Inter-Society Color Council *News*

Issue 407 Contents

Register now for the ISCC/CORM Meeting
NIST
Gaithersburg, MD
May 10-14, 2004
"Advances in Measurement Science for Color and Appearance"

January/February 2004

President's Column

Once again winter has wrapped us in its cold – colorless embrace. Still we have good news in this issue. You will find the announcements and registration information about our annual meeting coming up in the spring of this year. It will be held at the NIST laboratories in Gaithersburg, MD. If you have never visited Maryland in the spring then you really must plan on coming. If you have been to Maryland in the spring then you must come to see and hear about all of the recent activities on color measurement taking place in the NIST laboratories in the standardizing laboratories of her colleagues around the world. This is an exciting time in the history of colorimetry. Not since the 1950s has there been so much activity on improving the reliability of color measurements.

The meeting is a joint meeting with the Council on Optical Radiation Measurement (CORM) one of our more active memberbodies. The NIST facility lies in a really attractive campus filled with some of the top research personnel in the world. The meeting will last a whole week with the ISCC Interest Groups holding their meetings first, a joint poster session and project committees in the middle and the CORM conference the latter part of the week. If you stay for the whole week, then NIST is opening their labs for a self-guided tour on Friday afternoon. They will show us all of their instruments and how they develop and certify reference materials. What a terrific opportunity to meet and quiz the people who influence the colorimetry standards we rely on every day.

As I mentioned last month, there is one aspect of the 2004 meeting that will be somewhat different from a typical ISCC or CORM meeting – SECURITY. As a result of current political events around the world, we will need to know of your intention to attend the meeting early and certainly prior to the start of the meeting. So – start making plans to get your registration and company permissions now.

I hope that you are starting to get excited about our fall, Williamsburg-like meeting, at the Fashion Institute of Technology / SUNY in New York City. The general topic will be color in design and color psychology and should include some really terrific presentations and demonstrations.

Danny Rich, President of ISCC

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The New ISCC "Guide to Material Standards" is Out!

After several years of updating by ISCC Project Committee 51, the new revision of ISCC's "Guide to Material Standards and Their Use in Color Measurement" (ISCC TR-2003-1) is now available for purchase from the ISCC office, at a price of $50.00 plus shipping and handling.

The Guide provides an introduction to material standards and their use for the standardization of color measuring instruments. It defines and describes various types of material standards and gives procedures for their use in assessing instrument parameters affecting color measurement. It then discusses desirable properties of material standards, and provides tables of commercially available standard materials, material standards, and standardization services for color measurement. Typical standardization procedures are then provided as examples, and the Guide closes with a Glossary and an Annotated Bibliography.

Initiated by the ASTM in 1957 and continued as ISCC Project Committee 22, the document has a history of more than four decades. The last revision of "Guide to Material Standards" was ISCC Technical report 89-1, published in 1989. Much has changed since that time in instrumentation, available materials, and venues for obtaining and standardizing the materials. The Guide will be an important addition to any colorimetrist's bookshelf.

Joint ISCC/CORM Annual Meeting Registration Information

	Before Mar 30	After Mar 30
ISCC only	$325	$350
CORM only	$325	$350
ISCC & CORM	$600	$650
Students either mtg	$100	$100

Register for both conferences early and save $50!

Cut-Off date for Meeting Registration: April 26, 2004

(Cut-off date meets NIST security requirements.)

For more information and to download a registration form, see ISCC's web site: www.iscc.org.

Hotel Information:

Hilton Washington DC North
Gaithersburg
620 Perry Parkway
Gaithersburg, Maryland, 20877
(301) 977-8900
http://www.hilton.com/ and choose Gaithersburg.

For special room rate, please mention ISCC.
Cut-off date for making hotel reservations: April 8, 2004

ISCC/CORM JOINT MEETING

National Institute of Standards and Technology

MAY 10 -14, 2004, Gaithersburg, MD

Advances in Measurement Science for Color and Appearance

ISCC Preliminary Program

Monday, May 10th

Morning

Interest Group II: Industrial Applications of Color
"Industrial Applications of Color"
Gary Regulski, Chair

Speakers include:
Mike Bradbury, Color Solutions International
David E. Dabney, Americhem
Bruce Mulholland, Ticona

Afternoon

Interest Group I: Basic and Applied Research
"The Role of Standards in Color"
Milt Hardt, Chair and *Milt Misogianes*, Vice Chair

Speakers include:
Dr. Joanne Zwinkels, National Research Council of Canada, "Development of the NRC Reference Gonio-spectrophotometer"
Dr. Robert Hirschler, SENAI/CETIQT, Colour Institut of Brazil, "Standards for Assessing the Quality of Daylight Simulators in the UV Range-A Critical Comparison"

Evening - Awards Banquet, Willow Tree Inn

Tuesday, May 11, Morning

Interest Group III: Art, Design and Phycology
"Translating Color Standards from Designer to Colorist and Back to Designer"
Georgia Kalivas, Chair and
Marcia R. Cohen, Vice-Chair

Speakers include:
John A. Darsey, Jr., Color Solutions Intl. "Setting the Standard Color or Getting the Color that you Originally Wanted"

