellowish foods when served on long ocean voyages can cause people to become nauseated. Commercial airlines stopped using certain shades of yellow for interior design of planes because it was causing passengers to become airsick.

On a positive note, warm sunshine yellows provide 'food for thought' for students and can improve their grades when such colors are used in the classroom.

### Colors Can Make You Feel Cold or Warm

Howard Ketchum, an authority on color and its effects said: "Whether we realize it or not, color can lower our sales resistance, make us feel hot or cold, gloomy or gay. It can affect a man's personality and mental outlook quite as definitely as a sleepless night, a cold in the head or a good square meal." To support this claim, Ketchum cited an example of a New York factory manufacturer who painted the cafeteria light blue. Female employees complained that it felt too cold in the newly painted cafeteria. Ketchum sought the advice of a plant engineer who suggested that they repaint the baseboards orange and place orange slip covers on the chairs. Low and behold, the women stopped complaining about being cold.

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*A Blast from the Past continued***Which are Heavier: Dark or Light-Colored Boxes?**

Workers were complaining that lifting heavy metal black boxes was putting too much of a strain in their backs. The foreman called in a color expert who suggested that they repaint all the boxes a pale green color. Amazingly enough, the workers were better able to lift the “new” pale green metal boxes than the black ones because they “felt” lighter!

**After-Image Color Can Help the Meat Industry**

The sales of red meat products at a Chicago meat market were down after they redecorated and repainted the sales room walls yellow. They called in a color engineer for advice. The engineer found that the after-image created from the yellow they used was a grayish color, which made the meat look very unappetizing. So, the color engineer suggested that they repaint the walls to a greenish cyan color. This made the meat look even redder than its natural color, which increased sales for the company!

**Home Decorating Advice from Faber Birren**

“Faber Birren, a pioneer color engineer, contends that living room walls should be in soft dark hues to show off beautiful furniture to the best advantage. The human eye is always first attracted by brightness, he explains, and too-bright walls will prevent anyone from appreciating the other objects that are in the room.

“Birren believes that dining rooms decorated in soft peach colors produce the best appetites - particularly if they are accented with other edible colors such as lettuce green or apple red. Cool colors are his choice for bedrooms because experiments have shown that such colors actually reduce the blood pressure and induce relaxation. Rose, salmon or similar flesh tones make the best background for singing in the bathtub, according to Birren, because these hues reflect a rosy light and give the bather a glow of healthy well-being.”

Please enjoy the full contents of this 1968 ISCC newsletter by going to our website!

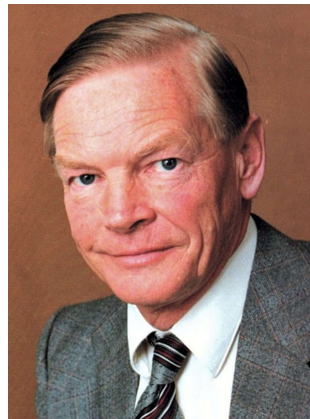
Paula J. Alessi, *ISCC News Editor*

**In Memory of Robert W. G. Hunt**

It is with heavy hearts that we announce the passing of Robert William Gainer Hunt on October 23, 2018, after a short illness. He was 95 years old. We affectionately knew him as “Bob” Hunt. In the words of his son-in-law, Mike Pointer, “Robert was a man of great wisdom, he had time for people, and colour science has lost a true pioneer”.

ISCC especially revered Bob when we awarded him our highest honor, the Godlove Award, in 2007. To quote from Robert Buckley’s citation “The Godlove Award recognizes Bob for the influence he has had on multiple generations of color scientists, engineers and technologists through his writing and his lecturing. This Godlove Award is presented to Bob for his seminal contributions to color science and color metrology, for his development of models of color appearance and for his efforts towards the education of generations of color scientists and technologists”. In his acceptance speech, Bob responded in his usual eloquent and humble way, “I note that I am only the second recipient from outside North America, the first having been David Wright, to whom I owe so much. It was he who first introduced me to the supremely fascinating subject of colour science and his infectious enthusiasm for everything to do with colour has been a lasting incentive to me for over fifty years”.

