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New CIE Division 8 “Image Technology”

It is with great pleasure that we announce the formation of CIE Division 8 – Image Technology. The division will bring the CIE's expertise in vision, colour science, and metrology to bear on a broad range of imaging problems. Its goal is to find common solutions that can be applied in such diverse areas as graphic arts, telecommunications, and medicine.

Because imaging technology is still in a period of rapid evolution, it is important that standards and recommendations be formed in a timely manner. Because it is vitally important that colour standards be consistent across industries and applications, the division will make a concerted effort to form liaisons with all relevant standards bodies. We have high hopes that the new division can fulfil these ambitious goals.

Over the last few years JTAG2, the ISO/IEC Joint Technical Advisory Group for Image Technology, has sponsored three international meetings of colour experts involved in imaging in both industry and standards organisations. The last two of these meetings were organised by the CIE, one in Vienna, Austria, and the other as part of the November 1997 IS&T/SID Fifth Color Imaging Conference in Scottsdale, Arizona, USA.

Each of these meetings highlighted the critical role that colour and appearance issues play in the current world of imaging. A key goal of each meeting was to provide guidance both for colour experts and CIE Technical Committees on important research subjects and areas needing standardisation.

At the Scottsdale meeting there was considerable discussion on the role of standards groups, the role of the CIE, and the role of the various user groups. A key issue raised was that the colour experts in CIE, and the standards and industry participants in application groups, may not be talking to each other sufficiently to ensure that they understand the needs of the colour users in the application groups.

This led to the suggestion that a new CIE Division be formed to deal specifically with issues of image technology. This suggestion received strong support and the view held by many was that this would provide the necessary focus for standardisation of colour issues, and a single

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focal point to which industry and standards groups could turn for co-ordination and assistance.

Based on this show of support Dr. Alan Robertson, a CIE Vice-President, drew together an ad hoc committee and prepared a report for the June 1998 meeting of the CIE Board of Administration which recommended that CIE form a new Division with the following terms of reference:

To study procedures and prepare guides and standards for optical, visual and metrological aspects of the communication, processing, and reproduction of images, using all types of analogue and digital imaging devices, storage media and imaging media.

The CIE Board of Administration accepted the recommendation and agreed to proceed to form the new Division. Formal approval by the National Committees has now been given: 16 ballots were returned, all in favour.

The following officers have been appointed:

Director: Todd Newman (US)

Associate

Director: Mike Pointer (GB)
(Responsible for liaison with other CIE Divisions)

Associate

Director: David McDowell (US)
(Responsible for liaison with other standards organisations, David is also chair of ISO/IEC JTAG2)

Secretary: Michael Stokes (US)

The first meeting of Division 8 was held in Baltimore, USA, on 29 September 1998, in association with a meeting of CIE Division 1. At this meeting the Chairmen, Terms of Reference and Working Programmes for 5 Technical Committees were approved. These have now been forwarded to the CIE Board for approval.

TC 8-01: *Colour Appearance Modeling for Colour Management Applications* (Chair: Gary Dispoto, US)

Terms of Reference: To study, develop and recommend methods for the application of a colour appearance model based on CIECAM97s for use in digital colour management, and to produce clear guidelines for the use of such a model for specific applications. Consideration is to be given to the colour and engineering requirements for open colour management systems.

TC 8-02: *Colour Difference Evaluation in Images* (Chair: Michael Stokes, US)

Terms of Reference: To study, develop and standardise methods to derive colour differences for images.

TC 8-03: *Gamut Mapping* (Chair: Jan Morovic, GB)

Terms of Reference: To study, develop and recommend an optimal solution for cross-device and cross-media image reproduction. This solution will provide a standard procedure to calculate the colour gamut of an image, an imaging system, or its components, and either one algorithm, or a set of algorithms and rules for use in specific applications.

TC 8-04: *Adaptation Under Mixed Illumination Conditions* (Chair: Naoya Kato, JP)

Terms of Reference: To investigate the state of adaptation of the visual system when comparing soft-copy images on self-luminous displays and hard copy images viewed under various ambient lighting conditions.

TC 8-05: *Communication of Colour Information* (Chair: Lindsay MacDonald, GB)

Terms of Reference: To standardise a minimal set of techniques that enable unambiguous and efficient communication of the colour information in images. Two fundamental approaches will be addressed:

- The association with the image data of additional data that describes the colour space of the image data.
- The representation of the image data in a standard colour space.

The standard will also define a minimal set of standard colour spaces that addresses a wide range of imaging applications. Whenever possible, existing standard colour spaces will be used in preference to creating new ones.

A number of Reporters will also be appointed.

Todd Newman
Director of CIE Division 8

News from the Divisions

The following items have been summarised from full Activity Reports and Meeting Minutes received at the Central Bureau. Readers requiring more information are kindly requested to contact their National Division Representative through their National Committee.

Division 1 - Vision and Colour

<http://nml.csir.co.za/~cie1>

The Division had its meeting on 28 and 30 September 1998 in Baltimore, USA. Detailed

minutes will soon be available on the Division's website.

The following new TC has been established:

TC 1-50: *A Disability Glare Formula* (Chair: J.J. Vos, NL)

Terms of Reference: To prepare a technical report describing a formula for disability glare which revises the Stiles-Holladay formula including dependencies of wider angular part and age

Division 3 - Interior Environment and Lighting Design

<http://ciediv3.entpe.fr>

The following new Reportership has been established:

Calculation of Utilisation Factors (Reporter: R. Topalova, CA)

Division 6 - Photobiology and Photochemistry

<http://129.6.177.5/cie/>

The following new TCs have been established:

TC 6-49: *Infrared Cataract* (Chair: M.L. Wolbarsht, US)

Terms of Reference: To evaluate current biophysical data related to infrared and heat-induced cataractogeneses and report on the potential mechanisms - both thermal and photochemical.