Wednesday, May 12

ISCC Project Committee Meetings

- ISCC Project 52 on Comparative List of Color Terms (Carter, Chair)
- ISCC Project 54 on Colors of Maximum Contrast (Fairman and Stanziola, Chairs)

CORM Preliminary Program

Wednesday, May 12

Afternoon

Advances in Retroreflectance Metrology
Richard Austin and Norbert Johnson, Chairs

Thursday, May 13 and Friday Morning, May 14th

Sessions:

Haze, Gloss, DOI and Appearance Attributes
Dr. Joanne Zwinkels, Chair

Advances in Color Imaging
David Wyble, Chair

Fluorescence and Color: Whiteness, Brightness, and Chromatic Fluorescent Materials
David Burns, Chair

Thursday Evening

CORM banquet with Dr. Roy Berns presenting the Franc Grum memorial lecture

Friday Afternoon, May 14th,

Tour of selected facilities at NIST

CORM Technical Committee Meetings

Wednesday, May 12

- CORM OP 1 - Inter-Instrument Agreement Evaluation (Rich, Chair)
- CORM OP 2 - Geometric Specification for Reflectance and Transmittance Measurements (Rich, Chair)
- CORM OP 4 - Retroreflectance (Johnson, Chair)
- CORM OP5 - IR Optical Properties of Materials (Hanssen, Chair)
- CORM CR-3 Photometry (Miller, Chair)
- CORM CR-4 Flux Integrating Devices (McKee, Chair)
- CORM CR-5 Flat Panel Displays (Brown, Chair)
- CORM CR-6 Diode Array Spectroradiometry (Austin, Chair)
- CORM CR-7 Measurement of LEDs (Muray, Chair)

ISCC/CORM Joint Events

Poster Session - Tuesday Afternoon, NIST
Karen Braun, Chair

Wine and Cheese Reception - Tuesday Evening, Hilton Hotel

See www.ISCC.org or www.CORM.org for more meeting information.

ISCC 2004 Ballot: Candidates for President Elect and 2004-2007 Director Positions

Following are biographies of the candidates for President Elect and the Board of Directors of the ISCC. According to the procedure begun last year, all members of the ISCC will have an opportunity to vote for president elect and up to three directors. You have thirty days in which to return your vote to the ISCC Office, by mail, fax or email, whichever method is easiest for you. **February 28, 2004 is the deadline.**

Robert R. Buckley for Office of President-Elect – Rob Buckley is a Research Fellow with the Xerox Imaging & Services Technology Center in Webster, NY. He earned two bachelor's degrees - one in electrical engineering from the University of New Brunswick, the second in psychology and physiology from the University of Oxford, which he attended as a Rhodes Scholar - before receiving his doctorate in electrical engineering from the Massachusetts Institute of Technology. Since joining the Xerox Palo Alto Research Center in 1981, he has held several management and individual contributor positions within Xerox corporate research. He has been involved in all aspects of color image processing, specializing in color data interchange, color printing and the development of formats and standards, and has several patents in color imaging. He has led sections of the JPEG2000 and TIFF-FX standards activities and chairs the CIE Division 8 Technical Committee on the Communication of Color Information. Rob has been active in the IS&T/SID Color Imaging Conference since its inception and will be the General Co-chair of the 2004 conference. In addition, he will be the General Co-chair of the IS&T's first Archiving Conference, scheduled for April 2004. It will bring together industrial developers and users, academicians and cultural institutions with an interest in archiving color images. Rob was on the BOD from 2000 to 2003, and was the BOD liaison for the AIC 2001, which the ISCC hosted in June 2001 in Rochester, NY.

Nurhan Becidyan for Board of Directors – Nurhan Becidyan has been in the color business for 30 years. He started first in the Paper Industry as a Technical Director of a tissue mill in Turkey, and then joined SANDOZ LTD (now Clariant) of Switzerland as a sales engineer 1976. He worked for Sandoz (Clariant) in Turkey, Egypt, and Switzerland before being transferred to the U.S. in 1982. At Sandoz he was Industry Manager for Coatings, Printing and Writing Ink Industries, and Synthetic Fiber Dope Dyeing. In 1986 he joined United Mineral & Chemical Corporation, an import and distribution company that acts as exclusive agents to many offshore colorant and chemical companies. Since 1996, he is the President and COO of the company. Nurhan has been involved in selling, marketing and providing technical service to a multitude of color using industries (paper, leather, plastics, synthetic fibers, printing inks, coatings, aluminum and detergents) all these years. Currently he is the Chairman of the Cadmium Pigments Subcommittee CPMA and an active member of ASTM E12 (Color and Appearance) Committee in the fields of Fluorescence and Phosphorescence. He also acts as a technical consultant to some of UMC's principals. He has an undergraduate degree in Chemical Engineering from Robert College, School of Engineering, Istanbul, Turkey, and a graduate degree in Pulp and Paper Engineering from the Institute of Paper Chemistry (currently called IPST) of Appleton, Wisconsin. His main color interests are in phosphorescence and fluorescence (both visible and UV/IR activated) and applications of color for security industries.