Bob Hunt was a member of the Kodak Research Laboratories for 36 years and his final position was Assistant Director of Research at Kodak Limited in Harrow, England. He has authored over a hundred



papers on color reproduction, color vision, color appearance and color measurement. He published two classic books that most color scientists have on their bookshelves: *The Reproduction of Colour* (six editions) and *Measuring Color* (four editions).

He had been Chairman and Newton Lecturer of The Colour Group (Great Britain), Chairman of the Colorimetry Committee of the International Commission on Illumination (CIE) and President of The International Colour Association (AIC). He has been the Fleming Memorial Lecturer to the Royal Television Society and the Edridge-Green Lecturer to the Royal College of Surgeons. Bob was awarded the Newton Medal of The Colour Group (Great Britain) in 1974, the Progress Medal of the Royal Photographic Society in 1984, the Judd-AIC Medal of the International Colour Association in 1987, the Gold Medal of the Printing Institute in 1989, the Johann Gutenberg Prize of the Society for Information Display in 2002, and the Award of the Office of the British Empire (O.B.E) in 2009. He was appointed

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# refractions

seemingly random musings on color



## The Dark Spectrum

Goethe and the Imaginative Interrogation of Color

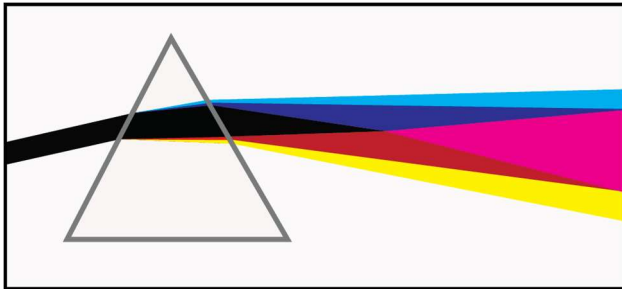


Image source: Carl Jennings

Though often dismissed as misguided and ill-informed, in terms of its scientific understanding of the physics of light, Johann Wolfgang von Goethe's work on color betrays an imaginative approach that knows no equal. His polemical rants against Newton (ones that he came to regret later in life) often obscured his contributions to the more perceptual aspects of color. In some ways, the adoption of the Standard Observer in color science today owes a debt to Goethe's rich and varied experiments on the phenomenology of color perception. And though his explanations and theories can appear wanting, the sheer force of his imaginative investigations have had a lasting effect on the subject of color ever since.

One of the strangest and most fascinating of Goethe's investigations involves what is known as the *dark spectrum* (also known as the inverted spectrum and the Goethe spectrum.) What at first sight might seem like an absurd and logical impossibility, the refraction of darkness has, it turns out, some interesting and curious things to say about our perception of color. The typical spectrum, as exemplified in the work of Isaac Newton, involves passing a beam of white light through a prism, and viewing the resultant array of colors that pass through the other side. Newton coined the term *spectrum* (from the Latin, meaning *apparition*) to describe this well-known phenomenon, and labeled the colors of the spectrum, red, orange, yellow, green, blue, indigo and violet. Goethe, on the other hand, felt that darkness was just as important as light, in the creation of color. In fact, he felt that all colors were an admixture of light and dark, an idea that went back to Aristotle. In his *Theory of Colors* (Zur Farbenlehre) of

1810, he proposed a series of experiments that he felt provided a more complete and comprehensive theory of color than Newton's. One such experiment (Fig.1) posited the idea of passing *darkness*, not light, through a prism, and noting the particular 'spectrum' that appeared on the other side. What Goethe found was a spectrum that was composed primarily of what we would today describe as cyan, magenta and yellow with intermediate colors of red and blue.

