



Inter-Society Color Council *News*

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The
2002 ISCC Directory
will be arriving with
your next issue. To
reserve your copy,
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dues are current and
any contact information
changes are recorded.

May/June 2002

Acceptance Speech ISCC President Danny C. Rich, Ph.D.

April 22, 2002

Thank you Jack, for passing the gavel to me and for leaving me a heritage of accomplishments that will be difficult to follow. After the events of the last two years – the bursting of the bubble in the electronic color business and the shock of September 11, 2001, the ISCC, like many of our member bodies, has great challenges to meet in the next two years.

Under Jack's guidance, the ISCC has successfully begun its transition from a council of professional societies to a council of professional color scientists, engineers, technologists, artists, educators and designers. I have the privilege of continuing this process toward transforming the Council from "our" Council – the Executive Committee and the Board of Directors – to your Council – the Individual Member Group.

The Council continues to be one of the most affordable and economical professional societies in the world. We will continue that tradition. We will plan to have more meetings focused on topics of interest to each one of you and to our new sustaining members. To many of our older members, this may seem to be an abandonment of the historically lofty goals of the Council. But it is in reality a recognition of the changing needs of our members. When I first joined the Council, the delegates and the individual members were vitally interested in and involved with the testing or development of the next color difference formula or a better tinting strength method or

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ISCC Executive Officers

President	Dr. Danny Rich Sun Chemical Research 631 Central Avenue, Carlstadt, NJ 07072 201-933-4500x1144 fax 201-933-5658 richd@sunchem.com
President-Elect	Dr. Joanne C. Zwinkels National Research Council of Canada Inst. for National Measurement Standards M-36, Montreal Road Ottawa, ON K1A 0R6 Canada 613-993-9363 fax 613-952-1394 joanne.zwinkels@nrc.ca
Secretary	Mr. John McCann McCann Imaging 161 Claflin Street, Belmont, MA 02478 617-484-7865 fax 617-484-2490 mccanns@tiac.net
Treasurer	Mr. Hugh Fairman 503 Bradley Court, Princeton, NJ 08540 609-430-1630 fax 609-430-1618 resourceiii@erols.com
Past-President	Mr. Jack Ladson Integrated Color Solutions, Inc. 1000 Plowshare Road, Yardley, PA 19067 215-369-5005 fax 215-369-3191 jack.ladson@integratedcolorsolutions.com

ISCC Board of Directors

2000-2003	
Dr. Robert Buckley	Xerox Corporation 43 Scarborough Pk, Rochester, NY 1462 716-422-1282 fax 716-265-8871 rbuckley@crt.xerox.com
Mr. Alan Kravetz	13 Farm Stead Rd, New Windsor, NY 12553 845-561-0788 fax 845-568-5859 alan.kravetz@verizon.net
Dr. Mary McKnight	NIST Bldg. 226, Rm 1B350, 100 Bureau Dr., Stop 8621, Gaithersburg, MD 20899-8621 301-975-6714 fax 301-990-6891 mary.mcknight@nist.gov
2001-2004	
Mr. James G. King	DuPont Performance Coatings 945 Stephenson Hwy, Troy, MI 48007-2802 248-583-8276 fax 248-583-8316 james.g.king@usa.dupont.com
Dr. Eileen Korenic	Univ. of Wisconsin-River Falls, Physics Dept. CSH, River Falls, WI 54022 715-425-3560 fax 715-425-0652 eileen.korenic@uwrf.edu
Prof. Margaret Miele	Fashion Institute of Technology/SUNY Asst. Prof. of Psychology 7th Ave @ 27th St., New York, NY 10001-5992 212-217-8449 fax 212-217-7095 mielemar@sfitva.cc.fitsuny.edu
2002-2005	
Dr. Karen M. Braun	Xerox Corporation 800 Phillips Rd., MS 128-27E, Rochester, NY 14580 585-422-6380 fax: 585-422-6117 kbrown@crt.xerox.com
Mr. Johnny Suthers	Eastman Chemical Company P.O. Box 511, Kingsport, TN 37662-5065 423-229-3263 fax: 423-229-4205 jsuthers@eastman.com
Ms. Lisa Thieme	Colwell Industries, Inc. 2605 Marion Drive, P.O. Box 308 Kendallville, IN 46755 260-347-3900x3372 fax: 260-347-2079 lisat@colwellind.com

an index of metamerism. Today, most of you are now vitally interest in knowing the latest tips, tools and methods to make your jobs easier or more efficient.

This does not mean that we do not need volunteers. We need them more than ever. The Board has opted to keep your dues in control by not taking the path of many of our member bodies who have raised their dues to fund a meetings and planning department. This meeting, for example, was conceived and planned by volunteers – not by the Board of Directors. Those volunteers are intimately involved in the production and control of appearance in the automotive industry. Next year we will focus on new instrumentation at a Symposium on Color & Appearance Instrumentation sponsored jointly with the Federation of Societies of Coatings Technology to be held in Chicago, Illinois and the following year on accuracy and standards in color measurement combining the ISCC annual meeting with the annual conference of the Council on Optical Radiation Measurements, to be held at the National Institute of Standards and Technology in Gaithersburg, Maryland. Both of these meetings focus on issues that important to our individual members, their companies and our co-sponsoring member body.

Manufacturing philosophies like Quality Management Systems, ISO 9000, ISO 14000 and Six Sigma initiatives have placed new requirements and burdens on those who conceive, create, reproduce and market colored products. If any of these issues resonate with you or your work requirements let us know and I will make every effort to connect you with someone who can help put together a meeting, a program, a symposium in an Interest Group to address your interests. The Office of the President, the Executive Committee, the Board of Directors cannot read minds or crystal awards. We can make things happen but you have to tell us what need to be done.

Our mailing addresses, telephone numbers and email addresses are in the Membership Guide. Please use them to let us know what is on your mind and how the ISCC can help make you more successful and colorful.

Danny Rich
ISCC President

Report on ISCC/DCC Symposium on Appearance and Color Pontiac Michigan, USA April 21-22, 2002

The 71st ISCC Annual Meeting was held April 21 - 23, 2002 in Pontiac, Michigan. The meeting was co-sponsored by the Detroit Colour Council (DCC), an active member-body of ISCC. This was the third ISCC Annual Meeting co-sponsored by DCC, focusing on Automotive Color. The meeting chairman was Jim Keiser former President of DCC and member of the ISCC Board. Judging the meeting by content and attendance, we congratulate him on pulling together such a successful meeting.

The technical sessions were interspersed with breaks, group luncheons, a wine and hors d'oeuvres social, and an evening at the Chrysler Museum, which included cocktails and dinner, while wandering through three floors of exhibits of Chrysler cars over the years and the company's history. These allowed for networking and informal discussions outside of the formal presentations. The ISCC Business Luncheon included presentation of the Nickerson Award to Romesh Kumar for his dedicated service as Arrangements Chair for numerous years. The prestigious Macbeth Award for recent contributions to color was presented to Mark Fairchild for his outstanding work on Color Appearance Models, resulting in CIECAM97s. Honorary Memberships were awarded to Terry Commerford and Fred Simon. The citations as well as other ISCC business are covered elsewhere in ISCC News.

The meetings started Sunday morning with reports by each of the active ISCC Project Committees.

Project Committee 51 – Guide to Material Standards – Art Springsteen

Art Springsteen reviewed the background and status of PG 51. Active members of this Project Group are Art Springsteen, Jack Ladson, and Danny Rich, revising ISCC's Guide to Material Standards for instrument calibration. The Draft copy of nine chapters and 14 figures is being prepared and will be submitted to the Board of Directors for review and comment by July 1, 2002, and anticipate publication by January 2003.

Project Committee 52 – Comparative List of Color Terms II – Ellen Carter

Ellen Carter presented the status report for PG 52. The

purpose of the project is to review the 1949 list of color terms, solicit new terms for addition, and compare definitions and usages of terms between disciplines. Sources of color term definitions are also being identified. After three meetings, a database of color terms has been created using Microsoft ACCESS. Collection of terms is ongoing. The committee requested suggestions with respect to the type of desired output: written hard copy report or CD-ROM vs. a searchable database with a query system for searching. Platform types and ability to query were also discussed.

Project Committee 53 – Annotated Webliography of Color – Mike Brill

Mike Brill discussed the status of the project to enhance the ISCC's website links to other color information web sites. The purpose of the project is to create a set of criteria to be used to select websites for annotation or citation, to make a first selection of websites according to the criteria, organize the selections into an annotated list for the ISCC web site, provide rules for updating the resultant "Annotated Webliography" and transition to a standing committee. Mike showed a sample questionnaire used for nominating potential links and discussed the results of reviewing 32 sites. Based on those results Mike proposed a redirection of effort to compilation of a list of sites based on user reviews. The Project Group is also looking for a new committee chair.

Project Committee 54 – 22 Colors of Maximum Contrast – Hugh Fairman

Hugh Fairman reported on the project to address requests for updated sets of colors of maximum contrast for use in color coding. The color pairs are used for situations such as chemical plant piping where it is important that those with deficient color vision are able to distinguish between the colors of the pipes. The original list, generated in 1964, is based on colors shown in the ISCC-NBS chip book that is out-of-print and uses Munsell renotation. The project committee is reviewing the colors on the original list, updating the color equation, and checking for gamut in various media.

Education Committee – Meg Miele

The Education Committee meeting started with a report by Georgia Kalivas, Fashion Institute of Technology, outlining a course she gives on "Principles of Color Tech-

nology for Textiles". It is a primer in applied color theory designed so that the students discover the principles themselves through exercises.

Mary McKnight, recently retired from NIST, talked of a "Framework for Predicting Appearance of Objects", a collaborative research effort between four NIST laboratories to advance the science of measuring color and appearance and characterizing the appearance properties of materials. They have developed instruments and mathematical models to measure traditional properties such as color and gloss but also characterize texture and microstructure of materials, including metallic and pearlescent flake materials. NIST also offers color measurement services and Standard Reference Materials for instrument calibration.