Stephen D. Glasscock for Board of Directors – Stephen D. Glasscock is a Senior Scientist at Hallmark Cards, Inc. in Kansas City, MO where he has worked for over 30 years in Technical Research and Development. This work has involved materials and processes used to manufacture such products as greeting cards, envelopes, gift-wrap, tissue, ribbon, candles, ornaments and partyware. Steve has wide-ranging experience in many types of printing and coating, ink formulation, computer color matching, appearance measurement and novel decorating techniques. His work on transfer metallizing, transfer printing and polymer rheology has led to patents and publications. He has presented papers to TAPPI, SOR and AIMCAL. His current interests include the visualization and enhancement of printing system color gamuts, the measurement of fluorescent colors and digital color technology. Steve received a B.S. and M.S. in Chemical Engineering from Northwestern University. Before joining Hallmark, he did R&D in Gulf Oil's Plastics Division for five years. In addition to the ISCC, he is a member of the American Institute of Chemical Engineers and the Society of Rheology.

Britt Nordby for Board of Directors – Britt Nordby is the Technical Manager of Color Science for Degussa Corporation, a manufacturer of pigment dispersions for the coatings industry, where she oversees a wide range of color science-related activities for the company's Architectural & Industrial Colorants Business Lines. These include managing the Corporate Color Laboratory, providing technical support to customers, and the marketing of color systems for point-of-sale. She received her B.S. degree in Color Science from Philadelphia College of Textiles and Science and has since been involved in various color-related industries such as plastics, textiles, computer and coatings. Her interests include improved color matching techniques, new color display methodologies, color management and

Continued on page 5

reproduction. Britt is currently a member of IS&T, SPE, FSCT, as well as the ISCC, where she served as Chairperson for Interest Group II (Industrial Applications of Color) for the past 4 years.

Frank O'Donnell for Board of Directors – Frank O'Donnell is a Division Scientist with The Sherwin-Williams Company.. He has worked for Sherwin-Williams for the past fifteen years. Ten years in the Automotive Finishes Division and five in their Consumer Group. In both divisions his work has concentrated on color test methods and computer color matching. Prior to working at Sherwin-Williams he worked at Diconix Inc. where he developed ink-jet inks and worked on digital imaging. Frank graduated from Manchester University U.K. with a Bachelor's degree in Chemistry in 1973. He obtained his Masters degree in education in 1974 and taught high school for five years. In 1979 he emigrated to the U.S. He studied Color Science at Rensselaer Polytechnic Institute where his research advisor was Dr. Fred Billmeyer Jr. He graduated with his doctorate in 1984. Frank has been a member of ISCC for more than twenty years and was Vice Chair of Interest Group I from 1998 to 1999 and Chair from 1999 to 2000. Frank has published and presented papers on such diverse topics as appearance and print quality.

Anthony P. Stanton for Board of Directors – Anthony Stanton is the Director of Graphic Media Management and Associate Teaching Professor at Carnegie Mellon University in the School of Industrial Administration. Graphic Media Management is a depth track (concentration area) in the undergraduate business school at CMU. In addition to teaching, Anthony is responsible for developing the curriculum, administering adjunct faculty, and advising students in the track. During his seven years at CMU, Stanton has taught a variety of courses including: Introduction to Graphic Media Management, Publishing on the Worldwide Web, Printing Technologies, Color Reproduction and Management, and Emerging Graphic Technologies. Prior to teaching at CMU, Stanton spent twelve years as Director of Process Controls for the Graphic Arts Technical Foundation. In this position, he was responsible for designing and overseeing the manufacture of quality control devices for the printing industry. He also performed research on print analysis and color reproduction. During his tenure at GATF, Anthony introduced whole-process test forms into the product line, which previously included only individual devices. He also introduced digital targets (and later, native PostScript targets) into the Foundation's product line. Stanton's educational background includes a BA in Art Studio from Colorado College (1972), an MEd in Industrial Education from the University of Maryland (1978), an MS in Printing Technology from Rochester Institute of Technology (1982), and a PhD in Instructional Technology from the University of Pittsburgh (1992). He has authored dozens of technical papers and holds a patent for a Frequency-Modulated control device.

Michael Vrhel for Board of Directors – Michael Vrhel is currently the Senior Scientist at ViewAhead Technology in Redmond, Washington. He graduated summa cum laude from Michigan Technological University with a B.S. in electrical engineering in 1987. In 1989, he received an M.S. degree in electrical engineering from North Carolina State University. In 1993, he received a Ph.D. in electrical engineering from North Carolina State University. During his Ph.D. studies he was an Eastman Kodak Fellow. From 1993 to 1996, Michael was a National Research Council, Research Associate at the National Institutes of Health (NIH) Bethesda Maryland, where he researched biomedical image and signal processing problems. In 1996, Michael was Senior Staff Fellow with the Biomedical Engineering and Instrumentation Program at NIH. From 1997 to 2002, he was the Senior Scientist at Color Savvy Systems Limited, Springboro Ohio where he developed color device characterization software and low-cost color measuring instrumentation. He obtained two patents at Color Savvy Systems and has several pending. Michael has published over 40 refereed journal and conference papers. He is a Senior Member of the IEEE, and a member of the SPIE. He is currently serving as a Guest Editor for the IEEE Signal Processing Magazine, Special Issue on Color Image Processing. He was a Conference Session Chair for ICIP-2002, ICIP-2000, and SPIE Wavelet Applications in Signal and Image Processing IV 1996

New NIST Reference Instrument for Measuring Surface Color

A new reference instrument for measuring the surface color of materials with high accuracy has been developed by the National Institute of Standards and Technology (NIST) Optical Technology Division. The Division now provides a calibration service for 0°/45° industrial color standards. Because color often plays a major role in the acceptability of a product, this calibration service is designed to meet a demand for improved measurements and standards to enhance the color matching of products.