TC 6-50: *Photodegradation of Pharmaceuticals* (Chair: J. Piechocki, US)

Terms of Reference: To report on the current knowledge related to the potential photodegradation of pharmaceuticals during storage under illumination by both sunlight and artificial illuminants.

Division 8 - Image Technology

<http://www.cie.co.at/cie/>

The new TCs are enumerated on page 2.

The following Reportership has been established:

Effect of Ambient Light on Colour Appearance of Soft Copy Images (Reporter: N. Katoh, Japan)

New publications

New publications available from the CIE Central Bureau

Erythema Reference Action Spectrum and Standard Erythema Dose

CIE Standard

CIE S007/E-1998

The CIE undertook a major review of its official recommendations on photobiological effects, their dose relationships and measurement. Based on these investigations the present standard describes present day knowledge of the erythemal effect.

The problem of dosimetry in skin photobiology lies in the fact that the ability of ultraviolet (UV) radiation to elicit erythema in human skin depends strongly on wavelength, encompassing a range of four orders of magnitude between 250 nm and 400 nm. Thus a statement that a subject received an exposure dose of $1 \text{ J}\cdot\text{cm}^{-2}$ ($104 \text{ J}\cdot\text{m}^{-2}$) of UV radiation conveys nothing about the consequences of that exposure in terms of erythema. If the radiation source was a UVA fluorescent lamp, no erythemal response would be seen apart from in people exhibiting severe, abnormal pathological photosensitivity. The same dose delivered from an unfiltered mercury arc lamp or fluorescent sun-lamp would result in marked violaceous erythema in most white skinned individuals. Consequently, photobiologists have long recognised the need to express the exposure as an erythemally-weighted quantity.

Recently the term *minimal erythema dose* (*MED*) has been used widely as a 'measure' of erythemal radiation. This is unreasonable because the *MED* is not a standard measure of anything but, on the contrary, encompasses the variable nature of individual sensitivity to ultraviolet radiation. Variables which affect the *MED* include optical and radiometric characteristics of the source; determinants of the exposure such as dose increment and field size; nature of the skin such as pigmentation, previous light exposure, and anatomical site; and observational factors such as definition of the end point, time of reading after exposure, and ambient illumination.

To avoid further confusing misuse of the term *MED*, we propose that this term be reserved solely for observational studies in humans and other animals, and that a new term, the *standard erythema dose* (*SED*) be used as a standardized measure of erythemogenic UV radiation.

This Standard specifies the erythema reference action spectrum $s_{er}(\lambda)$, and the Standard Erythema Dose.

This Standard has been approved by the National Committees of the CIE and supersedes the recommendations made in Publication CIE 106/4 - 1993 (reprint from CIE-Journal 6/1 17-22 1987) A reference *action spectrum for ultraviolet induced erythema in human skin*.

A French (CIE S007/F-1998) and a German (CIE S007/G-1998) translation is also available.

Practical Methods for the Measurement of Reflectance and Transmittance

CIE 130-1998 ISBN 3 900 734 88 7

The characteristics of materials related to their reflection and transmission properties are defined in accordance with the International Lighting Vocabulary and other relevant CIE publications.

The parameters affecting these characteristics and the principles of measurement involved, which are the same whether the measurement is made in terms of spectral or weighted (e.g. luminous) characteristics, are specified.

Methods, using an integrating sphere, are recommended for the measurement of

- reflectance for directional ρ , $\rho(\epsilon)$ and hemispherical ρ_{diff} incidence of radiation,
- diffuse reflectance ρ_d ,
- transmittance for directional τ , $\tau(\epsilon)$ and hemispherical τ_{diff} incidence of radiation,
- diffuse transmittance τ_d .

Specific methods are also recommended for the measurement of

- regular reflectance ρ_r ,
- regular transmittance τ_r ,
- radiance/luminance factor β (radiance/luminance coefficient q).

The absorptance α can either be measured directly or calculated from the measured values of reflectance and transmittance. Both procedures are described.

The principal measurement errors are examined and, where possible, methods for their elimination indicated.

The publication contains 66 pages, 28 figures and 1 table.

Proceedings of the First CIE Symposium on Lighting Quality 9-10 May 1998, National Research Council Canada, Ottawa/Ontario, Canada

CIE x015-1998 ISBN 3 900 734 91 7

CIE is pleased to announce that the Proceedings of the First CIE Symposium on Lighting Quality are now available for purchase.

The impetus for this Symposium came from many directions, as lighting quality is high on the agenda for many in the international lighting community. The National Research Council of Canada hosted the first-ever international effort to summarise what is known about lighting quality and to set a course for research to improve that understanding.

The conference committee set certain objectives for the two-day symposium, these being to review world-wide research, theory and practice related to lighting quality:

- to identify the various components of lighting quality,
- to identify issues that could be emerging from technological change (non-visual effects from high frequency operation, narrow-band phosphors, hazards),
- to critically examine current recommended practice,
- to determine what research is needed and to set priorities,
- to determine a means to involve users (designers, manufacturers, legislators) in the process.

These issues were examined from the perspectives of "Design", "Research" and the "Integration" of lighting quality, daylighting, electric lighting, energy efficiency and environmental issues. Invited speakers provided keynote addresses to open the three sessions, and were followed by invited responses or commentaries. In each session, a wide variety of papers and posters from authors in Europe, North America, Australasia, and Asia contributed to lively discussion and debate. The event culminated in focused group discussions.

The volume is 247 pages, softcover, and includes all papers and posters presented at the symposium, a summary of the group discussions, and a concluding statement by the conference committee outlining a framework for advancing lighting quality in research, education, and practice.

The publication is available from the National Research Council Canada and the CIE Central Bureau, Vienna.



New publications in the field of light and lighting

Physical Optics

Akhamanov S A, Nikitin S Yu

Oxford University Press, 1997
ISBN 0 19 851795 5

This book written by the late Professor Akhamanov and edited by Professor Nikitin is an authority treatment of the subject. Since the classical books like the one by Born and Wolf (Principles of optics, 1968), little was published covering all aspects of physical optics. In this respect this book fills a considerable gap in optics literature.