Michael Brill, a color technology consultant, talked of "The Cosmic Color: A Case Study in Color Education". Scientists at Johns Hopkins University computed the average color of 400 galaxies from measurements by the Anglo-Australian Telescope. Using free software from the internet, they determined from chromaticity coordinates, the digital inputs to display the color on a computer screen. This showed the color of the cosmos as turquoise. The software did not correct for white point or gamma non-linearity. Depending on how the data were further manipulated, the color was seen as beige or salmon. The moral of the story is: Don't trust software blindly and don't over-use color appearance models beyond what they were intended for.

Meg Miele (Fashion Institute of Technology) started the afternoon by encouraging the audience to participate in designing a Master's level course in color science, which she will be teaching at FIT in the future.

Interest Group III – Art, Design, and Psychology – Meg Miele

Fine Artist Peter Maier, former senior automotive designer for Cadillac, Pontiac and Chevrolet Motors Divisions, described how he uses Waterborne Refinish paints to create "Impossibly Real" paintings of automobiles using multiple transparent layers of single pigment colors. He also now paints one-of-a-kind Harley-Davidson motorcycles.

Jean-Paul Leclercq, Curator, Musée de la Mode et du Textile, Paris, showed many examples of how light and viewing direction interacts with the warp and weft patterns to effect apparent lightness, color, and texture of viewed objects, primarily textiles.

Meg Miele concluded the afternoon session with a discussion of the historical and current social significance of the color Red.

Interest Group I – Fundamental Research – Frank O'Donnell

Paul Tannenbaum (Dupont R & D) opened the Monday session with a presentation on Surface Appearance Assessment of haze, gloss, clarity, distinctness-of image, and orange peel. He compared different types of imaging geometries and equipment and their results.

Gary Meyer (U. Minnesota) discussed a color-appearance design and visualization program that estimates the BRDF from standard gloss, reflectance and metallic reflectance travel measurements and then provides a real time rendering of the gonio-appearance design. In A Computer Graphics System for Rendering Gonioapparent Colors he demonstrated the capability of the system with measurements of some automotive paint colors computer rendered onto curved shapes.

Gaël Obein, a graduate student of Françoise Viénot, (Muséum National d'Histoire Naturelle, Paris) presented a paper describing a method to build the entire BRDF (Bidirectional Reflectance Distribution Functions) profile, from any incidence plane, using the Cook-Torrance Model.

Andy Rutkiewicz, consultant, discussed whether current instrument technologies can adequately discriminate between acceptable and unacceptable appearance for gloss, distinctness-of-image, orange peel and micro-wrinkle. In Phase I of the study, a set of ACT orange peel visual standards were visually rated by two panels of observers, one expert and one naïve. The panels were then measured with several types of appearance instruments and the results correlated with the visual. In Phase II a set of culled automotive basecoat/clearcoat panels of multiple colors from DuPont was evaluated. The conclusion for Phase I was that OTF and Visual QFM give the best correlation with visual observers. The conclusion of Phase II was that the basecoat/clearcoat case shows more complex forms of visual distortion (wavelengths > 3mm from orange peel) and dullness (wavelengths < 0.1mm from micro-wrinkle), requiring a flux instrument such as that described earlier in the session by Paul Tannenbaum to measure.

Ted Early, NIST, reported on the efforts to develop new primary standards for specular gloss and a new calibration service. The new primary standard will be a wedged piece of BaK50 clear crown glass instead of the tradi-

tional black glass. It has the important properties of index of refraction of 1.5677 (nearly matches the theoretical standard) and the dispersion is similar to that of the black glass secondary standards typically calibrated. They also now have an upgraded goniospectrophotometer to perform the calibration measurements. Comparisons with other national metrology institutes are underway.

Mark Fairchild graciously and expertly stood in for Jim Leland, presenting Jim's paper on Bispectral Fluorescence Colorimetry. The paper presented the theoretical background for new ASTM standards for the calibration and use of bispectrometers. It also covered general operation of the bispectrometer and simple measurement equations.

Interest Group II – Industrial Applications – Britt Nordby

Danny Rich, Sun Chemical, described the phenomena of bronzing, a gonioappearance effect in highly pigmented printing inks where certain pigments will cause the film to change color dramatically when viewed at angles near the specular, displaying a coppery metallic color similar to a bronze alloy. He discussed two prime theories about the cause of bronzing. He then reviewed an experiment conducted by the NPIRI Color Research Committee that demonstrated a method to quantify the appearance using modern portable multi-angle spectrophotometers.

Robert Hertel, BYK-Gardner, presented a paper on behalf of Gabriele Kigle-Bockler, BYK-Gardner GmbH, about a new BYK instrument developed for measuring orange peel, fuzziness, and gloss in high gloss "Class A" coatings. Deviations from the ideal absolutely smooth, high gloss, and brilliant surface are observed by as light/dark patterns that are visible as a function of viewing distance. The new Wavescan DOI instrument developed by BYK-Gardner can measure film structures at multiple wavelength ranges and correlate the results with visual perception. A spectral curve of appearance can then be expressed in 5 waviness data plus a measure of DOI independently of refractive index.

Mike Henry, PPG Industries, described and demonstrated a PPG in-house computer-based modular color training program. The program teaches students practical visual skills, standardized terminology, and instrumentation.

Alberto Argoitia, Flex Products, described the development and characterization of a new diffractive pigment. Diffractive grating theory was used to design a new flake

containing triangular linear and square wave linear microstructures. The flakes were incorporated into a binder system, coated on card stock, and the color performance characterized using a goniospectrophotometer and an integrating sphere spectrophotometer.

Celine Junius, SPC Software/Isocolor, described a new "Revolution" goniospectrophotometer and "IsoEffect" QC software package. Commercial gonio-spectrophotometers today are cumbersome, particularly because of software limitations. SPC actively sought potential customer inputs during the meeting in order to design software meeting user needs.

The symposium on the last day was opened by Jim Keiser, the conference coordinator and Teri Schroeder, Detroit Color Council President. The morning session was moderated by Teri Schroeder. The first speaker of the day was Alan Eggly, Ford Motor Co Senior Designer. Speaking on the topic of Color, Effect, and Appearance, Alan defined color and appearance terms and considerations used by Ford automotive designers when choosing colors for various types of vehicle styles.

Margaret Hackstedde, Daimler Chrysler, described how designers at Daimler Chrysler use color and design to emphasize and enhance the differences between the four major automotive market segments of their business.

Marilyn White, PPG, in her talk, "Responding to OEM's" discussed the importance of using culturally sourced colors when designing new colors for automobiles in different parts of the world. Color popularity is local: teal, taken from local design elements, has become a very popular car color in Thailand and pink is now the fourth most popular color in Japan.

Ralph Stanzola, Industrial Color Technology, concluded the morning session with a talk about the hidden dangers of using color corrected fluorescent tubes in lightbooths to simulate D65 or other light sources. He emphasized the importance of comparing actual spectral power distributions of the tubes used with the SPD assumptions used in the equations for calculating metamerism or viewing colors.

The luncheon speaker was Jack Lewis, Vice President and General Manager of DuPont Performance Coatings, talking of "The Color of Green". He said that the financial color we'll paint the coatings industry in the years ahead will be determined by the art and science of color and the discipline of getting color on cars productively, with continuously improving quality and durability, and meeting environmental standards. He likes

the color of money because profits allow us not only the opportunity to survive as companies, they also allow us room to experiment and innovate for the benefit of society. Central to making the entire value chain work together is inventing better ways to improve our processes to increase trust, confidence, and reduce waste in our business interactions. Pre-competitive collaboration through symposia such as this meeting, allows us to share knowledge which we should, despite today's competitive landscape. He applauded attendees' efforts to grow professionally and contribute to the success of their companies through participation in ISCC and DCC.

The afternoon sessions, moderated by Jim King of DuPont, started off with a talk by Jack Ladson, Integrated Color Solutions. He presented a new software package for rendering colors on a video screen, based on multi-angle measurements. He briefly covered the Standard Practice for Multiangle Color Measurement of Metal Flake Pigmented Materials, which recently passed the ASTM E-12.12 ballot.

John Piscitello, A Shulman, described the difficulties of matching colors when target and batch media types vary, definitions of what constitutes a "good" match differ, and the aptitude or capability of the person passing judgment is impaired by deficiencies in the ability to see color.

The final topic of the day was a presentation on the status of the update of SAE J5145 by DCC project committee chairman Jeff Alspach, followed by a panel discussion. The initial effort is to upgrade SAE J1545 by year-end to include information such as multi-angle measurement of gonioapparent color and single-number pass/fail color difference scales. These technologies were too new and untested at the original writing of this standard. A sub-committee is taking a longer-range view to study color tolerancing of gonioapparent color, a subject not covered in the literature. Panelists included Bill Longley, Mike Henry, Bob Davis, and Allan Rodrigues. They expanded on specifics and answered questions from the floor. The discussion included:

- offsets when official, reference and working standards are made from different materials.
- research plans on gonioapparent color differences
- how this standard will help the end-user.

Wrap-up

Paul Tannenbaum ended the meeting suggesting that like Rodney Dangerfield, we colorists get no respect. Color is so commonplace in our lives that it is taken for granted by the consumer, until it is incorrect or mismatched. ISCC exposes us to the diversity of disciplines in color, allowing us to respect each others' efforts. This was yet another successful meeting, invigorating us with the respect of our colleagues!

*Reported by
Ruth A. Theobald
DuPont Performance Coatings*

Summary of the ISCC 2002 Annual Business Meeting

The meeting was convened by President Jack Ladson. He gave the President's report acknowledging the fine turnout for this meeting in such a poor economy and under the cloud of the events of late September.

The secretary's report indicated that the individual membership had not grown since last year but that we had several new sustaining members.

