



COMMISSION INTERNATIONALE DE L'ECLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION

MINUTES OF THE 3rd MEETING (McFadden TERM)

DIVISION 1: VISION AND COLOUR

Friday 19 May 2006

Ottawa, Canada

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

ATTENDANCE*

Officers

S McFadden	Director	Canada
F Viénot	Associate Director	France
M Pointer	Associate Director	Great Britain
E Carter	Editor	United States of America
Y Nakano	Secretary	Japan

Country representatives

	P McGinley		Australia
*	S McFadden		Canada
	M Vik		Czech Republic
	L Halonen	(nominated representative)	Finland
*	F Viénot	(nominated representative)	France
	G Rösler		Germany
*	M Pointer		Great Britain
	J Schanda	(nominated representative)	Hungary
	O Da Pos		Italy
*	Y Nakano		Japan
	N van Tonder	(nominated representative)	South Africa
	P Alessi		United States of America

Countries represented at the meeting: 12

Technical Committee Chairpersons

*	Y Nakano	TC1-30	Japan
*	F Viénot	TC1-36	France
	K Sagawa	TC1-37, TC1-54	Japan
	M Ayama	TC1-42	Japan
*	J Schanda	TC1-48, TC1-59	Hungary
	R Luo	TC1-52	Great Britain
	A Robertson	TC1-57	Canada
*	L Halonen	TC1-58	Finland
*	K Richter	TC1-63	Germany
*	S McFadden	TC1-64	Canada
*	M Pointer	TC1-65	Great Britain
	H Ujike	TC1-67	Japan

Reporters

	H Yaguchi	R1-19	Japan
*	R Luo	R1-33	Great Britain
*	J Schanda	R1-34	Hungary

* Asterisks before names represent duplication elsewhere in the list.

	N Itoh	R1-37	Japan
*	Y Nakano	R1-38	Japan

Guests Some guests are members of TCs

C Beke		Hungary
P Csuti		Hungary
W Davis	New TC chair	United States of America
M Eloholma	TC Member	Finland
C Françon		France
A Jackson		United States of America
F Leloup		Belgium
H Peter		Belgium
E Radkov		United States of America
J Zwinkels	Liaison	Canada

Apologies (country representatives, TC chairs, or reporters indicated)

Rengin Ünver (Turkey), Pieter Walraven (TC1-41), Marta Klanjsek Gunde (Slovenia)

Total attendance: 30

1. WELCOME

The Division Director, Mrs. McFadden, welcomed all present.

2. ANNOUNCEMENTS

Some change of the meeting schedule was announced. A part of Item 13, liaison, in the agenda was moved before the first break. See Appendix I.

3. ATTENDANCE

12 countries were officially represented.

4. MEMBERSHIP

Former representative of Brazil, Dr. Robert Hirshler, moved to Hungary, but we don't know the new representative of Brazil yet. Osram GmbH (DE) was appointed as supportive member, and Dr. Walter Steudtner would be the contact person.

5. DISCUSSION AND CONFIRMATION OF AGENDA

The agenda was confirmed as in Appendix I.

6. APPROVAL OF MINUTES OF THE SEVENTH MEETING OF THE SAGAWA TERM

The minutes of the 2005 meeting held in Leon, Spain, were approved. They appear on the Division 1 web site.

7. MATTERS ARISING FROM THESE MINUTES

None.

8. DIRECTOR'S REPORT (Mrs. McFadden)

Division 1 Specific

The following Technical report and Standard were published during the past year:

CIE 166:2005, Cognitive Colour.

ISO 23603:2005(E) / CIE S 012/E:2004, Joint ISO/CIE Standard, Standard Method of Assessing the Spectral Quality of Daylight Simulators for Visual Appraisal and Measurement of Colour.

The following Draft Standard and Technical report were approved:

CIE Draft Standard DS 014-4.2/E:2006 Colorimetry - Part 4: CIE 1976 L*a*b* Colour Space.

CIE 170-1:2006 Fundamental chromaticity diagram with physiological axes - Part 1.

The following new TCs were proposed and approved by the board:

TC1-67 Effects of dynamic and stereo images on human health, chaired by Dr. H Ujike (JP)

TC1-68 Effect of stimulus size on colour appearance, chaired by Dr. P Bodrogi (HU)

The change of chair for TC1-55 Uniform Color Space for Industrial Color Difference Evaluation, from J Nobbs (GB) to M Melgosa (ES), was approved by the board.