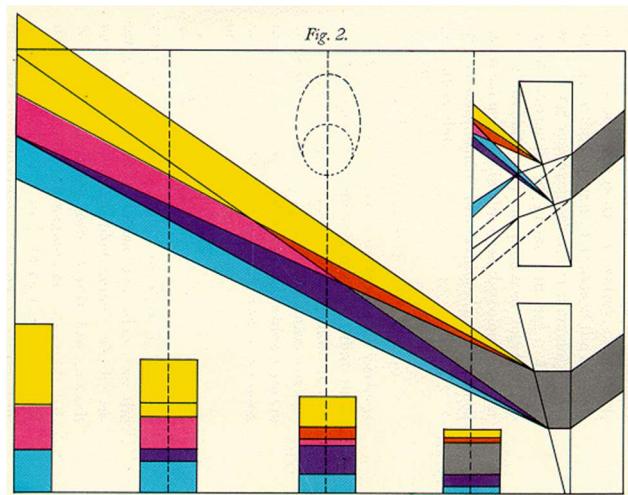


Fig. 1 J.W. Goethe, *Theory of Colors*. Plate IV fig.2 (1810)  
Trans. C Eastlake. Image source: Wikimedia Commons

This effect can easily be produced by projecting the image of a dark line on a white background through a prism (Fig. 2), or by placing an object in front of the prism.

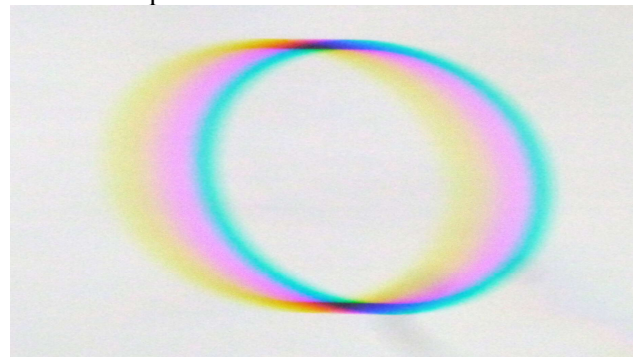


Fig. 2 A black circle image projected through a prism. Image source: author

From the standpoint of color science, darkness is the absence of light, and so cannot be refracted. To be fair, Goethe did not believe that the visible colors of his, or Newton's spectrum for that matter, were the result of

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*Refractions: The Dark Spectrum continued*

differential refraction. Instead he believed that color was an admixture of dark and light, as mentioned previously, and occurred only at the boundaries or edges of light and dark. He maintained that what we see in the middle of each of the two spectra, green (Newton's) and magenta (Goethe's), resulted from the mixing of their borders. Goethe believed that these two spectra proved the polarity and complementary nature of light and dark, a theme picked up by many of his followers and adherents. No doubt they do display a striking symmetry: one light, one dark, one composed primarily of the additive primaries (RGB) the other of the subtractive primaries (CMY), and both seemingly produced in similar ways. But the effect exhibited in the *dark* spectrum, is produced by the light that surrounds the dark shape, as it refracts differentially. Because the darkness is a 'gap' in the light passing through the prism, each refracted wavelength will contain its own corresponding 'gap' and will displace differently, according to its wavelength. By additively combining the remaining wavelengths found at such gaps, the resultant colors will appear, as can be seen in the following diagram (Fig. 3).

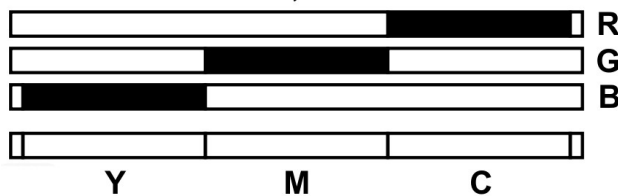


Fig. 3 By refracting the basic components of white light (RGB) the dark shapes contained in each, displace (horizontally) in such a way that the remaining wavelengths additively mix (vertically) to produce the secondary colors that are perceived when passing "darkness" through a prism. Image Source: Dr. Louis Adams.

But though he might have been wrong about the physics of his experiments, his imaginative approach to color is not without merit. Goethe's unorthodox approach encourages us to reimagine color in ways that might lead us to question what is accepted knowledge, and thereby open the door to a line of questioning that is as relevant today, as it was in Goethe's time. Though his science may be 'wrong', the example of the dark spectrum leads to something about color perception that has received very little attention; one that may challenge some of the more established 'truths' about human color perception. But for that, I am afraid I will have to leave you in the... dark, until the next installment!