The financial report was made by Treasurer Hugh Fairman, who indicated that despite the very successful AIC '01 meeting last June, the Council showed a small loss for the past year. Such a loss was anticipated and the Council cannot continue to operate for very long with back-to-back losses. If we cannot produce funds to cover our operating expenses through successful meetings then we may need a dues increase.

President Ladson then acknowledged and thanked the outgoing officers and directors. The outgoing Interest Group Chairs were inadvertently left off of the agenda.

The Business meeting was then closed to provide opportunity to begin the awards presentations. The citations and acceptances speeches

*Danny Rich
ISCC President*

The 2002 Macbeth Award presented to

Dr. Mark Fairchild

The Macbeth Award was established by Mr. Norman Macbeth, Jr. in honor of the memory of his father, Mr. Norman Macbeth. The award is usually, but not necessarily, presented biennially in even-numbered years.

The Macbeth Award is given for one or more recent outstanding contributions in the field of color. It is to be presented to a member, or former member, of the Council. The contributions shall have advanced the field of color, interpreted broadly as in the objectives of the Council as defined in Article II of the Constitution. The merit of a candidate shall be judged by his or her contributions to any of the fields of interest related to color whether or not it is represented by a Member-Body. The contribution to color 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.

The 2002 Macbeth Award goes to Dr. Mark Fairchild, Director of the Munsell Color Science Laboratory for his recent work on color appearance models, his textbook on color appearance, the first of its kind, and for the development of CIECAM97s - the world's first international standard color appearance model.

When I first met Mark he was an undergraduate student in the Imaging Science program at Rochester Institute of Technology. He was taking a course of study in the group headed by Franc Grum. Mark went on to complete his BS and MS degrees under Franc and then joined the group as a metrologist. Later, he went back to school to earn his Ph.D. under Peter Lennie at the University of Rochester in Vision Science.

From there, Mark's career and those of his students have been exemplary. He has studied and published on many aspects of color vision and colorimetry, relying heavily on his background in metrology to help design new and novel instrumentation. During the early 1990s he worked closely with several notable color scientists, such as R. W. G. Hunt and Y. Nayatani in trying to derive the optimum empirical color appearance model. The competition was fierce. Finally, at the CIE Division 1 meetings, held in conjunction with AIC '97 in Kyoto, Japan, his technical committee TC 1-34, Testing of Color Ap-

pearance Models, came to the conclusion that the models were about as good as they would get without a lot more work. The best of the models were very complex and required input data that most people were unable to acquire. The committee decided to formulate a single model with a simple version for many practical applications and a comprehensive version for a wide range of viewing conditions and phenomena. A challenge was given to Mark to get the TC recommendation out within a year. Amazingly, he was able to do so. The result is the formula known as CIECAM97s, and the report, Publication CIE 131-98, *The CIE 1997 interim colour appearance model (simple version) CIECAM97s*. That formula is now widely used in electronic imaging and is the benchmark against which all new models are tested.

Recently Mark has devised an improved version, indicating that he has not opted to rest on his laurels but to continue to pursue an even better model. I have seen CIECAM97s successfully applied in many complex image viewing environments including its use as a color difference formula for the prediction of metameric differences.

It gives me great pleasure to present the 2002 Macbeth Award to Dr. Mark Fairchild.

*Danny Rich, Chairman
Macbeth Award Committee*

Macbeth Award Acceptance Mark D. Fairchild

Thank You. I am deeply honored to accept this recognition of the work of the many students and colleagues I have collaborated with at RIT over the years. I have a favorite quote from Henry David Thoreau's journal that I sometimes use in my lectures on chromatic adaptation and color appearance. Today I'd like to share it in a broader context.

How much of beauty - of color, as well as form - on which our eyes daily rest goes unperceived by us!

*-Henry David Thoreau,
Journal, August 1, (1860)*

Today, I'd like to highlight some things that might otherwise have gone unperceived by us (myself included). Before I do that, I'll share one amusing story with respect to today's award. When I learned of this award from Jack Ladson, I happened to have a meeting with

the Director of our Center for Imaging Science at RIT (my boss), so I mentioned it to him. He was quite excited about the award and wanted to share the news with RIT's Provost (our highest ranking academic officer). Well, our Provost happens to be an expert in Shakespearean literature and he became quite concerned that I was receiving an award named after Macbeth. Fortunately he visited the ISCC web site and quickly learned that the award wasn't named after *that* Macbeth! It is always nice to receive congratulatory email from one's Provost and I can safely say that I see no daggers before me today.

This brings me to the first question that came to mind regarding this award. Just who was Norman Macbeth, Sr. (and Norman Macbeth, Jr. for that matter!), since it is truly him that we are honoring today. Of course, I am familiar with Macbeth light booths and instrumentation that I began using when I was a college freshman. However, I realized that I really didn't know anything about the Macbeths who established this award (Jr.) and who it honors (Sr.). Unfortunately, I couldn't find very much information on them and I would be interested in learning more if anyone can point me in the right direction. Norman Macbeth, Sr. developed the first lighting system to simulate daylight and founded the Macbeth Artificial Daylighting Company in 1915. He was also a founding member of the ISCC. Norman Macbeth, Jr. was Chairman of the Board of Kollmorgen Corporation and a long-time treasurer of the ISCC. While I can easily perceive a connection with the Macbeths through my extensive use of Macbeth booths and instruments, there is also a more subtle connection. I suspect that Norman Macbeth, Jr. had something to do with Kollmorgen's acquisition of the Munsell Color Company, which then resulted in the formation of the Munsell Foundation, which ultimately resulted in the endowment of the RIT Munsell Color Science Laboratory that I currently have the privilege to direct. I am grateful to my friends in the ISCC for giving me the motivation to explore these connections. Please use today's event to remember the contributions of the Macbeths.

I would also like to use my time here to recall those that have been honored with this award in the past. In reviewing that list of names, I can't begin to express my appreciation to be considered worthy to have my name amongst theirs. Fortunately, the ISCC is very good at keeping track of its history and I was able to find all of the previous Macbeth Award recipients on the ISCC web page and find all of the citations in the

past issues of the *ISCC News*. (I have copies with me if anyone would like to take a look at them.) Here is a quick review of the previous 15 recipients dating back to 1972. While many of the names are very familiar to me, there were a few that were not and I enjoyed this opportunity to learn about them.

In 1972, Peter Goldmark received the inaugural award for his work in the development of electronic video recording, an amazing combination of film and electronic imaging that allowed convenient storage and replay of video in the time before magnetic video tape.

Midge Wilson was the 1974 honoree for outstanding work on color forecasting and the development of related color cards used in the fashion and home furnishing industries.

Another important benefactor of RIT and a personal inspiration to me was honored in 1976. Richard S. Hunter received the award for his wide-ranging work that culminated in the publication of *The Measurement of Appearance*.

In 1978, Fred Billmeyer, who is responsible for educating many ISCC members and color scientists around the world, was honored for work in four areas: teaching and research, writing (*Principles of Color Technology*), editing (*Color Research and Application*), and organizational contributions (ISCC, CIE, ASTM). While I wasn't one of Fred's students, I heard him lecture a number of times and I could be considered a second-generation student of his.

The 1980 recipient was a very important figure in color science for me, as he was for many others studying color vision. David Wright received the award for continuing to educate a wide audience about color after his formal retirement from Imperial College. He continued that work in the early 1980's as a visiting professor in RIT's College of Liberal Arts. I had the opportunity to meet and learn from David during that period and he suggested and inspired several of my later research projects.

Harry Levison, received the 1982 award for outstanding achievements in color for the visual arts, specifically for research and standards on the lightfastness of artists' pigments.

In 1984, Ruth Johnston-Feller was recognized for a variety of accomplishments related to the joining of science and art through color and the materials used to

produce it. Unfortunately, I only learned of her vast contributions to the field while reviewing her necrology published in last year's *Color Research and Application*.

Another recipient has recently left us. The 1986 award was presented to Max Saltzman for not only his work on *Principles of Color Technology*, but for his post-retirement research on the study, identification, and conservation of ancient dyestuffs in textiles. Max was a

In 1988, Joy Luke was honored for her contributions to the development and publication of quality and health standards for artists' paints and related materials. I have always enjoyed my interactions with Joy at ISCC meetings and through her service on the MCSL advisory board.

I am very familiar with the 1990 recipient, Roy Berns. I had the privilege of being there to witness and benefit from his work to bring Franc Grum's vision of our laboratory to fruition while exceeding everyone's expectations. Roy was cited for that service to the color community as well as his important research contributions. At this point I also must acknowledge Franc Grum for his paramount influence on my life by setting the course for my professional career.

Jozef Cohen was the 1992 recipient for his work on *Matrix R*, which has recently been fully described in his posthumously-published book, a work with many connections to the ISCC. I also had the honor to interact with Jozef in 1986 when we hosted the *Matrix R* Conference at RIT and I was just starting out as a professor. He certainly pointed out some of the mysteries of color science, and the mathematics involved, to a young scientist. I recall that interaction fondly.

The four most recent recipients are also people that I consider to be good friends and colleagues who I have met through the ISCC and other professional societies. Peter Kaiser was the 1994 recipient for his research on minimally-distinct border, an important psychophysical technique in vision science. Michael Brill was honored in 1996 for his fascinating and insightful work on computational color constancy. In 1998, David Alman, one of the earliest industrial sponsors of research in our lab, received the Macbeth award for his outstanding and important contributions to the advancement of industrial color difference metrics. Most recently, an academic colleague, Brian Wandell was cited in 2000 for a number of contributions to color science including spatial extension to the CIELAB color difference equation;

work that is a basis for some of our current research on image appearance and difference metrics.

Wow! What a group! By now you might have figured out I am not really going to talk about myself, or my research, as you might have been expecting. I'll leave that for one of my students to do long after I have moved on to wandering some seaside links. Instead let me wrap up by acknowledging some very important people in my life and by attempting to give you some insight into how our laboratory functions.