The name of the new CIE award was changed from "CIE D. B. Judd award" to "CIE G. Wyszecki award." This is awarded to fundamental researches related to Divisions 1 and 2, and the board is looking for the nominations.

International Lighting Vocabulary harmonizing committee met in Spain last year. List of the terms was reviewed by the members and the members of Division 1, 2 and 8 sent back their responses. It will be published in electronic form and divided in two parts. One is for basic terms related to Divisions 1, 2 and 8, and the other is for applied terms related to the rest of Divisions.

CIE expert symposium on the measurement of visual appearance will be held in Paris, France, in 19-20 October 2006.

CIE 2007 quadrennial meeting will be held in Beijing, China, in 4-11 July 2007.

9. REPORTS FROM EDITOR AND SECRETARY

Dr. Carter reported that 2006 Activity Report was produced in January, and it was posted on the website. She had edited the Technical report from TC1-65 Measurement of visual appearance, and the following two documents were published.

CIE 166:2005 Cognitive Colour

CIE 167:2005 Recommended Practice for Tabulating Spectral Data for Use in Colour Computations

Dr. Nakano apologized his inactivity since the last meeting. He proposed to set up a bulletin board system on the Division 1 website.

10. VISION

(Associate Director: Dr. Viénot)

Dr. Viénot chaired this session.

TC1-30: Luminous Efficiency Functions (Y Nakano)

Dr. Nakano reported that after learning Sprague method for interpolating brightness luminous

efficiency functions, he will finish the report as soon as possible.

TC1-36: Fundamental Chromaticity Diagram with Physiologically Significant Axes (F Viénot)

c Part 1 of a technical report comprising chapters 1 to 6 has completed ballot and is now ready for publication. Work is still in progress on the contents of Part 2, Chapters 7 and 8.

1. Introduction
2. Fundamental response curves for the 10° observer
3. Derivation of the photo-pigment absorption spectra
4. Fundamental response curves for the 2° observer
5. A field size and age dependent observer
6. Tables
7. Photometric aspects: the choice of the $V_{10}(\lambda)$ and the $V_2(\lambda)$ functions
8. Development of a 2 dimensional chromaticity diagram
9. Conclusions and recommendations
10. Tables

TC1-37: Supplementary Systems of Photometry (K Sagawa)

Dr. Sagawa reported that he has published a paper: Towards a CIE supplementary system of photometry: brightness at any level including mesopic region, *Ophthalmol. Physiol. Opt.*, 25, 1-6 (2006).

TC1-41: Extension of $V_m(\lambda)$ beyond 830 nm (P Walraven)

Dr. Viénot reported that the terms of reference had been modified as follows in 2004: "Extension of $V_m(\lambda)$ beyond 830nm, including modification of $V_m(\lambda)$ in the 660-780 nm region of the spectrum." TC awaits the conclusion of chapters 5, 6 and 7 in the report of the TC1-36.

TC1-42: Colour Appearance in Peripheral Vision (M Ayama)

Dr. Ayama reported that this TC met yesterday and introduced a plan to complete the draft report chapter by chapter.

TC1-54: Age-Related Change of Visual Responses (K Sagawa)

Dr. Sagawa reported that work has started on a contribution to the CIE Guidelines for Accessibility – Guidelines in Light and Lighting for Older Persons and Persons with Disabilities, being produced by the CIE Board of Administration. Data collected concerns the three visual functions: spectral sensitivity (flicker photometry and brightness matching), visual acuity, and contrast sensitivity.

TC1-58: Visual Performance in the Mesopic Range (L Halonen)

Dr. Viénot reported that this TC met yesterday, and Dr. Halonen handed her a written report. Mrs. McFadden read the report instead of her. In the Ottawa meeting new data on mesopic visual performance was presented to compare the performance based mesopic models of MOVE and X. Based on this data the MOVE model is seen to predict mesopic luminances better than the X model, however new data is needed to compare and validate the existing models.

TC1-60: Contrast Sensitivity Function (CSF) for Detection and Discrimination (E Martinez-Uriegas)

Dr. Viénot reported that this TC met yesterday, and Mrs. McFadden reported the summary of the meeting. The following issues were discussed in the meeting: activity and responsibility of the members, communication mechanism among the members, relation to Division 8 and how much should be included on aging, individual differences etc.