Carl Jennings, *University of Hawai'i*

Please visit blog at <https://www.refractionsblog.com>



CIE Publication 015:2018 Colorimetry 4<sup>th</sup> Edition (ISBN 978-3-902842-13-8) provides the recommendations of the CIE concerning colorimetry. Specifically, it includes the use of the standard colorimetric observers and standard illuminants, the reference standard for reflectance, the illuminating and viewing conditions, the calculation of tristimulus values, chromaticity coordinates, colour space coordinates and colour differences and various other colorimetric practices and formulae.

As a new feature, the publication also includes further details of advanced colorimetry, including colour appearance models, and new findings on cone-fundamental-based tristimulus functions, with appropriate references to other CIE publications. Additionally, new illuminants for different LED types are introduced.

Tables of the data used in this report are made electronically available for purchasers of this publication via a respective download link.

This publication is consistent with the fundamental data and procedures described in the CIE International Standards on colorimetry.

For further details of some of the phenomena discussed in the document, the reader is directed to the appropriate CIE Technical Reports.

This report replaces CIE 15:2004 "Colorimetry, 3rd Edition".

The publication is written in English, with a short summary in French and German. It consists of 111 pages with one figure and 26 tables and is readily available from the [CIE Webshop](http://www.cie-usnc.org/) or from the National Committees of the CIE.

The price of this publication is EUR 162,- (Members of a National Committee of the CIE receive a 66,7 % discount on this price – please approach your National Committee for information on accessing this discount). To reach the CIE United States National Committee, please visit <http://www.cie-usnc.org/>.

**Save the Date**

The AIC 2019 Midterm Meeting will be held **October 14-17** in Buenos Aires, Argentina. The topic is *Color and Landscape*. This meeting is hosted by the Grupo Argentina del Color (GAC). Visit <http://aic2019.org/>

## HUE ANGLES

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

### Visualizing Four-Dimensional Colorimetry

This essay is a return to the now-popular topic of tetrachromacy (four-color vision [1]), but with a geometric flavor that responds to a challenge by Jan Koenderink:

"I hold the view that it is not possible to understand human color vision completely without having appreciated the tetrachromatic (or polychromatic of any order) embedding. I consider it to be somewhat of a scandal that the literature has so little to offer there." [2, p. 200]

Since the publication of Koenderink's book, as if on cue, researchers confirmed one example of a human tetrachromat [3,4]. So, it is timely to start to answer Koenderink's challenge, comparing trichromacy with tetrachromacy and including some observations that he himself made.

In three color dimensions (e.g., CIE space), it is common to project out one of the dimensions, to produce a 2D chromaticity space. The physical-light domain in this space is a planar region delimited by the spectrum locus and the line of purples: i.e., the familiar horseshoe diagram. Inside the diagram, let's denote a white point W and an arbitrary color A. If you draw a line from A through W, any points encountered thereafter are complementary to A. If you draw the line in the other direction from W through A, you will eventually meet the spectrum locus or the line of purples. If the meeting is with the spectrum locus, the meeting point is called A's dominant wavelength. If the meeting is with the line of purples, then A has no dominant wavelength.

In four color dimensions, the chromaticity domain has 3 dimensions—still accessible to our spatial visualization, perhaps with some difficulty. The spectrum locus is still a curve, but it is a space curve that spans all three chromaticity dimensions---like a bent wire hanger. Now imagine the wire hanger shrink-wrapped by a plastic sheet.\* Every point within the shrink-wrap can represent a physical light. Now, as in CIE space, denote a white point W and an arbitrary point A within the shrink-wrap. Again, you can draw a line between A and W. Extending on the W side, the points are legitimate complements of A: they add in certain proportions to give W. Because of the abundance of shrink-wrap area relative to wire-hanger area (theoretically zero), it will come as no surprise that the line will likely end at a shrink-

wrap point and not at a wire-hanger point: light A probably has no spectral complement. Extending the line on the A side, one similarly encounters shrink wrap and not wire hanger. That denies the existence of a dominant wavelength for the vast majority of colors. The selection of possible outcomes is the same for 3D as for 4D colorimetry, but the odds for each outcome are staggeringly different.