You might be surprised, or even shocked, to hear me say "I don't love science." Like most of us, I work because I must to survive in present-day society. Given that we have to work, then it is clear that we should love what we do, *and I do*. However for me it is not the science, but the people and the natural world. I love to learn and to teach. And I hope that my endeavors make the world better for someone at least.

This award is not so much for me as for the team, we like to call it a family, at MCSL. I don't have time to name everyone and I would be afraid to accidentally leave someone out. I want to highlight my students over the years. Those I have advised in research as well as those that have attended various classes, short courses, or spent time in the lab as visitors. They are my inspiration and motivation. They have taught me far more than I ever taught them. Also of utmost importance are my colleagues on the faculty and staff at RIT and within MCSL in particular. I think we have constructed an environment for learning and teaching that is unique and unparalleled. I say this at the risk of seeming immodest, but I want to stress that it is the whole team that makes it so. I simply make sure they have the opportunity to thrive. Finally, I am forever grateful to our sponsors that have made this all possible. They have provided equipment, funding, scholarships, political support, moral support, etc.

I do need to mention a few important people by name. The first is Lisa Reniff. She has been and is a student, a colleague, my best friend, my wife, and my soul mate. She is currently also busy as the mother of our two children (miracles in their own rite), Acadia, our 6-year-old kindergartener and Elizabeth, our 7-month-old blessing. My family is my life and I cannot acknowledge anything without remembering their undying support. Thank you Lisa, Acadia, and Elizabeth.

I mentioned the unique environment at MCSL and would like to finish by sharing some of the philosophy that I

have used to guide it. Much of that philosophy is echoed in the Tao Te Ching (dating back to 300-600 BC), in which the concept of leading from behind is described. There are many quotes that provide insight to this concept, but I will share one from Ch. 14 on experiencing the mystery...

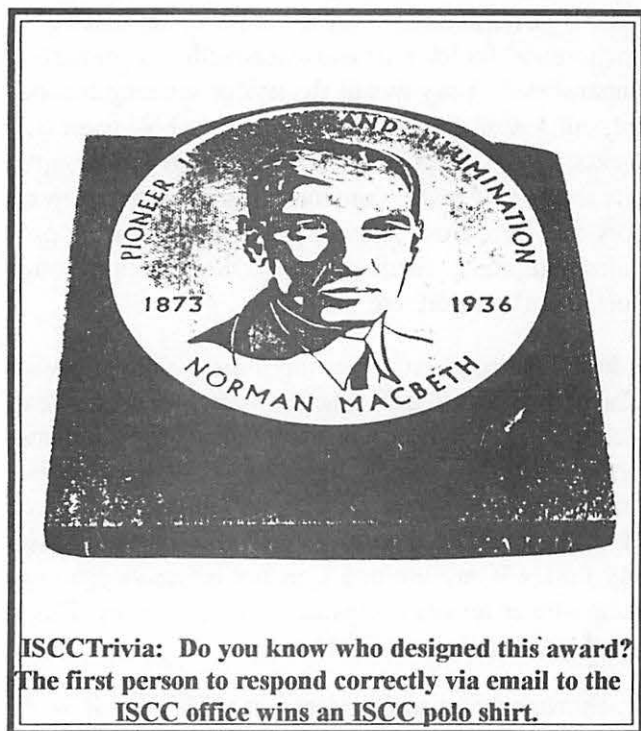
*Standing before it, it has no beginning;
even when followed, it has no end.
In the now, it exists; to the present apply it,
follow it well, and reach its beginning.*

I'd like to think we have created a place where nobody is afraid to experience the mystery of color science, we pursue that experience with a passion, and that our success, as recognized in events like this award, is a natural result of following that course. In closing, I want to thank you all again for this honor and the privilege of being your colleague and leave you with a quote from one of my favorite books, Michael Murphy's *Golf in the Kingdom*. On the surface, it is a quote about golf, but it applies equally well to color science or any other endeavor...

*Ye'll come away from the links with a
new hold on life, that is certain if ye
play the game with all yer heart*

My wish for all of you is that you can find the game to play with all your heart. Thank you.

Mark D. Fairchild



ISCCTrivia: Do you know who designed this award?
The first person to respond correctly via email to the ISCC office wins an ISCC polo shirt.

Romesh Kumar Receives ISCC Nickerson Service Award

Dr. Romesh Kumar received the Nickerson Service Award during the ISCC 2002 Annual Meeting in Pontiac, MI.

Dr. Kumar is the 16th recipient of the Nickerson Service Award. He joined the ISCC in 1978 and has been an active member since that time. Kumar was on the ISCC Board of Directors from 1990 to 1993. He chaired ISCC Annual Meetings in Newport, Rhode Island (1993) and Charlotte, North Carolina (2000). In 1990 Kumar co-chaired a Symposium on Color and Appearance Instrumentation (SCAI), which was held in Cleveland, Ohio. Dr. Kumar has been the ISCC Arrangements Chair since 1993. Under his innovative leadership the ISCC meetings have always been exciting and within budget.

Dr. Kumar is the Technical Manager for Coatings for Clariant Corporation in Coventry, Rhode Island. His current responsibilities include promotion of Clariant pigments and preparations by way of technical solutions to the Coatings industry in the NAFTA region.

Dr. Kumar received his M.S. in electrochemistry from Laurentian University and his Ph.D. in Color Science from Rensselaer Polytechnic Institute. He has made over 100 presentations at national and international meetings and won the Best Paper Award at the Society of Plastics Engineers meeting in 1982. Kumar was an invited speaker at the 2000 CIE meeting in Seoul, Korea.

He has taught Color and Pigments courses at the University of Southern Mississippi and at DePaul University. Kumar also chaired the Optical Properties of Coatings Subcommittee (D01.26) of ASTM International and is the current chairman of the ISCC delegation from the Federation of Societies for Coatings Technology (FSCT).

Dr. Robert T. Marcus
ISCC Publicity Chairman

Nickerson Service Award Acceptance Speech

"Growing up in a small village in the foothills of the Himalayas, life was very nomadic. Being curious and adventurous, we always wondered about the hills, and our parents always knew that we would be back when tired. There were times that we were gone with other kids for 2-3 days during the holidays just absorbed in colors and other fun things in the nature around. We did not have a television in the whole village, and most of the free time was used in chores, and listening to my grandpa, parents and teachers.

My mother was my first teacher who made sure that we did homework regularly and respected our teachers at school. While cooking, she would watch and guide me in solving the math problems although she had only five years of schooling.

My grandpa was another wonderful person in my life. After dinner, my cousins and I huddled around him to listen to his stories that had an important and moral message, and riddles to solve. Since there were no formal newspapers, we read every thing that we could get hands our on.

It was only by accident that I got involved in color. After graduating from Laurentian University, I joined Rensselaer Polytechnic Institute for graduate school in electrochemistry. However my future supervisor left me for sabbaticals, and in his absence my curiosity led me to join The Rensselaer Color Measurement Laboratory, headed by Dr. Fred W. Billmeyer, Jr. Here, I had the opportunity to visit with many of the color experts, and joined ISCC in 1978. Since my association with ISCC, I believe that my life is very enriched and I have become more than ever curious, and look for new adventures every day.

In my business position, I travel around the country as technical manager with Clariant (previously Hoechst), and again have the opportunity to

meet all types of people; clients and fellow travelers. It is very interesting that most people do not know much about color as we associated with ISCC define it. During one of my travels to Houston, I was sitting next to a wonderful lady in a Delta Airlines' DC9 who asked me about what I did for living. I mentioned that I was in pigments, and after a few seconds of hesitation, she mentioned that she respected that. She understood that I was talking about our skin pigments. I explained that pigments were essential for color in all things around us like the magazine she was reading and the cosmetics she was wearing. At this time she brushed a napkin across her lips to show me that was tattooed and was not wearing any makeup. Of course that left me speechless.

Needless to say, my association with ISCC and working in the color field has made my life very interesting all the time. With my current schedule, sometimes I believe that I travel about 10 days a week. Now I am a nomad again, however traveling at a much higher speed, and meeting many more people.

Many thanks to all of my ISCC colleagues for bestowing this award on me."

Sincerely

Romesh Kumar

Colorful Tongue Twisters!

A big blue bucket of blue blueberries.

Yellow yo-yos.

Red leather · yellow leather.

A black-backed bath brush.

**The green grub goes to the green grass.
(Le ver vert va vers le verre vert.) in French**

**A pale pink proud peacock pompously
preened its pretty plumage.**

Fred Simon and Therese Commerford Elected as ISCC Honorary Members

Professor Frederick T. Simon has been elected as an Honorary Member. Honorary Membership is reserved for those ISCC members who have rendered signal service to the ISCC or to those fields served by the individual Member-Bodies of the ISCC, in such manner as to aid in accomplishing the objectives of the ISCC. Professor Simon's achievement was formally recognized during the 2002 Annual Meeting.

Some of Professor Simon's most notable achievements are the development of the Simon-Goodwin charts for calculating color differences, the "555" system for shade sorting and for several methods for the measurement of fluorescent materials.

Currently Professor Simon is teaching half-time in the Graphic Communications Department of Clemson University. He began his professional career at American Cyanamid in Bound Brook, New Jersey. During World War II he worked for the US Army Quartermaster in Philadelphia. Professor Simon then worked in two different textile mills applying color science methods to textile processes. After gaining quite a bit of practical experience in the mills, he worked for the Union Carbide Research Division in Charleston, West Virginia where he did various projects mainly related to color measurement and polymer research. Following his tenure at Union Carbide, Professor Simon entered Academia where he spent 19 years teaching in the Textile Department at Clemson. His many fine students have their own successful careers and most of them have become ISCC members.

A native of Pittsburgh, Pennsylvania, Professor Simon did his undergraduate work at Carnegie Mellon University, Philadelphia University where he obtained a BS in 1938, and University of Charleston where he received another BS in 1956. Simon earned his MS in 1958 at Marshall University.