A short overview of the subjects covered by this book can convince any CIE expert that if he or she would like to get a more deep insight into the key elements of optics, it is worthwhile to read this book. In 23 chapters the fundamentals of physical optics are covered, starting with items such as wave propagation, polarisation, optical emission by the atom, the mechanism of thermal radiation and the laser. Questions of diffraction and interference are well described, just as interaction of radiation and matter, including both isotropic and anisotropic media. Thus the book provides basic information on phenomena the lighting engineer uses in his daily profession.

For the technically oriented reader trained in radiometry and photometry, it is somewhat annoying to see a book dealing with the subject and using cgs metrics, with very little mentioning of the system of SI units. In this respect one has to be somewhat careful in interpreting the terminology of the book. E.g. on p. 63 the photon jet engine is discussed, where you find units, such as Newton, Watt and dyne standing side by side. Even tonnes is used as a unit of force. The illuminating engineer would like to see also a distinction between the term light and optical radiation. But this is still used alternatively by many scientists who are not active in the fields of light and vision.

With above reservation the book can be recommended for those who would like to understand the physical principles of using modern tools of light and vision, especially computer driven displays.

Measuring Colour third edition

Hunt RWG

Fountain Press, England, 1998
ISBN 0 86343 387 1

It is a pleasure for the reviewer to report on the new edition of Professor Hunt's book on colorimetry. The

first edition of this book was published a good ten years ago, and a second, much enlarged edition was issued in 1995 and 1996. The popularity of this book is probably shown already by the fact that this third edition follows after only two/three years.

The book is certainly one of the most authentic books on colorimetry written in a concise form. It discusses the fundamentals of colorimetry on just above 300 pages and provides an excellent overview of the subject within such a limited space.

Those who have read one of the previous editions of the book will appreciate many new subjects dealt with here at the first time. The chapter on metamerism has been enlarged to encompass now also colour constancy, chromatic adaptation transforms and a colour inconsistency index, a subject now discussed internationally. A new chapter on colorant mixture has also been added. Major revision and extension is also found in the chapter "A model of colour vision", where now the brand-new CIECAM97 model gets its authentic introduction.

Also the Appendix got a new chapter, where the ASTM illuminant-observer weights, extensively used in abridged spectrophotometric calculations, were included.

To sum up, the new edition of the book by Professor Hunt is a very useful reading for both those who would like to get a genuine overview of colorimetry and those who read previous editions but would like to update their knowledge on colorimetry. For sure, it should not be missed by anybody interested in the fundamentals of colour.

Helmet-Mounted Displays and Sights

Velger M

Artech House, Boston, London
ISBN 0890068224

CIE is moving with its new Division 8: *Image Technology* into the area of applying vision research results within fields that used to be of no particular interest to illuminating engineers. Such subjects are e.g. the helmet-mounted sights and displays. The book by M Velger can permit some insight of CIE experts into questions where their understanding of vision can be applied and where also fundamental vision knowledge can be gained.

The book discusses the subject in ten sections, the first being an introduction to helmet-mounted sight and display (HMD). Although the driving force behind the development of HMDs comes from

military applications there is also an increasing field of civil use.

The second section of the book deals with human factors. Here also visual perception is discussed. This part of the book is again an example of the fact that CIE knowledge did not penetrate sufficiently into non-lighting applications. There are some minor misinterpretations of visual functioning (e.g. mixing up the functioning of rhodopsin and the cone photopigments), relatively old references to photometric research results, but the reader will be conducted to some very interesting findings related to HMD use and vision. The book presents here an interesting compilation of perceptual conflicts associated with HMDs, problems of binocular rivalry, etc.

The next sections deal with HMD construction. Some items are dealt with in more than one section (e.g. grey scale). Sections like HMD optics are certainly new to lighting engineers. These chapters are again followed by the discussion of biodynamic effects, among which one can find the description of saccadic eye movements and nystagmus. These are discussed here in connection with the use of HMDs. The last two sections deal with the discussion of the helmet design and the application of HMDs (both military and civil).

The book is certainly not in the main line of lighting, but it deals with many interesting subjects, is based on up-to-date HMD literature and thus can be highly recommended to everybody who would like to understand this subject of image technology in more detail. Surely many more applications will evolve based on these routes.

Optical Sources, Detectors, and Systems. Fundamentals and Applications

Kingston RH

Academic Press, San Diego, Boston, New York,
London, Sydney, Tokyo, Toronto
ISBN 0-12-408655-1

This somewhat less than 200-page book is intended to provide an introduction to photonics and some optical communication fundamentals. The author emphasises in the preface of the book that the understanding of noise in radiometric devices and systems was one of his main endeavours. To accomplish this task a short introduction to black-body radiation is given, followed by the description of radiation absorption and emission.

The CIE reader will probably not look into this book to learn about radiometry. Nevertheless it is

annoying to read here, as in many other books where the main emphasis is on other subjects but that have a short radiometric (or photometric) introduction, definitions such as: "radiance: the power per unit area radiated from the surface". Photometry is simply described by introducing the "relative luminosity factor", with a symbol $Y(\lambda)$, and by introducing the "luminous efficiency" as "680 lm/W" and with references to books, where probably these concepts were discussed incorrectly some 10 - 15 years earlier.

With such an introduction the referee trained in illuminating engineering can only hope that in the main subject of the book the author is more precise. It is interesting how different the perspective of somebody trained in optical communication can be if authoring a book on "optical sources": Black-body radiation is theoretically described, but practical incandescent sources are not dealt with. Absorption and emission are also only discussed as far as necessary to deal with lasers. A short section is devoted to semiconductor lasers but the description of incoherent solid state sources (LEDs), not mentioning gas discharge sources, are not dealt with.

The bulk of the book discusses noise in the detectors, ideal and real, and detecting systems, including heterodyne detection.