You can also use the picture of wire hanger and shrink wrap in understanding the optimal color reflectances in tetrachromatic color spaces.

In trichromacy, it has been shown many times that the optimal reflectances (on the exterior of the object-color solid in tristimulus space) have values 1 or 0 at each wavelength, with at most two transitions between 0 and 1. To derive the number of transitions [5] one can notionally slice the chromaticity space with a line and define the optimal reflectance transitions as the points on the spectrum locus that were impinged by the slice. The optimality follows from the argument that 1's inhabit all of the curve's wavelengths on one side of the slicing line and 0's occupy the other side---you can't do better than that. In trichromatic space, by the way, the number of transitions is two, if the spectrum locus is convex (which it mostly is).

One can use the same trick in tetrachromatic space, but now one is slicing a 3D chromaticity space with a plane. The number of intersections of the slicing plane with the spectrum locus (wire hanger) is the number of 1-0 transition wavelengths. It now remains to find the tetrachromat's analogue to convexity of the spectrum locus and use it to minimize the maximum number of crossovers. One could begin by asserting that the spectrum-locus curve must span the three dimensions of the chromaticity space, and posit as an axiom that no plane can cross the spectrum locus more than 3 times.

In performing this exercise, I am realizing that, whereas one can use either chromaticity or tristimulus space to visualize basic colorimetry for trichromats, the chromaticity domain is essential for visualizing tetrachromatic relations.

\*I intend shrink-wrap as a metaphor for the boundary of the 3D convex hull of the spectrum locus. Real

*continued on next page*



*Hue Angles continued*

shrink-wrap will sometimes incur concavity, so my metaphor is imperfect.

**References:**

- [1] Jennings C. All the colors we cannot see: tetrachromacy in humans. *ISCC News* Issue 482 (Spring 2018), pp. 13-14.
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- [4] Jameson KA, Winkler AD, Goldfarb K. Art, interpersonal comparisons of color experience, and potential tetrachromacy. Invited proceedings paper for the 2016 IS&T International Symposium on electronic Imaging (EI 2016). Technical session on Human Vision and Electronic Imaging.
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Michael H. Brill, *Datacolor*



## **MUNSELL CENTENNIAL SPECIAL ISSUE, December 2018**

I am honored to be writing this introductory column for the Color Research and Application Munsell Centennial Special issue. The purpose of this special issue is to continue the 2018 Centennial celebration by sharing with the journal readers highlights of the Invited Talks, Contributed Poster Papers, and Artwork pieces that were an integral part of the joint Inter-Society Color Council/Association Internationale de la Couleur (ISCC/AIC) 2018 Munsell Centennial Color Symposium. The Symposium took place at the Massachusetts College of Art and Design (MassArt) from June 10, 2018 to June 15, 2018. The Symposium was a huge international success with about 200 participants coming from 27 different countries around the world.

Let's begin with the story of how the Munsell 2018 Centennial Color Symposium came to be. Back in February of 2016, Inter-Society Color Council (ISCC) was asked if they would be interested in hosting an event to commemorate the milestone anniversaries that would be marked in the year 2018:

- The centenary of Albert Munsell's death.
- The 75th anniversary of Munsell Renotations.
- The 50th anniversary of the publication of Berlin and Kay's "Basic color term theory."

The International Colour Association (AIC) was also interested in a celebration to mark such important anniversaries. As Albert H. Munsell's work in color theory, color education, and color communication has been felt worldwide for the past 100 years, it was deemed fitting that ISCC and AIC should host this one-time special international event.

Munsell was an artist and art educator. So, because I come from the technical side of color, I asked Maggie Maggio, an artist and art educator whose focus is on teaching color in the 21st century, to be my cochair.

Here is a little background on how we put together this Symposium. First, our goal was for this event to be a celebration about the vibrant life of color around the world. So, the 100th year anniversary that became the focus of our celebration was the formation of the Munsell Color Company, which took place in February of 1918 shortly before Munsell passed away.