Professor Simon has been married to his wife, Irene, for 56 years, has two married daughters and two grandsons.

Professor Simon is an active member of the American Association of Textile Chemists and Colorists (AATCC) and is a fellow of the Society of Plastics Engineers (SPE).

Dr. Robert T. Marcus
ISCC Publicity Chairman

Ms. Therese R. Commerford has been elected as an Honorary Member. Honorary Membership is reserved for those ISCC members who have rendered signal service to the ISCC or to those fields served by the individual Member-Bodies of the ISCC, in such manner as to aid in accomplishing the objectives of the ISCC. Ms. Commerford's achievement was formally recognized during the 2002 Annual Meeting

Ms. Commerford served as an ISCC Director from 1977 until 1980 and ISCC Secretary from 1982 until 1990. After she completed her tenure as Secretary, that position was split into two positions – Recording Secretary and Membership Secretary. She also served as a delegate from the American Association of Textile Chemists and Colorists (AATCC) to the ISCC Individual Member Group. Ms. Commerford contributed to the work of several ISCC Problems Committees, notably Problem Committee 16 "Standard Methods for Mounting Textile Samples for Colorimetric Measurements," which completed its work in 1968, and Problem Comm. 25D "Determination of the Strength of Colorants (Dyes Section) for which she contributed a paper "Difficulties in Preparing Dye Solutions for Accurate Strength Measurements," appearing in *Textile Chemist and Colorists* 6:14 (1974).

Ms. Commerford is currently a research chemist with the Chemical Technology Team of the Individual Protection Directorate at the U. S. Army Natick Soldier Center, Soldier Biological, Chemical Command (SBCCOM) where she is working on a Joint Service program to provide chemical/biological protective clothing for aircrew personnel. After earning her B. S. degree in chemistry from Lowell Technological Institute (now University of Massachusetts-Lowell), Ms. Commerford began her professional career with the Derby Company in Lawrence, Massachusetts where she spent 27 years. For the majority of those years she served as Supervisor of the Color Laboratory.

Ms. Commerford served as Vice-President of the AATCC, a member of its Executive Committee on Research, a member of AATCC's Technical Committee on Research and a member of its Long-Range Objectives Committee. She was active on AATCC Research Committee RA 50 (Colorfastness to Light) and RA 36 (Color Measurement). She chaired the AATCC 1979 Sympos-

sium on Color Science in the Textile Industry held in Charlotte, NC. In addition to the ISCC and AATCC, Ms. Commerford has been a member of the Sigma Xi Honor Society and the Optical Society of America (OSA). She has lectured on color at the color courses sponsored by Clemson University and during workshops on color given by AATCC.

Dr. Robert T. Marcus
ISCC Publicity Chairman

ISCC Elects New Officers and Board of Directors

President-Elect 2002 - Joanne C. Zwinkels

Joanne Zwinkels is a Senior Research Officer and Head of the Photometry and Radiometry Group with the Institute for National Measurement Standards, National Research Council of Canada (NRC). She obtained her B.Sc. Honours in Chemistry from the University of Victoria (1977) and her Ph.D. in Physical Chemistry from the University of Alberta (1983) with specialization in the infrared optical properties of solids. Following an NSERC Postdoctoral position with the Department of Energy, Mines and Resources, Dr. Zwinkels joined the NRC Division of Physics in 1984 to work in the field of spectrophotometry. In 1991, she became the head of the Photometry and Radiometry Group.

Dr. Zwinkels is active in the International Commission on Illumination (CIE), the International Organization for Standardization (ISO) and the Inter-Society Color Council (ISCC). She is Canadian member of CIE Division 2, the chair of a CIE technical committee on calibration methods and standards for photoluminescent measurements, a member of CIE and ISO technical committees on the characterization of spectrophotometers, geometric tolerances for colorimetry, practical daylight simulators, and optical properties of paper, past Vice-Chair of ISCC Interest Group on Fundamental and Applied Colour Science, past member of the ISCC Board of Directors, and NRC liaison to CORM. Dr. Zwinkels' own research involves the development of instrumentation and reference materials for high accuracy spectrophotometry, spectrofluorimetry and gloss. She has designed, constructed and tested a high-accuracy spectrophotometer which defines the NRC scale of regular transmittance and a two-monochromator reference spectrofluorimeter which is used for high-accuracy to-

tal radiance factor measurements of fluorescent standards. Her current research involves the development of a one-monochromator spectrofluorimeter for routine calibrations of fluorescent materials and a reference goniospectrophotometer to extend the range of NRC specular gloss calibration services.

Karen Braun

Karen Braun received her B.S. degree in physics from Canisius College in 1991 and her Ph.D. in imaging science from Rochester Institute of Technology in 1996. Since then, she has worked in the Digital Imaging Technology Center at Xerox Corporation, focusing on color reproduction, gamut mapping, and color perception.

Karen has published numerous journal articles on color appearance modeling and gamut mapping, presented her work at conferences, and co-authored *Recent Progress in Color Science* in 1997.

Karen has been an active member of ISCC for ten years. She helped create the first student chapter of the ISCC at RIT in March 1993, and served as its first president. She was associate editor of ISCC News, a voting delegate of the ISCC for three years, and chairman of the Individual Member Group (IMG). Karen recently served on the steering committee for the 9th Congress of the International Colour Association, AIC 01, in Rochester, NY, chairing the Student Paper Award selection committee and the Congress poster design team.

Karen is an active member of IS&T. She has served on the Technical Committee of the IS&T/SID Color Imaging Conference for the past five years, and served as Poster Chair for three years.

Lisa Thieme

Lisa F. Thieme is Vice President of Technical Coordination/Research & Development for Colwell Industries, Inc. in Kendallville, Indiana. She received a Bachelor of Science degree from Indiana University, with a major in Business Management and minors in Psychology and Organizational Leadership and Supervision. She has held a variety of positions relating to color science and color control at Colwell Industries, Inc. over the past 17 years. Lisa is a member of ISCC, CORM, IMC, DCC and BPW.

Lisa's interest in color began as a laboratory technician in the Colwell Color Laboratory where she formulated paint for color cards and color system merchandising

tools. She was involved in the research and development of the Colorcurve® System with Ralph Stanziola and Don Woelfel and later managed the production of the system tools. Lisa managed the Colorcurve® Laboratory and the Colorcurve® Division of Colwell Industries including sales and marketing responsibilities.

She currently provides the technical coordination for Colwell Industries, manages the research & development department, color theory education, as well as the Colorcurve® product line. Lisa is actively involved in the Marketing Committee, Automotive Committee, and Creative Team for Colwell Industries. She has been married for 15 years and has a daughter, Karah, age 11.

Johnny Suthers

Johnny Suthers is a Principal Chemist in the Color Technology Development Group at Eastman Chemical Company located in Kingsport, Tennessee. He graduated from East Tennessee State University in 1969 with a BS degree in chemistry. He has worked in the area of color science for

32+ years. Johnny is a 21+ year senior member of the Society of Plastics Engineers, a 37-year member of the American Chemical Society, and a 19+-year member of the Inter-Society Colour Council. He is past Chairman of the Holston Valley Section of Society of Plastic Engineers. He holds the 1997 Outstanding Achievement Award from his local section. He is also active in SPE's Color and Appearance Division. He has held several positions in the C&A division and currently is the Chair Elect for the Division. He was Co-Chair for the Technical Program of the 1995 SPE Conference "Coloring Plastics for Performance", Co-Chair for the 1997 SPE Conference "Color Quantifications: Adding Value with Instruments" with the Inter-Society Colour Council, 2000 Chair for the Technical Program for the joint CAD-PMAD RETEC, "Your Ticket to Outstanding Color and Additives", and 2001 Co-Chair for the Technical Program for the SPE RETEC, "Hot Plastics, Cool Colors. He has presented papers at the SPE RETEC, SPE ANTEC, TAPPI and an ISCC joint meeting with the Detroit Color Council.

In addition to the above new Board of Directors and President-Elect, the incumbents, Hugh Fairman and John McCann were re-elected to their respective positions as ISCC Treasurer and ISCC Recording Secretary.

Danny Rich
ISCC President

American Society for Testing and Materials (ASTM)

Int'l Symposium on New Directions in Coatings Performance Technology
June 19-21, 2002, Philadelphia, PA

This symposium commemorates the 100th anniversary of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications. The changes that have occurred in paint technology in the last 100 years have transformed the industry from an artistic craft based on natural products to a high-tech industry based on cutting-edge chemistry, physics, and engineering. The purposes of the symposium are to:

- Present the state of the art in measurement of the properties of coatings and coating materials.
- Present trends in coatings regulations.
- Commemorate 100 years of standardization through Committee D01

Prominent speakers have been invited to present the state of the art in evaluation of the durability of coatings, measurement of the color and appearance of coatings, analysis of coatings and coating materials, measurement of the physical attributes of paints, and trends in regulations, particularly those that involve working with standardization organizations such as ASTM International.

This symposium will be held in conjunction with the June 16-19, 2002 standards development meetings of Committee D01, the symposium sponsor. All symposium attendees are welcome to participate in these meetings. **REGISTRATION INFORMATION** Registration fees include the Thursday evening reception (cash bar) and banquet, and symposium-related expenses. **Fees:** ASTM Member \$285.00 Non-member \$310.00 Student fee waived (Note: The waived fee for students does not include the reception and banquet.)

Register online at <http://www.astm.org/SYMPOSIA/upcomingsymp.htm> or contact Hannah Sparks at 610-832-9677, Fax: 610-832-9667, hsparks@astm.org. **Continuing Education Units Available**

Headquarters Hotel and Transportation: The symposium and the standards development meetings will be held at the Wyndham Philadelphia at Franklin Plaza, Philadelphia, PA 19103, located approximately 7 miles/15 minutes from Philadelphia Int'l Airport. Tel: 2152448-2000 www.wyndham.com/FranklinPlaza/default.cfm. Further Information: William C. Golton, Consultant, 610-543-0395, wgolton@aol.com.