A very short section, less than 15 pages, deals with image capture devices, and even here half of the section discusses photoemissive and photoconductive image tubes, and only a very few pages are devoted to CCD arrays.

Even with above limitations the book contains much useful information and can provide understanding of noise limitations encountered in such diverse subjects as fibre optic communication or supermarket checkout counter. Reading the book can be recommended to everybody who would like to get a better insight into the noise limitations encountered in radiometric systems

Introduction to Radiometry and Photometry

William Ross McCluney

Artech House
ISBN 0-89006-678-7

This book is intended for readers who only intermittently need some basic knowledge of radiometry and photometry. It covers a very broad range within this field starting from the fundamental concepts of radiometry and photometry up to colour science. Individual chapters are dedicated to

radiometric transfer (the most detailed chapter of the volume), sources, detectors, optical properties of materials, geometric optics, colour and instrumentation. Throughout the book the definitions of the CIE International Lighting Vocabulary are used consistently.

The book follows a more practical than theoretical approach. After the fundamental radiometry and photometry chapters the remaining ones are restricted to basic descriptions of principles and practices where some of them are not the most up-to-date ones. Great merit is the abundant referencing after each chapter.

Meetings Reports

Measurements of Optical Radiation Hazards (MORH) Symposium

1-3 September 1998, National Institute for Standards and Technology (NIST), Gaithersburg, MD

The MORH was organized jointly by the US Army Center for Health Promotion and Preventive Medicine (USACHPPM), International Commission on Non-Ionizing Radiation Protection (ICNIRP), the CIE Division 6, NIST and the US Center for Devices and Radiological Health, Food and Drug Administration (CDRH/FDA). The speakers were a prestigious list of world-renowned experts in optical radiation hazards and measurements. The symposium also included poster sessions and breakout/discussion groups, providing the speakers with ample opportunities to interact.

Presentations were given on the following topics:

- Action Spectra - General Information and History
- Action Spectra for Erythema, Photosensitization, Skin Cancer, Non-Melanoma Skin Cancers, Photokeratitis, Blue Light Hazard, Retinal -Thermal Injury
- Immunosuppression, Photoageing, Neuroendocrine Effects of Light, UV and IR-induced Cataract

Standards and Safety:

Guidelines for Optical Radiation Exposure for Workers, Lamps, Sunglasses, Ophthalmic Instruments - from the American Conference of Governmental Industrial Hygienists (ACGIH), ICNIRP, CIE, CDRH/FDA.

UVR and Public Health:

Prevention of Newborn Jaundice, Worldwide UVR Monitoring, Air Disinfection by UVR, Sunscreen

Testing, UVR Shading Materials, Communicating UV to the Public.

Field Measurements and Issues for the Industrial Hygienist:

Measurement Accuracy, Uses and Limitations of Broad-Band Instruments, Basis for Calibration, Details About Specific UVR Instruments and Personal Dosimeters, Personal Experiences in Measurements.

Panel Discussions were held on:

- Action spectra
- Impact of standards on product safety
- Problems in standards - future needs.

Proceedings will be available early next year.

5th International Symposium on Colour and Colorimetry

10 -12 September 1998, Brdo pri Kranju, Slovenia

The 5th International Symposium on Colour and Colorimetry was organised by the Slovenian Colorists Association and the Slovene Centre for Colour from the Faculty of Mechanical Engineering of the University of Maribor. 120 participants from 12 European countries took part.

The carefully prepared program comprised scientific achievements in the field of interdisciplinary colour science, novelties in the field of identification, visualisation and modelling, as well as the importance of numerical colour evaluation and colorimetry in graphics, textile industry, varnish and pigments production and polymers, 36 lectures and 19 poster papers were presented. The program was divided into 7 topics:

- Introduction lectures
- Colour visualisation and colour systems
- Colour and graphics
- Colour and textiles
- Colour and pigments
- Spectrometry
- The use of colorimetry.

In the poster section 19 poster papers were presented.

The content of the lectures and poster papers is presented in the Proceedings. For more information please contact:

Slovenian Colorists Association
Prof. Dr. Slava Jeler
Vetrinjska 16
2000 Maribor, Slovenia
tel.: (+386 62) 220 7500
fax: (+386 62) 109 53 20

New E-mail List for Colour

The e-mail list *Color* has been set up. Below is the information for people interested in subscribing.

COLOR LIST-INFO

Environmental Color Design (ECD) Study Group of the Association Internationale de la Couleur (AIC)

Chairpersons: Jose Luis Caivano – Leonhard Oberascher

The AIC Study Group on ECD is an international community of scientists, designers, architects, artists and other professionals with a specific interest in colour as a means of environmental design and its effects on human emotion, cognition and behaviour.

The aims of the ECD Study Group are: to promote communication among its members and other interested people; to provide for continuous exchange of knowledge and experience; to stimulate research and teaching, meetings and exhibitions; to disseminate theoretical knowledge and practical experiences through congresses, seminars, workshops, publications and exhibitions. Special sessions in AIC congresses, an e-mail list for discussion, and a web site (<http://www.fadu.uba.ar/sicyt/color/ecd.htm>) are some of the mechanisms to fulfill these aims.

ECD membership is free and is available for every person or organisation that scientifically or practically deals with colour as a means of environmental design, contributes to the realisation of the aims mentioned above, or wants to support the Study Group.

The e-mail list COLOR is mainly intended for:

- discussion of topics related to colour design,
- posting news and information of interest to subscribers.

You can subscribe the e-mail list without being an ECD member.

You can send the following messages to majordomo@fadu.uba.ar:

- *subscribe color <your e-mail address> to be included in the list*
- *unsubscribe color <your e-mail address> to quit from the list*
- *who color to receive the directory of subscribers*
- *info color to receive general information about the list*
- *help to receive assistance about Majordomo commands*

Messages to the list should be sent to color@fadu.uba.ar

The list is moderated by Jose Luis Caivano. Messages for the moderator should be sent to owner-color@fadu.uba.ar

Future meetings

Call for papers

CIE SYMPOSIUM '99: 75 Years of CIE Photometry Photometry of the past and what is expected for the next millennium

**30 September - 2 October 1999
Hungarian Academy of Sciences, Budapest**

The present photometric system was adopted 75 years ago by the CIE at its Session in Geneva.