Next, we had to pick a theme for this event. We chose *Celebrating the Past and Envisioning the Future while bridging Science, Art, and Industry*. In "Celebrating the Past", Albert Henry Munsell was a painter, who enjoyed painting landscapes and portraits. In fact, Helen Keller posed for Munsell as he painted her reading a braille book. Munsell became a teacher after graduating from the Massachusetts Normal Art School—which is now MassArt. Munsell rose to the challenge of teaching color to artists in the early 1900s by developing his unique and different thought for ordering colors. His quote, "Color anarchy is replaced by systematic color description" shows us that he developed the Munsell color order system with specifications like hue, value, and chroma to help his students better understand the complex world of color.

The second part of the theme was "Envisioning the Future". Throughout the symposium, all participants were invited to think about and discuss the following questions:

- Imagine you were taking a walk with Munsell in the year 2030. What kinds of color discussions would you be having?
- How does the Munsell color order system relate to what will be happening in the world of color 20 years from now?

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*CR&A Munsell Centennial Special Issue, continued*

- Munsell was a teacher and artist who combined educational philosophies with the latest color theories and then consulted scientists to develop his color order system. Is it time to repeat that process?
- What will be the cutting-edge areas of color exploration?
- What directions might we be taking in the future?
- How can we work together to promote color literacy in the 21st century?

The final aspect of the theme was *“Bridging Science, Art, and Industry”*. Not only are these three topics the basis for the foundation of ISCC as represented by the three vertices in the triangle of the ISCC logo, but they also describe the threefold purpose of the founding of the Munsell Color Company as evidenced by this excerpt from the foreword of *A Grammar of Color: A Practical Description of the Munsell Color System with Applications for its Use* by T. M. Cleland. This foreword was written by A.E.O. Munsell, Albert H. Munsell's son.

*“In February, 1918, a company bearing his (Munsell's) name was incorporated with the three fold purpose of carrying on the scientific work which he had so ably begun, of furthering the introduction of his system into schools and colleges, and of taking the first steps in its application to the varied problems of the business world.”*

The General Sessions of the symposium were designed to focus on each of the three areas featured in the ISCC logo, the Munsell 2018 logo and the threefold purpose for the formation of the Munsell Color Company. Each general session speaker gave an invited presentation. Monday, June 11 was the Science day. It was dedicated to Rolf Kuehni, the recipient of the 2018 Munsell Centennial Award for Science. Wednesday, June 13 was the Art day. Wednesday was dedicated to Joy Turner Luke, the recipient of the 2018 Munsell Centennial Award for Art. Thursday, June 14 was the Industry day. Thursday was dedicated to Calvin McCamy, the recipient of the 2018 Munsell Centennial Award for Industry. These awards were presented at the Tuesday night Gala Awards Banquet.

Let's talk a little bit more about use of the word *“Bridging”* in the theme. It is rare that scientists, artists, industrialists, and educators interested in color get together to discuss their trade. So, the hope was

that we could use these 5 days to communicate with each other and build bridges and relationships between the disciplines that will last long after the symposium was finished. The schedule built in discussion time after each talk. So, participants were encouraged to ask questions, spark discussions, and start thinking about color in ways that may never have occurred to them before. These discussions began at the end of each talk and continued during the week as all the participants networked with each other at a variety of events. Tuesday, June 12 and Friday, June 15 featured interdisciplinary breakout sessions that were designed to bring together small groups of participants to explore a specific topic in depth. During those 2 days of breakout sessions, participants were able to pick and choose from a variety of tutorials, workshops, and field trips led by an outstanding group of presenters from around the world. The tutorials were 90 minutes long featuring interactive lectures where discussion among attendees was encouraged. The workshops were 3 hours long giving the participants ample time for hands-on experiences and interactive color-related exercises. The field trips were half day sessions off the MassArt campus at places like Harvard University (Collection of Historical Scientific Instruments and The Straus Center for Conservation and the Forbes Pigment Collection), MIT Museum (The Beautiful Brain: Drawings of Santiago Ramón y Cajal), Boston Museum of Fine Arts and Boston Isabella Stewart Gardner Museum. These interdisciplinary breakout sessions were fun networking experiences as artists, scientists, industrialists, and educators from different countries came together to participate in a shared event. New friends were made and new conversations about color were started as enriching color activities brought people together in many different settings.