The Cosmic Color: ISCC Members Weigh In

Michael H. Brill

While researching the evolution of the cosmos through data taken by the Anglo-Australian Telescope, Johns Hopkins University astronomers Karl Glazebrook and Ivan Baldry (www.pha.jhu.edu/~kgb/cosspec; *Astrophys. J.* 569:582-594) computed the “average” color of over 100,000 galaxies captured by the telescope (corrected for red shifts). Using free software from the Internet, they entered the x and y chromaticity coordinates they had measured from the cosmos ($x = y = .345$, from a virtually flat spectral power distribution in wavelength). They hoped the software would tell them the digital input that would reproduce the cosmic color faithfully on computer screens everywhere. The computer screens revealed the cosmic color as **turquoise**.

Unfortunately, the software was faulty and got the color going in the wrong direction relative to white. [Anyway turquoise is theoretically impossible as an average color from stars and galaxies near the black-body locus.] Baldry and Glazebrook (B&G) also omitted a step to “gamma pre-correct” the nonlinearities of the red, green, and blue display primaries that would recreate the cosmos color they measured. Omitting this step exaggerated the turquoise color. After a number of color scientists—who happened to be ISCC members—phoned B&G, they corrected their result (laudable and relatively rare behavior in today’s research world) and displayed several alternative answers as patches on a white background.

But the color scientists disagreed as to what should be declared “the color of the cosmos”. Some (such as Mark Fairchild) said that if you go out in the cosmos and visually adapt to the “average” light, the perception of this light should be very close to white. By choosing an adapting light at $(x,y) = (.333, .333)$ —close to, but not exactly, the measured average color, they concluded that **beige** would be perceived.

Other color scientists (such as myself) claimed that “beige” says a lot about visual adaptation but virtually nothing about the cosmos (like a “You are Here” sign that points at your feet, not at a point on a map). We thought it fairer to portray “the color of the cosmos” by delivering to the eye a light with the same chromaticity as was measured for the cosmos. One could look at this objectively correct light in any desired condition. When shown as a patch on a display screen surrounded by a D65 screen white, the “objective color” of the cosmos looks **salmon**! This was one of B&G’s patches, which they called “D65 Gamma.” The salmon color was a surprise, but measurements of the D65-Gamma patch (by Edward F. Kelley at NIST) confirmed that B&G had delivered the right chromaticity—within measurement error.

Still other color scientists (such as Jack Ladson) were bothered by the rather arbitrary assignment of luminance for the “cosmos” color patch B&G displayed on the screen-white background. B&G chose a luminance that is distinctly lower than screen white, but not low enough to be seen as black when the viewer is adapted to screen white. On the other hand, Ladson et al. reasoned that the space-averaged luminance of an entire galaxy (which has lots of space between the stars) would almost certainly be so low that the patch would appear **black** on the screen. I don’t object to this logic, but it brings to light the fact that “average color” must take into account the size of the visual areas entering the average. If these areas are galaxy-sized, then the color is black. If new technology made these areas star-sized, then the color would be blinding, dazzling white: the “cosmos color” would itself set the visual adaptation, and then the screen—and the poor observer’s visual system—would fade to black.

I reported all but the “black” argument at the April ISCC Color Education Committee meeting. The story illustrates the pitfalls of trusting software blindly, and of assuming the software does more than it does. But more than this, it shows how a beautifully simple question can become ambiguous under close examination. Do we mean by “color” the (context-dependent) sensation, or the objective tristimulus values? Can we hide the hard-to-defend luminance and identify the objective color only by chromaticity?

Before the question unraveled, the color of the cosmos got widespread press coverage, catching the popular imagination. People everywhere were captivated by being able to ask a new but simple question about the whole universe, and being able to understand the answer (indeed, being able to apprehend it by direct vision). It was a beautiful idea that, even in the wake of 9/11, all humans would see the same “universal average color.” Cultural icons are born of deep shared needs, and in this case color science—and the ISCC—got into the picture.

Final Call for Papers & Registration!!!

4th Oxford Conference on Optical Spectrometry

Color and Appearance: Fluorescence, Standards, and Display Metrology in the New Millennium

The Council for Optical Radiation Measurement (CORM) and the ORM Club of the National Physical Laboratory (UK) will co-sponsor the Fourth Oxford Conference on Spectrometry, **June 9-13, 2002 at Davidson College, Davidson, NC.** The conference has already received 25 papers. These promise to be a significant contribution to the field of spectrophotometry and color science.

TECHNICAL PROGRAM

Day 1 - Spectrophotometry

Session 1 - Advances in Instrumentation

Chair: Dr. Art Springsteen, Avian Technologies LLC
(arts@aviantechnologies.com)

Session 2 - Colorimetry of Fluorescent Materials

Chair: David M Burns, 3M Company
(dmburns@mmm.com)

Session 3 - Standards and Intercomparisons

Chair: Dr Joanne Zwinkels, NRC
(Joanne.Zwinkels@nrc.ca)

Day 2 - Materials and Methodology

Session 4 - Measurement of Appearance

Chair: Dr Michael Pointer, NPL
(Mike.Pointer@npl.co.uk)

Session 5 - Standards and Techniques

Chair: Richard Harold, Avian Group USA
(rrwharold@worldnet.att.net)

Day 3 - Radiometry and Colorimetry of Displays

Session 6 - Standards and Methodology

Chair: Dr Steve Brown, NIST
(Steven.Brown@nist.gov)

Session 7 - Measurement Techniques

Chair: Dr Julie Taylor, NPL
(Julie.Taylor@npl.co.uk)

Conference Overview: The Conference is held as a "Gordon-type" Conference, with sessions in the morning and evenings and with afternoons free for social and technical activities. Both oral and poster sessions are included in the program. In addition, selector vendors are invited to sponsor social events. The Conference also publishes hard-bound proceedings which will be distributed to all attendees.

Applications: Applications have been sent to all ISCC members. If you have not received a mailing, please contact Art Springsteen.

Fees: The conference includes housing on campus for 4 days (Sunday evening - Wednesday evening), Breakfast, lunch, dinner and snacks each day. Fees are \$500 for CORM or ORN members; \$550 for non-members.

Venue: The Conference will be held on the beautiful campus of Davidson College, in Davidson, NC. This small liberal arts college offers a traditional collegiate setting along with a new, state-of-the art conference facility, which will be the site of the conference. Davidson College is conveniently situated less than half an hour from Charlotte International Airport, one of the largest and busiest airports in the U.S. For further information: www.davidson.edu.

Accommodations: Accommodations are *en suite* on Davidson's Campus. The modern living quarters have four bedrooms sharing two baths and a common living area. For those wishing not to stay on campus, Davidson provides a small amount of housing for families on a first-come first-served basis (and at an extra cost). Housing off campus may be found at the Davidson Village Inn (704-892-8044). Davidson College is in a resort area of NC so there are other accommodations within 2-3 miles of campus. Further information: www.lakenorman.org

Travel: The official travel agency of the Fourth Oxford Conference is Compass Travel. They may be reached in the USA at 1-800-526-9601 or from outside the US at 1-603-526-9600. Compass guarantees the lowest available rates for travel. When contact Compass Travel, mention that you are calling in regards to the Oxford Conference.

In Memorium John A. C. Yule

One of the world's leading color reproduction scientists and photomechanical researchers, John A.C. Yule, died on February 17, 2002 at the age of 95.

John Yule, who was born in Bradfield, Berkshire, received a Bachelor of Science degree from the Royal College of Science (part of the University of London) in 1927. The petroleum company he subsequently worked for in the south of England transferred him to their United States operations in 1932. John was about to return to England in 1936 when an offer of employment arrived from Alexander Murray of the Kodak Research Laboratory. He accepted the offer and began his long association with the imaging science community of Rochester, New York.

At Kodak, he invented graphic arts products, was awarded some of the first (early 1940s) patents on color scanner technology, and authored numerous scientific and technical papers on color reproduction, film development and photomechanical processes. His 32 years at Kodak included service as an advisor to the United States Army Map Service during World War Two and, in 1951, four months of development work on the first successful color scanners at Time Inc.'s Springdale Laboratories in Connecticut. The subsequent PDI series of scanners was produced until the 1980s. His early research is still cited regularly, particularly that concerning the Yule-Nielsen equation, a method for converting density measurements into dot areas.

Dr. Yule joined the Rochester Institute of Technology in 1968 as a Research Associate. His seven years at RIT included a series of pioneering studies conducted with Milton Pearson and Irving Pobboravsky on the optimum reproduction of color and, in 1971, collaborative work with Nathaniel Korman of the Ventures Research and Development Group on the first lookup table-based color scanner.

John Yule's contributions to the color and imaging sciences have received widespread recognition. The University of London conferred upon him one of its higher doctorates, the Doctor of Science degree, in 1967. This distinction was followed in 1968 by the presentation to him of the Institute of Printing's Gold Medal, an award that was, and is still, quite exclusive: four years elapsed before the Institute found another candidate worthy of this honor. He was one of the first four recipients of the Technical Association of the Graphic Arts' Honors Award in 1975, and was recognized by the Society for Imaging Science and Technology with a Fellowship in 1974 and Honorary Membership (their highest honor) in 1984. The Graphic Arts Technical Foundation awarded him their 1978 Robert F. Reed Technology Medal, a prestigious award that honors scientists and engineers in the graphic arts.

In years to come, John Yule will probably be best remembered as the author of the authoritative book "Principles of Color Reproduction". This landmark text on the scientific foundations of color reproduction in the printing and related industries was published by John Wiley Inc. in 1967. It was reprinted once before going out of print in 1980. A Japanese language edition was published in 1971. The ongoing critical acclaim and the dearth of second hand copies led the Graphic Arts Technical Foundation to publish an updated reprint edition in November 2000.