The new reference colorimeter measures the spectral reflectance properties of non-fluorescent samples, from which color quantities are calculated. The instrument is designed to perform measurements at all possible combinations of illumination and viewing angles, which is important for accurate image rendering. In addition, the standard 0°/45° geometry (illumination at 0 degrees and viewing at 45 degrees) is highly automated through the use of a sample wheel with a capacity of 20 samples.

The new calibration service is NIST's first for color measurement in many years. This new service complements ongoing services in reflectance, transmittance, and specular gloss. Industrial customers are expected to send samples (typically colored tiles) to NIST for measurement, and then use these samples as standards to calibrate their own instruments.

Dr. Maria Nadal, NIST

SID/IS&T
11th Color Imaging Conference

November 5-7, 2003, Scottsdale, AZ USA

The 11th Color Imaging Conference (CIC), jointly sponsored by the Society for Information Display (SID) and the Society for Imaging Science and Technology (IS&T), drew 265 color scientists and engineers. The high quality of the refereed papers maintains the CIC's reputation as the premier forum for color imaging. It is worth noting here that several ISCC members received awards at CIC-11, as reported in Issue # 406, p. 5.

The tutorials had great variety this year. A successful two-day class, "Basic Color Science & Imaging," by R. W. G. Hunt, attracted 45 attendees. During the same two days, 12 two-hour tutorials offered an alternative smorgasbord: Color Appearance Modeling: CIECAM02 and Beyond (Mark Fairchild, RIT); Solving for Colour Constancy (Graham Finlayson, Univ. of East Anglia); Retinex Theory and Application (John McCann, McCann Imaging); Psychophysical Quantification of Image Quality (Brian Keelan, Eastman Kodak); Spatial Color-Vision, Devices, and Imaging (Lindsay MacDonald, Univ. of Derby); Digital Photography (Michael Kriss, Sharp Labs); Color in Electronic Displays (Gabriel Marcu, Apple Computer); Recent Advancements in Color Print Technologies (Annette Jaffe, Jaffe Consulting); Digital Color Halftoning (Keith Knox, Boeing LTS); and Color Processing Functions and Their Interactions in a Digital Imaging System (Raja Bala and Gaurav Sharma, Xerox).

A significant theme this year was the dynamic range of an image. Several papers dealt with high-dynamic-range (HDR) input images compressed into low-dynamic-range outputs. Faithful rendering of bright-daylight colors received some color-management notice. The low-luminance regime also received attention, through models and methods of dealing with the mesopic regime—in which both rods and cones contribute to color vision.

Two papers quantified aspects of mesopic vision. Lindsay MacDonald (now at the London College of Printing) generalized the lightness predictor of CIECAM02 to include rod contributions. An interactive presentation by JaeChul Shin, Naoki Matsuki, Hirohisa Yaguchi, and Satoshi Shioiri (Chiba University, Japan) provided an experiment and a model for predicting asymmetric color matches across vastly different illuminance levels. The experiment was probably difficult, but the model is the first I've seen that predicts mesopic color matches.

Garrett Johnson (RIT) and Hedva Spitzer (Tel-Aviv Univ.) reported on compression of high-dynamic-range images to lesser-dynamic-range output media. Both works used spatio-chromatic vision models that produce, as Johnson said, "a tone curve for each pixel in the image depending on the luminance of the surrounding neighborhood." Because Johnson incorporated an inverse "eyelike" transform to the destination medium in color but not in space, I saw a new frontier for color management: apply its rigors to spatial-image management.

A new session on digital cinema drew experts who had never before attended a CIC. Chuck Harrison (Far Field Associates, Snohomish, WA) started the session by describing how color management in cinema is unlike that in other media. First of all, the darkness in a movie theater removes the external "reference white" to which the eye may adapt: we adapt to whatever light is on the screen. The luminance level, at most 50 cd/m^2, is low compared with other media. The dark viewing environment suppresses extraneous light, so the screen contrast can vary from 500:1 to 10000:1, clearly an excursion into the mesopic range. Whereas Harrison emphasized the transition from film to digital light projectors, Ado Ishii (Imagica, Tokyo) and Dave Bancroft (Thomson Broadcast & Media Solutions) discussed workflow that sometimes led back to a hardcopy print. Joseph Goldstone (previously at Industrial Light + Magic, now at Lilliputian Pictures), reported his transport of images from a digital HDTV original to film.