Finally, the last important fact to share is how the General Sessions were arranged. Each General Session day began with a historical section outlining Munsell's contributions from the late 1880's until his death. That led into an Evolution section that featured the milestones and significant color events that have developed from Munsell's death until the 21st century. Then there was a State-of-the-Art section that described where color concepts are in 2018. Finally, each General Session day ended with talks on what the Future might hold for color in science, art, industry, and education in the years beyond 2018.

Each General Session day featured a Contributed Poster Papers Session where authors were present at their poster as participants wandered around to hear

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*CR&A Munsell Centennial Special Issue, continued*

new ideas about all aspects of color in art, science, industry, and education. There also was a Contributed Artwork display of pieces of art that were done using many different types of media by many of the art and design participants.

This Munsell Centennial Special issue will feature articles from Invited speakers and Contributed Poster Paper authors. Some topics covered by these articles are unique hues, Munsell Crayon spectra, color in abstract images, an elastic color solid, color education, color memory, and preferred colors of meat products, optical measurement standards for reflective e-papers, a new color psychology system, and chromatic harmony in architecture. The art on the cover of this issue is by Evan Murphy, a student from Temple University (USA), who won our Top Student Artwork Award. Please enjoy selected other pieces of art from the symposium display that are sprinkled throughout this issue. Kudos to Maggie Maggio, my cochair, for organizing the artwork in such a way that it would best fit with the articles contained in this issue.

We hope you enjoy this special Munsell Centennial issue and we hope that it sparks new color ideas among our readers for what lies ahead in color beyond 2018!

Paula J. Alessi, *Retired Color Scientist, Eastman Kodak Company, ISCC News Editor*

### In Memory of Robert W. G. Hunt

*continued from page 11*

an Honorary Member of the Society for Imaging Science and Technology and GAC. His later years were spent as an independent color consultant and a Visiting Professor of Colour Science at the University of Derby and the University of Leeds, and of Physiological Optics at City University London.

His lectures touched us all in the color science world. He had a remarkable way of making even the most complex subjects easily understandable. His color demonstrations were unique and extremely instructive not to mention very enjoyable! His quick wit frequently made us laugh out loud.

It is hard to imagine the color science world without Bob Hunt in it. He will stay in our hearts and in our minds forever. Dr. Robert W. G. Hunt leaves a legacy that will remain valuable to the international color science community forever. Our sympathies go out to his family members. We hope that our dear friend and colleague, Bob Hunt rests in peace!

**Color Research and Application**  
Members of the ISCC are invited to Subscribe or Renew their subscriptions for \$158/year  
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### Calling ISCC Communicators!

The ISCC needs your help in building a new team to handle communications. We would like to develop a new and more efficient way of producing the newsletter. Do you have experience with a newsletter for your neighborhood, school, or other volunteer group? We need your expertise in Best Practices to publish our quarterly Newsletter. The content is provided by the ISCC committees and Board of Directors. The Communications Committee is needed to assemble the content into a newsletter to be shared with members. Please reach out to [isccoffice@iscc.org](mailto:isccoffice@iscc.org) if you can help with:

- How to compose and publish a newsletter
- Proofreading
- Editing
- Other ideas about communication

### Cooper Hewitt Museum Presents “Saturated: The Allure and Science of Color”

When was the last time you visited New York City? Well treat yourself today with a visit so that you can see “Saturated: The Allure and Science of Color”. This exhibit is organized into fascinating and colorful seven sections: Capturing Color, Color Optics, Creating Colors, Navigating Color, Color and Form, Color Collaboration and Consumer Choice. It is really worth the trip!