John's retirement years were spent with his wife June in Prescott, Arizona. He continued to follow developments in the color imaging field, but his many hobbies, which included international folk dancing, hiking and music, were his preferred activities. John was a reserved but friendly man whose lively mind and physically active life produced an acclaimed career and a vital retirement that provides an inspiring example to those of us who seek to follow his path.

Gary G. Field

Color Research and Application In This Issue Vol. 27, No. 3, June 2002

In 1528, Latin poet and scholar, Antonius Thylesius, published *Libellus de coloribus*, which was the most extensive color dictionary of its time. Although much of the literature of the ancient world had been lost forever, enough remained to enable Antonio Telesio to locate and identify over 150 Greek and Latin color-related terms. We open this issue with an article by Roy Osborne, "Telesio's Dictionary of Color Terms." This article not only translates individual color terms but also examines the manner in which they are grouped and sequenced within Telesio's text as a whole.

From Renaissance, we quickly jump nearly 500 years to research on new topics. The next two articles are a pair with some authors in common. The first describes a new set of data and the second uses that data set for digital camera characterization. Kobus Barnard, Lindsay Martin, Brian Funt, and Adam Coath present an extensive data set for color research, which the authors are making available on line. The data was collected over a period of years as part of the ongoing investigation into computational color constancy. In the article, "A Data Set for Color Research," the authors provide details of the collection process including camera characterization. The main part of the data is 743 images of scenes taken under a carefully chosen set of 11 different illuminants. The data also includes several standardized sets of spectra including some data for fluorescent surfaces.

In the next article two of the previous authors, Kobus Barnard and Brian Funt, describe "Camera Characterization for Color Research." The image recorded by a camera depends on three factors: the content of the scene, the illumination and the characteristics of the camera. In this article Barnard and Funt introduce a new method for estimating camera sensitivity functions from spectral power input and camera response data. They compare the new method with a number of others on both synthetic data and for the characterization of a real camera.

Our next three articles examine various previously published models: a color-appearance model, the Hering opponent color system, and a color tolerance metric. The CIE 1997 Interim Color Appearance Model (Simple Version) abbreviated CIECAM97s, was proposed in response to the needs of the imaging industry for a single

color appearance model for device-independent color imaging applications. Since its publication CIECAM97s has been intensely studied and evaluated. In this journal in the December 2001 issue, Mark Fairchild proposed a revision to the CIECAM97s model. In this issue R. W. G. Hunt, C. J. Li, L. Y. Juan, and M. R. Luo review the predictions given by the Fairchild model and propose some refinements and extensions to the model. From reading their article "Further Improvements to CIECAM97s," one might conclude that while much has been learned about the application of color appearance models to images, "interim" is a key word in the 1997 CIE proposal and that even "the simple version" of the model is and will be in a state of development for some time. Stay tuned for more research results in the future.

Yoshinobu Nayatani proposed the addition of reference gray to the Hering opponent-colors theory in a recent article [Vol. 26:290-304 (August 2001)]. In "A Hue Rectangle and its Color Metrics in a Modified Opponent-Color System," Dr. Nayatani discusses a City-Block metric that improves on the more common hue circles for showing the chromatic coordinates of colors. The key is the addition of the reference gray. He then goes on to describe a method of transformation from the NCS color system to the modified opponent color space. When looking at color tolerance ellipses graphed on the a^*b^* plane, it has generally been observed that they are oriented radially from the neutral axis, with the exception of the blue region where the major axis appears to be rotated clockwise. Several of the newer metrics, BFD, LCD, and CIEDE2000 seek to adjust this anomaly in the blue region. However, it is always desirable that such adjustments have a physiological basis. Recently it was pointed out that the critical tritan point could help to clarify the best rotation term to be used in the metrics. This suggestion resulted in the research described in the next article, "On the Relationship between the Tilt of the a^*b^* Tolerance Ellipses in the Blue Region and the Tritanopic Confusion Lines" by A. Yebra, R. Huertas, M. M. Pérez, and M. Melgosa.

For over eight years Yoshinobu Nayatani and Hiroaki Sobagaki have been studying the relationships between brightness and luminance matching, which are related to the Helmholtz-Kohlrausch effect. In the next article, "A Relationship between Brightness/Luminance Ratio and Additivity-Law Failure," they report on a relationship that exists between the degree of additivity-law failure, the chromaticity of the mixture color, and the brightness/luminance ratio at the chromaticity. This relation

ship is general and holds for any formulas predicting the brightness/luminance ratios.

We turn to the textile industry for the next article. In the last issue Bernadette Philips-Invernizzi, Daniel Dupont, Anne-Marie Jolly-Desodt and Claude Cazé contributed an article on color formation in fiber blends by Stearns-Noechel model. This model worked quite well, but is purely empirical. In their article the authors mentioned another model, which was proposed by L. F. C. Friele in 1952. This model, while not performing better than the Stearns-Noechel model, is interesting because it relies on theoretical principles. Therefore, in this issue Bernadette Phillips-Invernizzi, Daniel Dupont, and Claude Cazé contribute a second article in which they examine the "Formulation of Colored Fiber Blends from Friele's Theoretical Model." In this article, they give more details about Friele's theory, describe software based on this theory, and report on tests of the software in practical industrial formulation. We live in a society where the use of color is increasing. With new technologies we not only have the dyed and painted materials surround us, but also view colored images on an ever widening array of electronic devices. It has long been said that color sells, and there are entire industries based on selection of colors for fashions or other products. Our final two articles in this issue deal with the psychological effects of color. First, color preference is an important factor. Preference for various colors or combinations of colors reflects personal taste, culture, as well as current fashion trends. Several studies involve preference for individual colors. Color combinations may evoke visual sensations and responses that differ from those caused by the individual color stimuli. In our next article Nilgün Camgöz, Cengiz Yener, and Dilek Güvenç examine the "Effects of Hue, Saturation and Brightness on Preference" for color combinations. In particular they are looking at the relationships between foreground and background color.

For the final article of this issue Jinsub Um, Sunghan Doo, Kyoungbae Eum, and Joonwhoan Lee use neural networks and adaptive fuzzy systems to propose two kinds of emotional models. Emotions evoked by color depend on physical characteristics of the observer such as age, sex, as well as other factors such as environment and human feelings. In "A Study on the Emotional Evaluation Models of Color Patterns Based on Adaptive Fuzzy System and Neural Networks" the authors determine the common emotion evoked by a single color using a color psychology experiment using an image scale having opposite concepts, such as warm-cool:

This is then extended to colored patterns. Then they use an adaptive fuzzy system to approximate non-linear relationships between the patterns and the emotion evoked. The evaluation results of color patterns can be used to construct the emotion based on a color pattern retrieval system, which can recommend the color patterns of the desired human feeling. The authors believe that these color pattern retrieval systems can be used to query databases to find textile designs, wallpapers, or pictures in a gallery that correspond to designated human feelings. We end this issue with two book reviews. Dr. Fred Simon tells us about a new English edition of *Industrial Color Testing* by Hans G. Völz. Then Dr. Tatsuya Yoshizawa talks about Mary Miller's book *Color for Interior Architecture*.

Ellen C. Carter, CR&A Editor

The Center for Visual Science

23rd Symposium Engineering the Eye
June 13-15, 2002 **Rochester, New York**

The University of Rochester's Center for Visual Science will host a three-day symposium on the University's campus. This symposium brings together basic scientists, clinical researchers, and engineers sharing an interest in marshalling the latest technological developments in ophthalmic optics to improve vision and retinal imaging. Topics include: Innovations in Vision Correction including the control of emmetropization and the customization of contact lenses, intraocular lenses and refractive surgery, and Innovations in Retinal Imaging, including adaptive optics, OCT, fluorescence, and confocal imaging. **Confirmed speakers and Discussion Leaders** Ray Applegate, Univ. of Texas Health Science Ctr at San Antonio; Pablo Artal, Universidad de Murcia, Spain; Dirk-Uwe Bartsch, Univ. of California, San Diego; Reginald Birngruber, Medical Laser Ctr, Lubeck GmbH; Steve Burns, Harvard Univ.; Ian Cox, Bausch & Lomb; Chris Dainty, Imperial College of Science, Technology & Medicine; Dan Ferguson, Physical Sciences Inc.; Fred Fitzke, University College, London; Joe Izatt, Case Western Reserve Univ.; Susana Marcos, Instituto de Optica (CSIC), Spain; Don Miller, Indiana Univ.; Tom Norton, Univ. of Alabama at Birmingham; Scot Olivier, Lawrence Livermore National Lab; Eli Pelli, Harvard Univ.; Austin Roorda, Univ. of Houston; Chris Sanstedt, Calhoun Vision; Earl Smith, Univ. of Houston; Rob Webb, Harvard Univ.; Program information: <http://www.cvs.rochester.edu> The registration form

is on the web: www.cvs.rochester.edu/symposium_reg.html.

Accommodations: Radisson Hotel Rochester Airport, Free shuttle service to and from the airport as well as the university. Conference rate of \$89/night for single or double occupancy rooms. Please register on the web. **Fellowships** available to cover the cost of travel and accommodations for ten graduate students/postdocs. Send a one-page abstract of your research for poster presentation, a cover letter requesting support, and reference letter from your advisor also stating that other funding is not available for you to attend.