The CIE Symposium will commemorate this anniversary in Budapest, Hungary, between 30 September and 2 October 1999.

Invited papers are intended to review the system of photometry, put it in proper perspective from the point of view of modern vision knowledge and legal metrology, discuss its merits and short comings as seen by lamp manufacturers, the indoor and outdoor lighting practitioners.

Main emphasis will be laid not on the past 75 years but on what we can learn from this period, and what should be done to develop photometry into a system that can serve lighting engineering well for the next 75 years.

Invited papers will be read on the following subjects:

- Historic overview
- CIE photometry and vision research
- The base unit of the CIE system of photometry and the Metre Convention
- Lamp industry view on photometry
- The usefulness of photometry in indoor and outdoor lighting
- Challenges for the next 75 years: Incorporating quality criteria into photometry

This meeting is open to all participants. To ensure adequate space and support, and to allow distribution and adequate review of relevant documents, prior registration is required.

The format of the meeting will include Invited and Contributed Papers as well as Poster Presentations. Ample time will be secured for round-table discussions. Contributed papers and Poster Presentations are invited. Authors should submit two page extended abstracts of their proposed contributions in English no later than 30 April 1999 to:

CIE Central Bureau
Kegelgasse 27
A-1030 Vienna, AUSTRIA, per mail
or e-mail: ciecb@ping.at

(please do not fax, as the extended abstracts, if accepted, will be used to print the Abstract Booklet).

Authors will be notified of acceptance of their abstract before 1 June 1999.

Registration fee: US\$ 200,-.

Deadline for registration is 15 June 1999.

To obtain further information on the meeting, and on hotel accommodation, contact the CIE Central Bureau, or use the on-line registration at: <http://cie.kee.hu/symp99>

World Summit on Nordicity

2 - 5 February 1999, Québec, Canada

The World Summit on Nordicity is a non-profit organization which produces a biannual forum for the international community emphasizing the generic theme of adaptation to the cold and promoting networking and innovation. Nordicity refers to all the elements that influence living conditions within the coldest zones of the Northern Hemisphere.

This conference will also include a Session on "Urban Lighting in Northern Communities".

For further information please contact:

World Summit on Nordicity
1327 Maguire Avenue, Suite 200
Québec, Canada G1T 1Z2
tel.: (418) 684-0689
fax: (418) 681-6892
e-mail: nordicit@riq.qc.ca
www.nordicite.org

General Assembly of the European Geophysical Society

19 - 23 April 1999, The Hague, Netherlands

The next General Assembly of the European Geophysical Society will be held in The Hague, Netherlands from 19-23 April 1999. Among many other topics, the scientific program includes also a symposium devoted to "Solar Ultraviolet Radiation", which covers most of the research topics relevant to this scientific field (analysis of observations, instrumentation, process studies, modelling, forecasting).

All the details concerning the organisation of the EGS General Assembly are posted in the web site: <http://www.copernicus.org/EGS/egsga/denhaag99/denhaag99.htm>

Call for Papers

68th ISCC Annual Meeting

5 - 7 May 1999, Vancouver, B.C.

Interest Group I: Fundamental and Applied Colour Research

Send abstract by 1999-03-01 to Dr. Helen H. Epps (The University of Georgia, 300 Dawson Hall, Athens, GA 30602, e-mail: HEPPS@fcs.uga.edu).

Interest Group II: Industrial Applications of Colour

Send abstract by 1999-03-01 to Michael Stokes (Hewlett-Packard Company, fax: (208) 396-5161, e-mail: Michael_Stokes@hp.com).

Interest Group III: Art Design and Psychology

Send abstract on fundamental or applied research on topics related to colour and lighting technology - colour and the psychology of colour rendering by 1999-03-01 to Curt Fritzeen (Steelcase, fax: (212) 445-8845, e-mail: cfritzeen@steelcase.com)

Call for Papers

SID '99

16 - 21 May, 1999

The Society for Information Display (SID) encourages the submission of original papers on all aspects of research, engineering, application, evaluation and utilization of displays. SID 99 will feature topical sessions on:

- Active-matrix LCDs
- Applications
- Applied vision/human factors
- CRTs
- Display electronics
- Display manufacturing
- Display measurement
- Display systems
- Projection displays
- Liquid crystal and other non-emissive displays

For further information, please contact:

Paul S. Drzaic (North America):
fax: +1-617-868-8089
e-mail: pdrzaic@elektronic-ink.com

Michel Hareng (Europe):
fax: +33-160-830-148
e-mail: harengm@thmulti.com

Heiju Uchiike (Asia):
fax: +81-824-22-7031
e-mail: uchiike@ipc-hiroshima_u.ac.jp

AIC 1999 Midterm Meeting Applications of Colorimetry in Industry and Design

22 - 23 June 1999, Warsaw, Poland

This two-day conference-meeting will focus on industrial and design applications of colorimetry and is jointly organised by the Central Office of Measures and the Polish Committee on Illumination. It will take place immediately before the 24th Session of the CIE in Warsaw.

Main topics are: tristimulus and spectral colorimetry in industrial and design applications including measurement and calibration techniques, reference standards and methods of evaluation of uncertainty. Registration fee will be US\$ 200,-.

Deadline for submission of abstracts:
31 March 1999.