A session on mathematical analysis of color imaging, chaired by Michael Brill (Datacolor), featured two papers, one applying known invariant expressions to sort images numerically, and the other using a symbolic-manipulation program to generate all the invariants in a new situation automatically. Steven D. Hordley (Univ. of East Anglia, UK) examined the extent to which histogram-equalization can sort images independent of illuminant and device, and found the results encouraging. Reiner Lenz (Linköping Univ., Sweden) presented "Group Theoretical Invariants in Color Image Processing." Using a program in Maple that exploits the theory of Lie groups, Lenz used a new kind of dichromatic-reflection model to illustrate how all the invariants can be enumerated without overcounting them.

Two papers described case studies of ICC-based color-management. One was "Issues Encountered in Creating a Version 4 ICC sRGB Profile," by Kok-Wei Koh (Hewlett-Packard). In applying ICC profiles for the first time to digital cinema, Joseph Goldstone (whose paper is discussed above) recounted some difficulties in using the system.

In the tradition of CICs, three keynote presentations highlighted CIC-11, one of them by Robert W. G. Hunt (Univ. of Derby, UK). Hunt's keynote, "The Importance of Not Being Too Earnest," described corrections for such image distortions as lens vignetting, camera spectral sensitivities, reproduction gamut, and spatial resolution limitation. He concluded that "means for correcting these deficiencies are sometimes available, but the earnest application of these methods can be undesirable in practice." Reiner Eschbach (Xerox, Webster, NY) stressed that an image inherently loses information relative to its "original", and that we seek less to reproduce an image than to produce one that satisfies a need. Finally David Brainard (Univ. of Penn.) discussed showed some startling constancy effects that call for new high-level vision models.

David G. Stork (Ricoh Innovations and Stanford Univ.) delivered Thursday evening's address, "Did the Great Masters 'Cheat' Using Optics?" The presentation replied to an analysis by artist David Hockney and physicist Charles Falco that claimed artists as far back as 1420 CE relied on images cast by a mirror-based camera obscura. By showing in the

Continued on page 7

paintings that parallel lines didn't converge to vanishing points (among other things), Stork assured us that Renaissance artists probably didn't use optics in this way.

The winner of the annual "Cactus" poster award was "Illuminant Multiplexed Imaging: Special Effects Using GCR" by Gaurav Sharma (Univ. of Rochester), Robert P. Loce, Steven J. Harrington, and Y. (Juliet) Zhang (the last three from Xerox). By clever ink and lighting design, these authors produced a picture that transformed into another picture when the lighting changed. Henry Hemmendinger (recently deceased) talked of seeing somewhere in San Francisco a plate by M. C. Escher that had the same property. In that case a moonlit scene transformed into a sunlit scene. Neither Hemmendinger nor anyone else could find that plate again. If you've seen it, please let me know.

Finally, the late-breaking news session at the end of the conference featured four high-quality papers. The first, by Robert Ulichney (Hewlett-Packard, Cambridge, MA), described a website, www.redbot.com, to which anyone can upload a digital photograph in which a flash has created a red retinal reflection from the eye of a photographic subject. In return for offering the image to the Redbot database, the donor receives a redeye-corrected version of the image, usually in less than a second. Other papers in the late-breaking session dealt with new printer and camera developments.

In 2004, CIC-12 will be held in Scottsdale on November 9-12. CIC-12 will develop themes from previous years, and will begin to add new ones such as astronomical imaging, imaging of art works, and preservation of color ("color for the 22nd century and beyond").

Michael H. Brill, Datacolor

Member Item:

R. S. Fisch-Robert L. Leslie Graphic Arts Collection

Richard Fisch has donated his extensive graphic arts library and that of his uncle, Robert L. Leslie, to the GATF Library. The collection includes books and journals on photography and photographic processes. The two hundred plus books in the collection were published from 1855 to 1999 and include several very rare editions. Notable books are Photographic Chemistry by Hardwich published in 1864 and Photographic Mosaics by Lea and Wilson published in 1866. The photographic journals and technical annuals include the American Annual of Photography, Photographic Engineering, and the British Annual of Photography. In addition the collection includes over four hundred journals and magazines. To view the full press release, please visit http://www.gain.net/PIA_GATF/newsroom/archives/g1103d.html

CIE EXPERT SYMPOSIUM LED Light Sources: - Physical Measurement and Visual and Photobiological Assessment -

LED light sources are now widely used in illuminating engineering as well as in information technology and are expected to be one of the major light sources in our future life. Despite the wide and rapidly growing use of LEDs, reliable methods for physical light measurement and visual and photobiological evaluation are still in question. The CIE organized two successful symposia on LEDs in 1997 and 2001. There are still yet many questions left unsolved such as measurement of partial flux and radiance, visual evaluation such as colour rendering, requirements for photobiological safety, and so forth.

To discuss these issues, CIE Divisions 1 and 2 as well as Division 6 plan to hold a CIE symposium on LED light sources focusing on items in these areas covered by the Divisions. The meeting will be held at AIST (National Institute of Advanced Industrial Science and Technology) Tokyo Waterfront, Japan June 7-8, 2004 with support from the Japanese National Committee of the CIE and AIST, Japan. The symposium outcomes will be used as recommendations for new work items in the Divisions.