AATCC Color Science Symposium

**Color Innovations 2002: Concepts,
Communication, and Control**
North Carolina State University,
Raleigh, NC June 3-4, 2002

Monday, June 3, 2003

8:15 Welcome and Opening Remarks
Carol T. Revels, Gap, Inc., Symposium Chair
8:30 Cotton Incorporated's Color and Trend Forecast:
Fall/Winter 2003-2004
Carrie Yates, Cotton Incorporated

Session One: Practical Aspects of Color

9:00 Lighting: What You See is What You Lit
Kevin Loughrey, GretagMacbeth LLC
9:40 Practical Applications of Standard Test Methods
and Evaluations; Karen E. Kylo, Intertek Testing Svs
10:20 Break
10:40 Oh, Say Can You See ... Our Wonderful World
of Color; Laura T. Scott, Polo Ralph Lauren
11:20 Overview of the Dye Systems
Nelson E. Houser, Burlington Chemical Co. Inc.
12:00 Lunch

Session Two: Color Communication

1:00 Color: The Front End of Color Business
Mary Brannon, VF Jeanswear Inc.
1:25 The Secret to Victoria's Secret Color Standards
Andrew N. Fraser, Victoria's Secret Stores
1:50 Improving Consistency in Digital Color Commu-
nication; Alison Hardy, Improved Technologies
2:15 Lab Dip Development: Can We Keep it Simple
in a Complex World?; Leslie R. Silver, Pacific
Sample Dyers

2:40 Break

3:00 Managing the Color Approval Process through
Electronic Communication; Denise A. Wilson, Con-
sumer Testing Laboratories Inc., Wal-Mart Stores

Session Three: Color Quality Control (lab-produc- tion-manufacturing-retail interface)

3:40 Life after Lab Dips: Color Quality Matters!
Carol T. Revels
4:20 Vendor Certification
Keith D. Hoover, Target Corp.

Tuesday, June 4, 2002

8:00 Global Color Quality Control
Mason Epperly, Jerzees Div. of Russell Corp.
8:40 Process Improvement Terms: Numbers, Charts,
Solutions and Control; S. Jean Hoskin, May Mer-
chandising Co.

Session Four: Digital Color (retail consumer interface)

9:20 Color Communication: Present and Near Future
Ralph Stanziola, Industrial Color Technology LLC
10:00 Break
10:20 Digital Product Sampling for the Web and Print
Media; Matt Hulsman, d cube Studios
10:55 3D's for 3C's: Digital Design & Development
for Collaborative Color Communication
Jill M. Simmons, Lectra
11:30 Internet Color Issues - Using Cutting Edge
Technology to Improve Color Communication
Peder Nelson, Chromaticity Inc.
12:00 Lunch
1:15 New Enterprise Solutions for Appearance and
Color; Jack A. Ladson, Integrated Color Solutions
1:45 Chaos to Coordination: Observed Trends and
Successes in Color Programs at Retail and Apparel
Companies; Christopher W. Hipps, Datacolor Int'l

Session Five: New Technology

2:45 Instrumental Agreement - The Basis of Color
Communications, Problems and Solutions
Roland L. Connelly, SheLyn, Inc.
3:25 Update on Color Difference Measurements and
Sample Handling;
Richard W. Harold, BYK-Gardner USA
4:05 Digital Design and Prototyping
Lashawnda McKinnon, NC State University
June 3-4, 2002 4:45 Closing Remarks and Adjourn
For additional information: Kim Nicholson, AATCC
919/549-3535 fax: 919/549-8933; nicholk@aatcc.org
https://www.aatcc.org/workshops/color_science.pdf

“Jerry, We Will Miss Your Smiling Face”

Jerry Tew, AATCC technical director, will officially retire on May 31, 2002. Jerry, graduate of University of North Carolina, Chapel Hill joined AATCC in October, 1964 as the lab manager when AATCC moved their headquarters from Massachusetts to their present location in Research Triangle Park, NC. He left AATCC for about 10 years and worked for Beaunit Corp. In July 1979 Jerry rejoined AATCC as lab manager and became technical director when George Mandikos retired at the end of 1985.

As technical director, Jerry was responsible for arranging AATCC Technical Committee meetings. In 1980 the sections of AATCC turned the administration of the IC&E over to the technical center. Since then, Jerry has been responsible for developing the technical program, speakers and moderators, and the general administrative functions for the event.

In addition, Jerry participates with research committees to develop test methods. He is also responsible for the development, procurement, and inspection of AATCC quality control materials and he helps conduct workshops that provide training on AATCC test methods.

As technical director, he also served as the secretary to the Executive Committee on Research (ECR) and to the Technical Committee on Research (TCR), which oversee all the test method development activities of the Association. His responsibilities also involve him in the work of other testing organizations. He has been active in ASTM's care labeling test method efforts in order to coordinate test method development between the associations. He has served as the AATCC representative to the joint AATCC/ASTM coordinating committee on test method development to ensure that there is no duplication.

He is a member of the US Technical Advisory Group (TAG), the body that reviews international test methods on behalf of ANSI for the US textile industry. One of the favorite events during the spring AATCC Committee meeting in Research Triangle Park is a pig pickin' buffet. This traditional buffet includes barbecue pork, slaw, baked beans, hush puppies, and all the fixings for a true southern meal. Also at that time, the members will honor Jerry G. Tew. Those of us who know Jerry wish him much success on his retirement.

Gultekin Celikiz, Editor, ISCC News

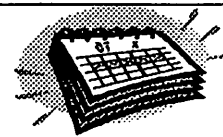
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Contact: **MICHAEL H. BRILL, Ph.D.**
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CALENDAR



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

Ms. Cynthia Sturke, ISCC Office
11491 Sunset Hills Road, Reston, VA 20190

703-318-0263 tel 703-318-0514 fax

iscc@compuserve.com website: <http://www.iscc.org>

2002

- May 3-5** IACC/NA, International Association of Color Consultants/Designers, N. America, Santa Fe, NM (USA). Annual Conference. Contact: Laura Mercurio: IDMERCURIO@aol.com
- May 6-8** CORM Annual Meeting, Sheraton Westport, St. Louis, MO
- May 21** ASTM Intl. Regulatory Compliance for the Flammability of Wearing Apparel New York, NY www.astm.org/TRAIN, Marsha Firman, mfirmen@astm.org 610-832-9612
- May 22** Regulatory Compliance for the Flammability of Children's Sleepwear, Greenville, SC Marsha Firman, mfirmen@astm.org 610-832-9612
- June 3-5** The Digital Printing Conference at Philadelphia University, Continuing Professional Education, 215-951-2900 www.philau.edu/training email: evening@philaU.edu
- June 9-13** Fourth Oxford Conference on Spectrometry, Davidson College, Davidson, N.C. Info: Art Springsteen arts@aviantechnologies.com Teresa Goodman tmg@npl.co.uk
- June 16-20** ASTM D-1 on Paints - Meeting and Centennial Symposium, Philadelphia, PA
- June 26-28** ASTM E-12 on Color and Appearance, Little America Hotel & Towers, Salt Lake City, UT
- July 1-3** Colour and Appearance of Foods. The Colour and Imaging Institute, Univ. of Derby, England Linda Marshall lmmarshall@compuserve.com <http://colour.derby.ac.uk/food>
- July 7-11** Int'l Symposium on Optical Science & Technology, SPIE's 47th Annual Mtg, Seattle, Washington. Register by June 21, 2002 and save \$100. Program and registration detail online: <http://spie.org/info/am> Tel: 360-676-3290 spie@spie.org
- July 10-12** Intl Conference on Information Visualisation-IV02-London, England Contact: Ebad Banissi, REF: IV02, Visualisation & Graphics Research Unit, South Bank Univ., 103 Borough Rd London SE1 0AA. UK. +44 171.815.7476, Fax: +44 171.815.7499 banisse@sbu.ac.uk www.graphicslink.demon.co.uk/IV02/ Sponsored by: Information Visualisation Society
- Aug 29-31** Interim Meeting: AIC Color 2002, "Color & Textiles" Maribor, Slovenia Contact: vanja.kokol@uni-mb.si or www.dks-drustvo.si
- Oct 1-4** AATCC International Conference and Exhibition, Charlotte Convention Ctr, Charlotte, NC Contact: Shirley Clifton 919-549-8141 919-549-8933 fax
- Oct 13-15** CMG's Fall International Conference, San Diego, CA, USA www.colormarketing.org 703.329.8500 Fax 703.329.0155 jhood@colormarketing.org
- Nov 8-15** Integrating Remote Sensing at the Global, Regional and Local Scale. The 15th William T. Pecora Memorial Remote Sensing Symposium/Land Satellite Information IV Conference and ISPRS Commission I (Platforms and Sensors) Symposium, Denver, CO www.asprs.org/Pecora-ISPRS-2002. For ISPRS information: www.isprs.org

2003

- March 9-11** ISCC Williamsburg Conference, Solutions for Industrial Color Problems, Chairs: Ralph Stanziola, 908-369-8736 rascolor@juno.com Philadelphia University John S. Locke, 302-695-1865 john.s.locke@usa.dupont.com

Calendar (cont.)

- April 13-16** ISCC Annual Meeting and Symposium on Color & Appearance Instrumentation co-sponsored by ISCC and FSCT, Chicago, IL
Chair: Romesh Kumar, Clariant Corporation, 401-823-02161
romesh.kumar@clariant.com
- May 3-9** ASPRS Annual Conference, Anchorage, AK
- June 25-July 2** CIE's 25th Session entitled "Light, Dark Skies and Space" San Diego, CA
Information: www.cie-usnc.org
- Aug 4-6** Midterm Mtg: AIC Color 2003 "Color Communication & Management" Bangkok, Thailand
Contact: aran@sc.chula.ac.th

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Editor: Prof. Gultekin Celikiz
tel: 215-836-5729
fax: 215-836-0448
celikizg@aol.com

Assoc. Editor: Cynthia J. Sturke
iscc@compuserve.com

All submissions must be in English.

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 Society of Plastics Engineers, Color & Appearance Div.(SPE)
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ISCC News Editor

Prof. Gultekin (Tek) Celikiz 1309 Paper Mill Rd, Erdenheim, PA 19038-7025
celikizg@aol.com 215-836-5729 215-836-0448

ISCC Office Manager/ISCC News Associate Editor

Cynthia J. Sturke, Office Mgr. 11491 Sunset Hills Road., Reston, VA 20190
iscc@compuserve.com 703-318-0263 703-318-0514