For further details and registration, please contact the Conference Secretariat at:

Central Office of Measures
Optical Radiation Laboratory
Elektoralna 2
00-139 Warsaw
tel.: (+48 22) 620 59 71
fax: (+48 22) 620 83 78

Balkan Light '99 Energy-Effective, Ecological and Ergonomical Lighting

6 - 8 October 1999, Varna, Bulgaria

The Bulgarian National Committee of the CIE, the Union of Scientists in Bulgaria, the Technical University Sofia, the National Electrical Company Bulgaria, the Black Sea Energy Center and FEMOPET have the pleasure to invite you to take part in the 1st Balkan Conference and Exhibition in Lighting, Balkan Light '99. This conference will give the possibility to all specialists in lighting from Balkan countries as well as from European and other countries to exchange knowledge and experience in the field of lighting.

The topics will include:

- Energy efficiency in lighting and ecology
- Vision and colour
- Physical measurement of light and radiation
- Interior environment and lighting design
- Lighting and signalling for transport
- Exterior and other lighting applications
- Photobiology and photochemistry

- General aspects of lighting, terminology and standardization.

The working languages of the conference are English, German and Bulgarian. During sessions, simultaneous translation will be available.

Deadline for abstract submission: 1999-01-30.

Deadline for registration: 1999-06-30.

An exhibition of light sources and gear, luminaires, measuring equipment, books, standards, etc. related to the topics of the conference will be held in parallel.

For further information on the conference or exhibition, registration or abstract submission, please contact:

Balkan-Light '99
Bulgarian NCI - Union of Scientists in Bulgaria
Marin Drinov Str. 9
BG-1504 Sofia, Bulgaria
tel.: (+359 2) 650940 or 650955
fax: (+359 2) 654883
e-mail: DENIMA@OMEGA.BG
<http://acstre-ma.vmei.acad.bg/balkanlight/>

Following this conference, the Colour Group Bulgaria will organize an international colour conference from 8 to 10 October 1999 at the same venue. For further information please send a fax to (+359 2) 9878 360.

NEWRAD 99

7th International Conference on New Developments and Applications in Optical Radiometry

25 - 27 October 1999, Madrid, Spain

The conference will bring together people interested in the accurate measurement of optical radiation, including those in metrology laboratories, space applications, remote sensing and solar measurements. The range of wavelengths included extends from the UV to the IR.

Papers and poster presentations are invited in the following areas:

- Theoretical aspects of radiometry
- Absolute radiometry
- Developments in radiometric calibration transfer
- Radiometric aspects of photometry
- Radiometric sources and detectors
- UV, VIS and IR radiometry

- Applications of radiometry for space and the environment
- Results of calibration comparisons
- Instrumentation
- Realization of radiometric and photometric scales
- Uncertainty
- Novel techniques.

Registration fee: US\$ 400,-.

For further information please contact:

Dr. Antonio Corróns
 Departamento de Metrología
 Instituto de Física Aplicada - CSIC
 C/Serrano 144
 28006 Madrid, Spain
 tel.: (+34 91) 561 8806
 fax: (+34 91) 411 7651
 e-mail: corrons@fresno.csic.es
 http://newrad.metrologia.csic.es

National Lighting Design (UK) Awards 2000 Launched

The purpose of the National Lighting Design Awards is to promote the importance and influence of good lighting, and to commend energy efficiency and innovation in the design of the lit environment. As the UK's most prestigious national lighting competition, it offers lighting designers the opportunity to gain the highest recognition for their design and energy management skills.

The Awards, which cover all types of lighting (apart from residential) are open to all street lighting engineers, architects and lighting designers.

For the millennial Awards the eight entry categories have been redefined as follows:

- Road Lighting
- Community Lighting
- Building/Structure Lighting
- Lighting for Leisure
- Retail Lighting
- Commercial Lighting
- Industrial Lighting
- Lighting for Religious Buildings

The closing date for entries is Friday 24 September 1999.

Entry forms can be obtained by faxing the ILE at Lennox House (+44 1788 540145) or the LIF on +44 181 673 5880.

□ Liaison Matters

IEC has sent us the following documents:

31/268/CDV

Electrical apparatus for explosive gas atmospheres - Caplights for use in mines susceptible to fire damp - Part 1: General requirements - Construction and testing in relation to the risk of explosion

Deadline for comments and vote: 1999-02-01.

34A/837/CDV

Draft amendment 1 to IEC 60081 - Double capped fluorescent lamps - Performance specifications (parallel IEC CDV/CENELEC enquiry)

Deadline for vote: 1999-02-01.

34A/838/CDV

IEC 61231, Ed.2: International lamp coding system (ILCOS)

Deadline for comments and vote: 1999-02-01.

34A/841/CDV

Draft IEC 62035, Ed.1: Discharge lamps (excluding fluorescent lamps) - Safety specifications (parallel IEC CDV/CENELEC enquiry)

Deadline for vote: 1999-02-15.

34A/842/CDV

Draft Amendment 2 to IEC 60901: Single-capped fluorescent lamps - Performance requirements (parallel IEC CDV/CENELEC enquiry)

Deadline for vote: 1999-02-15.

34A/853/INF

Maintenance of IEC 60662: High pressure sodium vapour lamps

Deadline for comments: 1999-01-30.

100/85/CDV

Colour measurement and management in multimedia systems and equipment - Part 2-1: Colour management - Default RGB colour space - sRGB (parallel IEC CDV/CENELEC enquiry)

Deadline for vote: 1999-02-15.

100/88/CDV

IEC 61966-3: Colour measurement and management in multimedia systems and equipment - Part 3: Equipment using cathod ray tubes (parallel IEC CDV/CENELEC enquiry)

Deadline for vote: 1999-03-15.

100/91/CDV

Colour measurement and management in multimedia systems and equipment - Part 4: Equipment using liquid crystal display panels (parallel IEC CDV/CENELEC enquiry)

Deadline for vote: 1999-04-15.

Persons interested in above items are requested to contact their IEC National Committee for further details.