### Editor's Note: Munsell Centennial Color Symposium Special Issue Part 2

The second part of the Munsell Centennial Color Symposium Special Issue will be published as a stand-alone edition of ISCC News. It will be issued following this newsletter. Its number will be #483A. All ISCC members will receive a copy of it to complete the summary of the very successful Munsell 2018 Symposium. So be on the look out for this Special Issue Part 2 #483A.



### Calendar

#### 2018

**Dec 5-6 AATCC Digital Printing Conference 3.0** Sheraton Imperial Hotel, Durham, NC , Info: <https://coloursymposium.org/>

**Dec 5-8 4<sup>th</sup> Conference of Asia Color Association**, Chiang Mai, Thailand, Info: [www.aca2018.rmutt.ac.th](http://www.aca2018.rmutt.ac.th)

**Dec 17 23<sup>rd</sup> Applied Vision Association**, University of London, Great Britain, Info: <http://www.theava.net/meetings.php>

#### 2019

**Jan 30-31 ASTM E12 Meetings**, Hyatt Regency Houston, Houston, Texas, Info: [www.astm.org](http://www.astm.org)

**Mar 17-20 TAGA/ISCC 2019 Joint Conference**, Millennium Minneapolis, Minneapolis, Minnesota, Info: <https://www.taga.org/register/>

**Mar 27-29 IAPR Computational Color Imaging Workshop**, Chiba University, Japan, Info: <http://dippix.tp.chiba-u.jp/CCIW2019/>

**May 23-25 ICA-Belgium Colour Symposium**, KU Leuven Ghent Technology Campus, Ghent, Belgium, Info: <https://coloursymposium.org/>

**Jun 10-13 International Conference on Predictive Vision**, Centre for Vision Research, York University, Toronto, Canada, Info: <http://www.cvr.yorku.ca/conference2019>

**Jun 17-22 CIE Quadrennial Meeting**, Washington, D. C., Info: [www.cie.co.at](http://www.cie.co.at)

**Sep 2-9 18<sup>th</sup> International Conference on Computer Analysis of Images and Patterns**, Salerno Italy, Info: <http://caip2019.unisa.it/>

**Oct 14-17 2019 AIC Midterm Meeting**, Buenos Aires, Argentina, Info: <http://aic2019.org/>

#### 2020

**Oct 12-16 2020 AIC Interim Meeting**, Avignon, France, Info: <https://aic-color.org/event-2880983>

#### 2021

**Oct 11-16 2021 AIC Congress**, Milan, Italy, Info: <http://aic2021.org/>

## ISCC Sustaining Members

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

Avian Technologies	<a href="http://www.avianttechnologies.com">www.avianttechnologies.com</a>	603-526-2420
Bloomsbury Publishing/Fairchild Books	<a href="https://www.bloomsbury.com/us/academic/fairchildbooks/">https://www.bloomsbury.com/us/academic/fairchildbooks/</a>	800-932-4724
BreakThroughColour	<a href="http://www.breakthroughcolour.com">http://www.breakthroughcolour.com</a>	No phone #
Datacolor	<a href="http://www.datacolor.com">www.datacolor.com</a>	609-895-7432
GTI Graphic Technology, Inc.	<a href="http://www.gtillite.com">www.gtillite.com</a>	845-562-7066
Golden Artist Colors	<a href="http://www.goldenpaints.com">www.goldenpaints.com</a>	607-847-6154
Hunter Associates Laboratory, Inc.	<a href="http://www.hunterlab.com">www.hunterlab.com</a>	703-471-6870
Konica Minolta Sensing Americas, Inc.	<a href="https://sensing.konicaminolta.us">https://sensing.konicaminolta.us</a>	888-473-2656
Visual Color Systems	<a href="http://www.visualcolorsystems.com">http://www.visualcolorsystems.com</a>	845-434-2646
Wiley/Color Research & Application	<a href="https://onlinelibrary.wiley.com/journal/15206378">https://onlinelibrary.wiley.com/journal/15206378</a>	877-762-2974
X-Rite Pantone®	<a href="https://www.xrite.com/">https://www.xrite.com/</a>	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](mailto:jconant@aerodyne.com)

### ISCC News Issue #484, Fall 2018

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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](http://www.iscc.org/applicationForm.php)*

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