The two-day Symposium will feature Invited Papers and Contributed Papers. Ample time will be secured for round-table discussions. A Poster session with a capacity of several papers will be held also. Papers dealing with the following subjects are invited:

- Physical measurement of radiometric properties of LED light sources
- Photometry and colorimetry of LED light sources
- Photometric standard LED light sources
- Colour rendering of LED light sources
- Brightness evaluation of LED light sources
- Visual performance under illumination of LED light sources
- Photobiological evaluation of LED light sources
- Photobiological safety standard of LED light sources

Authors should submit two page extended abstracts of their proposed contributions in English using the Submission Paper Form to be found at the WEB site of the Symposium: http://www.cie.co.at/symp/ledforms.html **by email or post no later than January 31, 2004** to the Chair of the Symposium:

Dr. Ken Sagawa - *sagawa-k@aist.go.jp*

AIST, 1-1-1 Higashi, Tsukuba, Ibaraki 305-8566, JAPAN

Symposium registration forms for the event can be found at http://www.cie.co.at/symp/ledforms.html. Deadline for early registration is March 15, 2004. For accommodation you can find information on hotels in Tokyo on the AIST WEB site, http://unit.aist.go.jp/humanbiomed/humed_en/index_en.htm.

Color Research and Application In This Issue, February 2004

It is 2004, a new year and, according to the saying, life goes on. But unfortunately too often we are reminded that it doesn't really happen that way. In this issue, we say good-bye to Henry Hemmendinger, who died this past year. I am sure I am not alone when I say "Henry was, is, and will remain an inspiration to me."

We lead off with a review of "Cognitive Color." We often discuss color vision and the perception of color. An additional step to be considered is what happens within the brain after the early visual processing. In the past we have had articles on color categorization and naming. All of these fall under the category of cognition. Cognitive color involves the categorization necessary to perform a certain task. Our first article surveys cognitive aspects of color in terms of behavioral, neuropsychological and neurophysiological data. In particular, the authors Gunilla Derefeldt, Tiina Swartling, Ulf Berggrund and Peter Bodrogi discuss the visual tasks that require cognitive color including color categorization, color coding, color naming, the Stroop effect, spatial organization of colored visual objects, visual search and color memory.

Our second article involves the use of color for attracting attention. In the case of vision, it is not possible to process all data at once, to recognize everything in the visual field at one time. Thus, we make selective decisions to focus on one area for processing, before moving on to another. Nilgün Camgöz, Cengiz Yener, and Dilek Güvenç have been studying the "Effects of Hue, Saturation, and Brightness." In Part 1 they focused on preference. In this issue the same authors present "Effects of Hue, Saturation, and Brightness: Part 2: Attention." Here they report on the attention responses for various foreground-background color combinations. Their findings show that no matter the background, the foreground color with the highest saturation and brightness attracts the most attention. Hue seems to be of secondary importance. Also, statistical analyses show that neither gender nor location has a significant effect on attention.

In "Spectral Spaces and Color Spaces" Rajeev Ramanath, Rolf G Kuehni, Wesley E. Snyder, and David Hinks compare psychological 3-dimensional color spaces with those resulting from a dimensional reduction of a spectral space. A spectral space is based on implicit weighting by functions derived from mathematical analysis of spectral data. A color space is the explicit weighting by function based on the results of color-matching experiments. It is the intention of the authors to demonstrate that the differences between the two types of spaces are critical from the point of view of color vision.

The measurement of colored materials has been reported for fifty years or more. However, new materials such as those using pearlescent pigments present special challenges, and the measurements have not yet become routine. Our next article, "Color Measurement for Pearlescent Coatings," describes the colorimetric characterization of pearlescent coatings at the National Institute of Standards and Technology in the United States. Maria E. Nadal and Edward A. Early report on a research project, which had the goal of developing a measurement protocol for the accurate color characterization of pearlescent coatings. This research used an understanding of the pearlescent scattering mechanism as a guide.

In the December 2003 issue of this journal James A. Worthey discussed "Color Rendering." I had stated that the article in that issue subtitled, "Asking the Question" was the first in a series and the next would come in this issue. In this issue we have Part 2 "Color Rendering: a Calculation That Estimates Colorimetric Shifts." In this part Dr. Worthey reports on an opponent-colors analysis that leads to a matrix formulation. Using the elements of the resulting matrix it is possible to explain and quantify the colorimetric shifts that result when changing to a specific light source.

To quote John Hutchings, a color can mean whatever we wish it to mean. Specific colors are used as symbols, which have special meanings and uses within our culture, some legislated and some traditional. The colors used or their meanings differ from one region to another. In the article John Hutchings discusses "Colour in Folklore and Tradition – The Principles." First he reports on a project in which he searched for evidence for use of color in custom, oral tradition and language. Then, he examined the evidence and looked for patterns of human behavior.

In our Industrial Applications section this month, we focus on the food industry, in particular meat processing. Most additives used in meat processing cause changes in the color of the meat. In "Effect of Sodium Chloride, Sodium Tripolyphosphate and pH on Color of Pork" J. Fernández-López, E. Sayas-Barberá, J. A. Pérez-Alvarez, and V. Aranda-Catalá quantify the effect of various processing changes or additives on the colorimetric properties of meat. They report that from a technological point of view, the additives used in meat processing modify the myoglobin forms and other factors resulting in an enhancement of the final meat color.