TC1-67: Effects of dynamic and stereo images on human health (H Ujike)

Dr. Ujike reported that this TC met yesterday. Time schedule, incidences of sickness, experimental data and gender effect were discussed in the meeting.

R1-19: Specification on Individual Variation in Heterochromatic Matching (H Yaguchi)

Dr. Yaguchi reported that he was not going to propose a TC in conclusion of the reportership.

R1-23: Guidelines on Planning a Mesopic Photometry Investigation (P Trezona)

Dr. Viénot reported that the report prepared by Dr. Trezona has been reviewed and she was willing to revise the report.

R1-35 Irregularities in $\bar{y}_{10}(\lambda)$ (P Walraven)

Dr. Viénot reported that Dr. Walraven had some data and he would write a report..

R1-36 Action Spectra for Discomfort Glare (J Fekete)

Dr. Viénot reported that Dr. Fekete provided a comprehensive report for the last activity report though no report was received for this meeting.

R1-37 Definition of the Visual Field for Conspicuity (N Itoh)

Dr. Itoh presented her survey on functional visual field. Division of retina and category of function of visual field (detection, discrimination, recognition, motion, performance/behavior) were discussed in her talk.

11. COLOUR

(Associate Director: Dr. Pointer)

Dr. Pointer chaired this session.

TC1-27: Specification of Colour Appearance for Reflective Media and Self-Luminous Display Comparison (P J Alessi)

Dr. Pointer reported that the chairman was now preparing a final technical report. A first draft should be ready late in 2006.

TC1-38 Compatibility of Tabular Data for Computational Purposes (M Pointer)

Dr. Pointer proposed to disband this TC following the publication of CIE Publication 167:2005: Recommended practice for tabulating spectral data for use in colour computations. Closing of this TC was unanimously approved.

TC1-44 Practical Daylight Sources for Colorimetry (R Hirschler)

Dr. Pointer reported that there was no progress on a draft Technical Report.

TC1-55 Uniform Colour Space for Industrial Colour Difference Evaluation (M Melgosa)

Dr. Pointer reported that the new Chairman of this TC, Manuel Melgosa, has formed a committee that will hold its first meeting at the IS&T CGIV Conference at the University of Leeds on 15 June 2006.

TC1-56 Improved Colour Matching Functions (M Brill)

Dr. Pointer reported that work was on going in three locations.

TC1-57 Standards in Colorimetry (A Robertson)

Dr. Robertson reported as follows.

These standards are to be numbered in a series as follows:

CIE S014-1 Colour-matching functions (D2)

CIE S014-2 Standard illuminants (D2)

CIE S014-3 Calculation of tristimulus values (TC 1-57)

CIE S014-4 CIELAB (TC 1-57)

CIE S014-5 CIELUV (TC 1-57)

CIE S014-6 CIEDE2000 (TC 1-57)

S014-1 is the responsibility of D2 and the current version is ISO/CIE 10527(E), 1991 (CIE S002, 1986). An NC ballot on CIE DS014-1.3/E: 2005 closed at the end of January 2006. There are no

changes to values, only minor changes to the wording. S014-2 is also the responsibility of D2. The current version is ISO 10526/CIE S005 (1999) and an NC ballot on CIE DS014-2 closed at the end of January 2006. There are no changes to values and only minor changes to the wording, including clarification that the values are for standard air. The next version will include illuminant D50 to establish it as a Standard Illuminant (TC 2-57). S014-4 is the responsibility of TC1-57 and Division and BA ballots are completed. The Division result was 9 in favour, 0 against, 0 abstentions, and the BA result 8 in favour, 0 against, 1 abstention. There were several editorial comments which were dealt with at a meeting of the TC held the previous day. This Standard is now ready for publication.

The first draft of S014-5 has been circulated and the main issue is whether the standard is needed at all. Some think it is not used enough to warrant being a standard (except for the u', v' diagram), others believe it is needed as a reference for those who are using it. The meeting the previous day agreed that the standard should be written as originally intended.

S014-3 Calculation of Tristimulus Values will cover the following: The input data bandwidth equal to the wavelength interval.