From the Lighting Journals

Color Research and Application

Volume 23, Number 5, October 1998

Theoretical aspects of mesopic photometry and their implication in data assessment and investigation planning

P.W. Trezona

Brightness-to-luminance ratio of colored light in the entire chromaticity diagram

M. Ayama, M. Ikeda

Relations between the two kinds of representation methods in the Helmholtz-Kohlrausch effect

Y. Nayatani

Visual determination of hue suprathreshold color-difference tolerances

Y. Qiao, R. S. Berns, L. Reniff, E. Montag

Hue uniformity and the CIELAB space and color difference formula

R. G. Kuehni

The Alexandrite Effect of the Tavernier diamond caused by fluorescence under daylight

Y. Liu, J. Shigley, T. Moses, I. Reinitz

Color research in architectural education - A cross-cultural explorative study

J. Janssens, B. Mikellides

The conundrum of supra-threshold hue differences

R. G. Kuehni

International Journal of Lighting Research and Technology

Volume 30, Number 3, 1998

Chromatic effect on apparent brightness in interior spaces I: Introduction and colour gamut models

S. A. Fotios, G. J. Levermore

Chromatic effect on apparent brightness in interior spaces II: sws Lumens model

S. A. Fotios, G. J. Levermore

Chromatic effect on apparent brightness in interior spaces III: Chromatic brightness model

S. A. Fotios, G. J. Levermore

Transparent domed skylights: Optical model for predicting transmittance, absorptance and reflectance

A. Laouadi, M. R. Atif

Rooflight spacing and uniformity

E. J. Dewey, P. J. Littlefair

New developments in CSP (Comfort, Satisfaction, Performance)

A. R. Bean, T. M. McFadden

Paired illuminance measurements: Eliminating calibration error

P. R. Tregenza

International Lighting Review

Volume 49, Number 981

The many faces of the office

M. Wouters, W. van Bommel

Lighting controls

Office lighting

M. Wouters

Glare or no glare ?

W. van Bommel, A. de Visser, M. Wouters

Journal of Light and Visual Environment

(published by the Illuminating Eng. Inst. of Japan)

Vol. 22, Number 1, 1998

Development of high-bright and pure-white LED lamps

K. Bando, K. Sakano, Y. Noguchi, Y. Shimizu

Photocatalytic reaction of TiO₂ films and its application to lighting systems

A. Saitou, H. Kamata, M. Saitou, K. Ogishi

Theoretical evaluation of spectral power distributions of radiant energy from microcavities

S. Sekine, M. Ueno, H. Suzuki, M. Ohkawa

Standard sky luminance patterns, their levels and occurrence probabilities

R. Kittler

The optimal illuminance for reading: Effects of age and visual acuity on legibility and brightness

Y. Inoue, Y. Akitsuki

Impressions of overall brightness in a non-uniformly illuminated space

S. Kobayashi, Y. Nakamura, M. Inui

Emergency evaluation lighting for the elderly

W. G. Julian, G. Watson

Simulating reflection characteristic of inspected object in automatic inspection system by Monte Carlo method

L. Chen, M. Suzuki, N. Yoshimura

Study of a method of measuring the transverse distribution of illuminating laser light and laser-induced chlorophyll fluorescence in plant leaves using a micro-fluorescence imaging (MFI) system

K. Takahashi

Task and ambient lighting systems committee

M. Saitoh

Lighting Design + Application

September 1998: Entertainment

October 1998: Outdoor Lighting

LUCE (in Italian)

(see also: <http://www.tecnet.it>)

Volume 37, Number 4, September 1998

Dall'oggetto al contesto

M.C. Passoni

Litestar 3.0, un "quasi-Cad" al servizio dell'illuminotecnica

G. G. Mongiello

La nuova sede italiana dello studio Freshfield

G. Pollice

Il nuovo complesso scolastico per il liceo scientifico di Ivrea

F. Recchia

Regolazione di lampade a scarica e tubi fluorescenti

G. Bellato

Volume 37, Number 5, October 1998

Lo stade di France a Saint Denis

G. Forcolini

L'illuminazione della chiesa parrocchiale di San Clemente a Bellinzago

A. N. S. Dell'Era

Il North Greenwich Transport Interchange a Londra

P. Ceregoli

L'illuminazione di sicurezza e di riserva

F. Baldassari

Colori e scena urbana: l'immagine notturna di Firenze

A. Godoli, A. Reggiani

Determinazione delle interdistanze fra gli apparecchi di illuminazione di sicurezza

R. Bellocchio

The Lighting Journal

Volume 63, Number 5, September/October 1998

Accidents will happen - or will they ?

G. Pritchard

Glasgow's fitting development

C. Gardner

50 years of lighting in Scotland

J. Beaton, J. Milne

Volume 63, Number 6, November/December 1998

Lighting in historic buildings

B. Skingley

Value for money: Street lighting and crime reduction
K. Painter

Non-destructive testing of lighting columns
A. Howard

The lighting of the pont Sir Y Flint - the Flintshire Bridge
N. Pollard, T. Bowden

Vision Research

Volume 38, Number 5, 1998

Rod photoresponses in 6-week and 4-month-old human infants

S. Nusinowitz, D. G. Birch, E. E. Birch

Luminance contrast and spatial-frequency tuning of the transient-vergence system

M. Edwards, D. R. Pope, C. M. Schor

Volume 38, Number 6, 1998

The role of "contrast enhancement" in the detection and appearance of visual contours

R. F. Hess, S. C. Dakin, D. J. Field

Short-wave cone signal in the red-green detection mechanism

C. F. Stromeyer III, A. Chaparro, C. Rodriguez, D. Chen, E. Hu, R.E. Kronauer

Thresholds for the identification of the direction of motion of plaid patterns defined by luminance or chromatic contrast

K. R. Gegenfurtner

Volume 38, Number 7, 1998

Optical properties of retinal photoreceptors and the Campbell effect

C. Pask, A. Stacey

Tuning of orientation detectors in human vision

D. L. Ringach

Dichromatic color vision at high light levels: Red/green discrimination using the blue-sensitive mechanism