We close this first issue of the year with three book reviews, announcements about two upcoming meetings, announcements about awards, and some information from the Inter-Society Color Council (a meeting report, and two news items). Dr. Danny C. Rich reviews *Modern Concepts of Color and Appearance* by Choudhury. Dr. Robert T. Marcus comments on *Understanding Science and Technology of Color* by Gangakhedkar and I discuss the book, *Colour Engineering: Achieving Device Independent Colour* edited by Green and MacDonald. We note the upcoming CIE Expert Symposium on Image Acquisition and Display and CGIV 2004. Let's offer congratulations. Two

Continued on page 9

people on the Editorial Board of this journal were honored this past year. Mitsuo Ikeda received AIC Judd Award and Rolf Kuehni received ISCC Godlove Award. The new section of this issue describes these awards.

Ellen Carter, Editor
Color Research and Application

AIC Colour 05

The 10th Congress of the International Colour Association, AIC Colour 05, is to be held in Granada (Spain) in the Granada Conference and Exhibition Centre (palacio de Exposiciones y Congresos de Granada) from 8 to 13 May 2005. Since 1969, the AIC has held an international congress every four years, bringing together specialists in the various branches and aspects of colour science from all over the world. The Spanish Colour Committee participated in the founding of the AIC in 1967 although this is the first time that the committee has had the honour of hosting the international congress.

The organizing committee has the pleasure of inviting all those either actively involved or interested in the field of colour science to attend the 10th International Congress in Granada. Scientists, technologists, engineers, architects, artists, designers and educators, who all study the subject of colour from many points of view, will have the chance to exchange opinions and the results of their research within a wide selection of specialist and multidisciplinary forums.

The scientific, cultural and social program is designed to fulfill the primary aims of the conference to bring up to date our knowledge and understanding of colour science and to encourage the exchange of ideas among the participants.

Because of the interdisciplinary nature of the conference, subjects are wide-ranging, including such topics as colour-appearance models, colour management, colour imaging, the multispectral processing of chromatic information, the colorimetry of foodstuffs and materials such as textiles and ceramics, colour-representation systems and colour-difference formulas, colour in education, colour vision, colour in object design, colour restoration, the use of colour as an element of artist expression and colour in different popular cultures.

The scientific program will be arranged around symposiums, a variety of talks on particular subjects, the presentation of posters, guest lectures given by specialists renowned in their field, discussion groups and an exhibition of technology and instruments related to all aspects of colour science.

Prospective authors are invited to present original papers for presentation in any of the technical areas related to the field of colour. All papers will be reviewed by the scientific committee to ensure that the conference provides significant and timely information to its participants.

An exhibition featuring the latest developments in colour technology will be held during the congress. If you would like to exhibit would you please return the pre-registration form to the secretariat or contact us via the web page.

For further information check the conference web site: www.ugr.es/local/aic05.

AIC Colour 01 Symposia Videos -- Order Information and Form

All AIC Colour 01 meeting symposia were recorded, and videos are now available in NTCS and PAL format VHS tapes. The symposia included in the packages are:

- What is Color?
- The State of the Art and Futureof Color Management
- Role of Color in the 3-D Worl
- How Should We Teach Color?
- The Artist and Digital Media
- How is CIE Helping Us Make Color Work?
- What is Color For?
- Color Issues for Digital Archives
- Environmental Color Design
- Spectral Imaging
- The Future of Color

The videos were digitally mastered and fully edited. They also include important discussions and papers that were NOT included in the AIC Color 01 Proceedings.

Please specify the package wanted. Note, there is an additional cost of $50 for PAL tapes. Shipping costs within the US are $6.50, $8 for Canada & Mexico and $10 for all other countries. The video package includes four VHS tapes. Place an X next to the package you are interested in purchasing. No orders will be processed until payment is received for both the package and shipping.

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Cynthia Sturke, ISCC Office Manager

CALENDAR

Please send any information on Member-Body and other organization meetings involving color and appearance functions to:

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2004

Jan 18-24	**IS&T/SPIE Electronic Imaging Conference 2004,** San Jose Marriott and San Jose Convention Center San Jose, California USA, www.electronicimaging.org
Feb 8-10	GAFT Technical Alert Conference 2004, Pittsburgh, PA, Gwen Martin *gmartin@gatf.org*, 412-741-6860
March 28- 31	**2004 NAPIM Annual Convention,** LaQuinta Resort, LaQuinta, CA http://www.napim.org/
Mar 31-Apr 2	ISENA Lightfair International, Las Vegas, NV
Apr 5-8	**CGIV 2004 - Second European Conference on Color in Graphics Imaging and Vision,** Technology Center AFIT, Aachen, Germany, www.imaging.org/conferences/cgiv2004/
April 18-21	**TAGA/IS&T 2004 San Antonio,** Hyatt Regency Riverwalk Hotel, San Antonio, TX, Contact: TAGA at 585-475-7470, http://www.taga.org
April 20-22	**Color Pigments Manufacturers Association, Inc.,** "International Color Pigments Conference," Chicago, Ill. Contact CPMA, P.O. Box 20839, Alexandria, VA 22314; email *cpma@cpma.com*
April 25-29	**Society of Plastic Engineers/Color and Appearance Division, Chicago ANTEC,** Navy Pier, Chicago, IL, www.specad.org
May 10-12	**ISCC Annual Meeting and Symposium,** Co-sponsored by ISCC and NIST, National Institute of Standards and Technology, Gaithersburg, MD. ISCC IG meetings will be May 10 and 11; ISCC PC Meetings will be May 12
May 12-14	**CORM Annual Meeting,** NIST, Gaithersburg, MD.
May 17-19	**ASTM E12 Color and Appearance Meeting,** Gaithersburg, MD
May 23-28	**ASPRS 2004 Annual Conference, "Mountains of Data — Peak Decisions,"** Adam's Mark Hotel, Denver Colorado, http://www.asprs.org/denver2004
May 23-28	**SID International Symposium 2004,** Washington State Convention and Trade CenterSeattle, WA, http://www.sid.org/conf/conf.html
July 25-28	**IESNA Annual Conference,** Illumination Engineering Society of North America, Marriott Waterside Hotel, Tampa, Fl http://www.iesna.org/
Sept 13-17	**AATCC's 2004 International Conference & Exhibition,** a co-located event with ATME-I 2004, Palmetto Expo Center in Greenville, SC, http://www.aatcc.org/ice/
Sept. 15-17	**CIE Expert Symposium on Image Acquisition and Display,** Budapest, Hungary
Oct 10-14	**OSA, Frontiers in Optics 2004/Laser Science XX,** Rochester Convention Center, Rochester, New York, http://www.osa.org/meetings/annual/
Oct 22-24	**ISSC Williamsburg Conference,** Fashion Institute of Technology, New York, New York, *iscc@compuserve.com.*
Oct 13-15	**NAPIM 2004 Technical Conference,** Pheasant Run Resort and Spa, St. Charles, IL, http://66.95.150.74/
Oct 27-29	**FSCT, ICE 2004, "Challenge – Change – Opportunity,"** McCormick Place North, Chicago, IL, www.coatingstech.org

CALENDAR, Continued

Nov 9-12 **IS&T/SID, CIC12 12th Color Imaging Conference - Color Science, Systems & Applications,** The SunBurst Resort, Scottsdale, AZ, http://www.imaging.org/conferences/cic12/authors.cfm.

2005

April 7-11 **NAPIM Convention** - Hyatt Coconut Point, Bonita Springs, FL, http://www.napim.org/.

May 8-13 **AIC 05 Granada, 10th Congress of the International Colour Association AIC Colour 05,** Conference and Exhibition Centre, www.ugr.es/local/aic05 email: *eurocongres@eurocongres.es*

May 12-21 **CIE Divisional and Technical Committees Meetings, Lighting in the XXI Century,** Leon, Spain, email: *leon05@ceisp.com.*

Electronic Distribution of ISCC Newsletter

ISCC will be distributing the newsletter electronically via email to all members unless otherwise requested starting with the Jun/Jul issue. Please make certain that ISCC has your correct email address.

Publications Available from ISCC Office

Color and Light by Fred W. Billmeyer Jr. & Harry K. Hammond., III. Authorized reprint from: ASTM Manual 17, Copyright 1996, ASTM International, 100 Bar Harbor Dr., W. Conshohocken, PA 19428 ..... $5 ea or 20 copies/$50.00

Demystifying Color by Bob Chung, 11 pages. Discusses and explains ten myths about color ... $5 ea or 20 copies/$50.00

Proceedings - 9th Congress of the International Colour Association, AIC Color 01 Rochester, Allan Rodrigues, Editor, papers given at technical sessions $75*

Guide to Material Standards and Their Use in Color Measurement (ISCC TR-2003-1). The Guide, developed by ISCC Project Committee 51, provides an introduction to material standards and their use for the standardization of color measuring instruments $50

*Plus shipping and handling

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The ISCC advertising policy for the ISCC News is as follows: Pre-paid color-related advertising will be accepted 30 days in advance of the publishing date. The rates are:

$ 100	business card-size ad
$ 250	1/4 page ad
$ 500	1/2 page ad
$1,000	full page ad

The editor reserves the right to determine the acceptability of the advertising. A 20% discount is available for a yearly contract.

Job Wanted

An ISCC Member seeks employment in the area of color in Architecture, Urban Design or Interior Design.

Education includes Bachelors Degree in Architecture from Middle East Technical University (1990), Masters Degree in Building Design with a thesis entitled "Color Dimension in Urban Space (1995), PhD in Building Design with a thesis "Constituting Vernacular Color Palette of Bursa and Its Relation with Traditional Color Culture of the City (2003).

Work experience: Teaching experience at the Middle East Technical University, color research and applications, architectural office experience, organization of symposiums, congresses, exhibitions and other cultural activities, translation and interpretation for United Nations and other governmental immigration groups.

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All submissions must be in English. Please submit materials by the first of each even numbered month. Materials submitted later may be printed in the following issue.

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IsoColor Inc.	*www.spc-software.com*	201-935-4494

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