- The standard method of summation is from 360 nm to 830 nm by 1 nm.
- For any abridgement or manipulation, the user must have reviewed the impact on the final results.
- Abridged methods are summation from 380 - 780 x 5 nm for 10 or 20 nm intervals, with ASTM Table 6 or Li et al. for calculation.
- Manipulate input data if necessary. Try to be compatible with TC 2-60 (Effect of instrument bandpass function and measurement intervals on spectral quantities) The final standard is S-014-6 on colour difference evaluation. A period of use, testing and reporting by the user community will precede a determination on whether to make the new method a CIE standard: it is considered that this period is now over. There is some debate as to whether the standard should include the Nobbs & Li version that has no cross-product term. A Reporter must consider this first – see R1-39 below. TC1-61 Categorical Colour Identification

No progress in writing a draft technical report.

TC1-61: Categorical Colour Identification (T Ishida)

Dr. Pointer reported that the report from Ishida said no progress. He suggested to close this TC if there was no progress by Beijing meeting.

TC1- 62 Colour Rendering of LED Light Sources (P Bodrogi)

Dr. Pointer reported that draft 2 of a technical report has been completed and will soon be circulated for TC ballot. Dr. Yaguchi introduced a new concept of color rendering index “FCI” based on “Visual Clarity” or “Feeling of Contrasts”.

TC1-63 Validity of the Range of CIEDE2000 (K Richter)

Dr. Richter reported that this TC met yesterday. Work has started on gathering data on large colour differences ($>5 \Delta E$) using a method based on a printed test chart. Five committee members will provide scaling data. Work has also started on the design of an experiment for the evaluation of threshold differences. Eight data sets are already available and a test chart-based method has been designed for easy use.

TC1-64 Terminology for Vision, Colour, and Appearance (S McFadden)

Mrs. McFadden reported that there was no progress. A decision is still awaited from the Central Bureau on how to publish the next edition of the International Lighting Vocabulary.

TC1-65 Visual Appearance Measurement (M Pointer)

Dr. Pointer reported that a first draft of a Technical Report was circulated to the TC and over 200 comments received from 14 members. The TC met in León, Spain, in 2005 to review the way in which the comments would be handled. The chairman produced Draft 2 of the report and resolved 140 of the comments. The remainder were resolved after committee circulation and Draft 3 of the

report created. By separate circulation a discussion was held on the definition of the term 'appearance.' The report was then sent to the Division Editor for editing and to the Technical Committee members for approval. 16 positive votes were received and no negatives. The editorial comments were resolved by producing Draft 4 of the report which has now been sent to the CB for NC ballot.

The CIE Expert Symposium on Appearance is to be held in Paris on 19-20 October 2006 and 26 papers have been received to date. See <http://www.mnhn.fr/cievisualappearance> for further details.

TC1-66 Indoor Daylight Illuminant (J Schanda)

Dr. Schanda reported that this technical committee met yesterday and an outline Technical Report discussed. There are several questions which will have to be resolved:

1. Should average data be quoted, or average data with a range, or sets of typical data?
2. Should D1 derive a trial SPD and let D2 provide a near-matching source, with the proviso that D1 can then change the SPD to match that of the realised source?
3. Should coated glass be included as a separate case?

The chair asked that real samples be provided so that measurements can be made.

TC1-68 Effect of Stimulus Size on Colour Appearance (P Bodrogi)

Dr. Pointer reported that Dr. Bodrogi was now working on gathering data commenced.

R1-11 Cognitive Aspects of Colour (G Derefeldt)

Dr. Pointer proposed to close this Reportership and it was unanimously approved.

R1-32 Emotional Aspects of Colour (G Derefeldt)

Dr. Pointer reported that there was no progress.

R1-33 Colour Difference Evaluation (R Luo)

Dr. Luo reported as follows. It is considered that the evaluation period for assessing the performance of CIEDE2000 is now over. There is an issue with the use of the hue rotation term in that it does not permit the colour difference to be assigned hue, lightness and chroma components. An alternative formulation, due to Nobbs and Li has been suggested but not published in the open literature. This will be investigated by a new reporter and appropriate action recommended. Dr. Pointer proposed to close this Reportership and approved by 11 favored and 1 abstention.

12. DISCUSSION ON NEW WORK ITEM PROPOSALS

Colour Rendition by White Light Sources

Terms of Reference:

To investigate new methods for assessing the colour rendition properties of white-light sources used for illumination, including solid-state light sources, with the goal of recommending new assessment procedures.