M. J. McMahon, D. I. A. MacLeod

Contrast-modulation flicker: Dynamics and spatial resolution of the light adaptation process

S. He, D. I. A. MacLeod

Local nonlinearity in S-cones and their estimated light-collecting apertures

S. He, D. I. A. MacLeod

The zone of focal attention during active visual search

B. C. Motter, E. J. Belky

The contribution of color to visual memory in X-chromosome-linked dichromats

KR. Gegenfurtner, FA. Wichmann, LT Sharpe

Volume 38, Number 8, 1998

On the binocular summation of chromatic contrast
D. R. Simmons, F. A. A. Kingdom

Color and luminance detection and discrimination
asymmetries and interactions
A. J. Vingrys, L. E. Mahon

Orientation dependency for foveal line stimuli:
detection and intensity discrimination, resolution,
orientation discrimination and Vernier acuity
G. Westheimer, B. L. Beard

Effects of contrast and temporal frequency on
orientation discrimination for luminance and
isoluminant stimuli
T. E. Reissbeck, K. R. Gegenfurtner

Spatiotemporal impulse response and cortical
magnification
V. Manahilov, S. Atanassova

Optical flow and the metric of the visual ground
plane
J. M. H. Beusmans

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Applied Vision Association
September 1998, Issue 128

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background equivalent? Sparse chromatic context
revisited. *Vision Research*, **38**, 1789-1793, 1998.

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detect changes in speed and direction of visual
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study of visual strain and individual differences.
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Environmental Medicine*, **69**, 666-674, 1998.

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the function of the cone-rich rim of the retina? *Eye*,
12, 548-552, 1998.

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(HMD) are not distinguishable from those of desk-
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For your Diary

Date	Title of Meeting	Organizer	Place of Meeting
1999			
Feb. 2 – 5	World Summit on Nordicity	Nordicity, Fax: +1 418 681-6892, nordicit@riq.qc.ca, www.nordicite.org	Québec, Canada
April 19 - 23	General Assembly of the European Geophysical Society	http://www.copernicus.org/EGS/egsga/denhaag99/denhaag99.htm	Den Haag, Netherlands
April 25 - 28	Image Processing, Image Quality, Image Capture Systems Conference	IS&T, 7003 Kilworth Lane, Springfield VA 22151, info@imaging.org	Savannah, Georgia, USA
May 5 - 7	Inter-Society Color Council Annual Meeting	ISCC, iscc@compuserve.com	Vancouver, Canada
May 16 - 21	SID '99	M.Hareng, fax: +33 160 830 148, P.Drzaic, fax: +1 617 868 8089	
June 22 - 23	AIC 1999 Midterm Meeting	Central Office of Measures fax: +4822 620 83 78	Warszawa, Poland
June 24 - 30	CIE Session 1999	Session Secretariat: fax: +4822 660 5616, CIE99@ee.pw.edu.pl	Warszawa, Poland
June 28	CIE Division 8 meeting	CIE Division 8	Warszawa, Poland
June 28	CIE Division 6 meeting	CIE Division 6	Warszawa, Poland
June 28	CIE Division 5 meeting	CIE Division 5	Warszawa, Poland
June 28-29	CIE Division 3 meeting	CIE Division 3	Warszawa, Poland
June 28-29	CIE Division 1 meeting	CIE Division 1	Warszawa, Poland
June 28 - July 3	World Electrotechnical Congress WELC'99	AES, Krasnokazarmennaya Str.14 Moscow 111250 fax 095 2870891	Moscow, Russia
June 29-30	CIE Division 4 meeting	CIE Division 4	Warszawa, Poland
June 30	CIE Division 2 meeting	CIE Division 2	Warszawa, Poland
June 30	CIE Division 7 meeting	CIE Division 7	Warszawa, Poland
July 12	International Astronomical Union Symposium No. 196 "Preserving the Astronomical Window"	IAU, D.Crawford, crawford@darksky.org, http://www.darksky.org	Vienna, Austria

Date	Title of Meeting	Organizer	Place of Meeting
July 18-23	Int.Symp. on Optical Science, Engineering and Instrumentation	SPIE	Colorado, Denver, USA
Aug. 2 to 6	ICO XVIII - Optics for the next millenium	ICO, SPIE, POB 10, Bellingham WA 98227-0010, USA	San Francisco, CA, USA
Aug. 23 - 25	Diffraction Optics (22nd EOSTM)	EOS, F.Wyrowski wyrowski@uni-jena.de	Jena, Germany
Sep. 22 - 25	Physiological Optics (24th EOSTM)	EOS, H.Kasprzak, henkas@rainbow.if.pwr.wroc.pl	Wroclaw, Poland
Sep. 30 - Oct. 2	CIE Symposium '99: 75 years of CIE Photometry	CIE	Budapest, Hungary
Oct. 3 - 9	XXIst World Road Congress	PIARC, fax: 33 1 4900 0202, piarc@pratique.fr	Kuala Lumpur, Malaysia
Oct. 6 - 8	Balkan Light-99, 1st Balkan Lighting Conference & Exhibition	Balkan Light 99, fax: +3592 654883 e-mail: denima@omega.bg	Varna, Bulgaria
Oct. 18 - 21	Méetrologie 99	MFQ, fax:+33 4 6791 3343, sandrine.gazal@wanadoo.fr	Bordeaux, France
Oct. 25 - 27	Newrad 99, Int.Conf.on new developments in optical radiometry	A.Corrans, fax:+34 91 4117651, corrans@fresno.csic.es, http://newrad.metrologia.csic.es	Madrid, Spain
2000			
Feb. 20-22	ISCC 2nd Panchromatic Conference - Color in its Surround	ISCC, iscc@compuserve.com	Hilton Head South Carolina, USA
Sep. 20 - 22	Licht 2000	LiTG, Germany	Goslar, Germany

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**SEASON'S GREETINGS
MEILLEURS VOEUX**

und wünscht

FROHE FESTTAGE



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