Chair: Wendy Davis US

Members: Mike Pointer GB, Janos Schanda HU, Peter Hanselaer BE, Françoise Viénot FR, Hirohisa Yaguchi JP, Ronnie Luo GB, Peter Bodrogi HU, Klaus Richter DE

The Division unanimously approved the establishment of this TC.

Committee number: TC1-69 (Color section)

Alternative Forms of the CIEDE2000 Colour-Difference Equation

Terms of Reference:

To investigate alternative formulations of CIEDE2000 equation and make a recommendation to the Division on any necessary action.

Reporter: Mike Pointer GB

The Division unanimously approved the establishment of this Reportership.

Reporter number: R1-39 (Color section)

Scene Dynamic Range**Terms of Reference:**

To investigate the concept of scene dynamic range, the appearance of colours brighter than the adapted white, and adaptation to the dynamic range when viewing, and make recommendations regarding work to be done by the CIE.

Reporter: Jack Holm US

The Division unanimously approved the establishment of this Reportership.

Reporter number: R1-40 (Vision section)

13. LIAISON**AIC**

Ms. Alessi reported that some officers were changed. The new vice president is Mrs. B Bergström (SE), and the new secretary is Dr. J Romero (ES). She also reported the coming meeting schedule as follows. 2006 meeting will be held in Gauteng, South Africa, in 24-27 October 2006, and its topic will be "Colour in Fashion and Colour in Culture." 2007 meeting will be held in Hangzhou, China, in 12-14 July 2007. 2008 meeting will be held in Stockholm, Sweden, in 15-18 June 2008. 2009 quadrennial meeting will be held in Sydney, Australia, in 27 September - 2 October 2009.

ANSI/NIST

Mr. A Jackson reported the NIST activity on standardization of CRI.

ISO/TC38/SC1: textiles: Colour Fastness and Measurement

Dr. Luo summarized the work going on in ISO/TC38 such as "colour inconstancy index" etc.

ISO/TC6/W3: Paper, Board and Pulp - Optical Properties:

Dr. Twinkels reported that the executive of ISO/TC6/W3 had been changed from Dr. Anthony Bristow to Dr. Byron Jordan (CA) in August 2005.

ISO/TC42/ Photography

No report.

ISO/TC130: Graphic Technology

No report.

ISO/IEC JTC1/SC28 Office Equipment

Dr. Richater reported about topics dealt within JTC/SC28 such as laser printers and monitors. He is watching if there is any matter Division 1 should deal

ISO/TC159/Working group 2 (Ergonomics)

Dr. Ken Sagawa (JP) proposed himself to be this new liaison officer.

14. PLAN FOR NEW EXECUTIVE IN 2007

Mrs. McFadden asked Division members to send her the information on the nominations for new executive by the beginning of August. Division ballot will be carried out by the end of August, so that the new executive can be approved by the board in October.

15. NEXT MEETING

Next Division meeting will be held in conjunction with CIE Quadrennial Meeting in Beijing, China July 2007.

CLOSE

After thanking all members and guests for attending, Mrs. McFadden formally closed the meeting.

CIE DIVISION 1 "VISION AND COLOUR"

Third Meeting of the McFadden Term

19 May 2006

AGENDA

Friday 19 May

9:00 – 10:00 **General Opening Session**

1. Opening and welcome by Director, Ms. Sharon McFadden
2. Announcements
3. Attendance
4. Membership
5. Discussion and confirmation of agenda
6. Approval of the minutes of the 2nd meeting of the McFadden term
7. Matters arising from these minutes
8. Director's report, including report from CIE Board of Administration
9. Reports from Editor and Secretary, E. Carter and Y. Nakano

10:00 – 10:30 Break

10:30 – 16:30 **CIE Division 1 Business Session**

10:30 – 12:00 10. Report of Vision Section and Discussion

Dr. Françoise Viénot

12:00 – 13:00 Lunch

13:00 – 14:30 11. Report of Color Section and Discussion

Dr. Mike Pointer

14:30 – 15:00 Break

15:00 – 16:00 12. Discussion on new work item proposals

- new TCs and Reporters

16:00 – 16:10 13. Liaison

16:10 – 16:20 14. Plan for new executive in 2007

16:20 – 16:30 15. Next meeting

16:30 Close