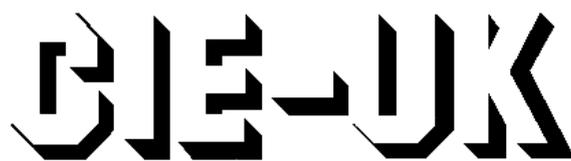


COMMISSION INTERNATIONALE DE L'ECLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION

Annual Report
of the
National Illumination Committee of Great Britain

---000---

1st October 2012 to 30th September 2013



National Illumination Committee of Great Britain

Report for the year ending 30 September 2013

The highlight of this year must have been the Centenary Meeting of the CIE in Paris back in April.

The meeting was accompanied by a 2-days conference on the subject “Towards a New Century of Light.” In 2 keynote speeches, 60 oral presentations and 134 posters, experts from all over the world presented their latest research results and learned observation on various subjects related to light and lighting – all of which are now available in CIE Publication x038:2013 from the CIE Web shop.

A century is a long time and how the world of lighting has changed in those 100 years. Our own CIE-UK Centenary, which we will be celebrating this December, was presided over, amongst others, by The Institution of Gas Engineers – an indication that back in 1913 gas was still one of the main sources of artificial light, particularly for street lighting. There will be more to say on our own Centenary in next year’s Report.

Administration

The administration continues to run smoothly and while our Executive Secretary Mike Pointer will be standing down after the 2013 AGM in December, to ensure a smooth changeover and after an open invitation, the Trustees have appointed Allan Howard, a Past President of the Institution of Lighting Professionals, to take his place.

Membership

There has been one new Individual Member: Mr Enrico Bianchi of Bianchi Lighting, and Loughborough University (John Mardaljevic) has become a University member.

Finance

The accounts again show the relatively healthy state of our affairs although we did again have to limit our travel funds to those going to CIE meetings.

Technical

The innovative new service of the searchable online database of the International Lighting Vocabulary is now well established. It just needs a click on <http://eiv.cie.co.at/> to get immediate access to all terms and definitions (> 1400) of the current version of the ILV (CIE S 017/E: 2011). They can all be found in the database, including the according number in the ILV. To get a list of terms containing a certain word or fraction of a word the database can be searched by using different search options.

The technical work of the CIE Divisions is ongoing as ever, and can be examined in detail on their respective Division websites.

Finally, we are continuing to plan for the 28th Sessional Meeting in Manchester in 2015 for which a Steering Committee has been set up: we continue in good shape for the years ahead.



Nigel E. Pollard
Chairman

CIE Division 1: Vision and Colour

The Terms of Reference of Division 1 are:

To study visual responses to light and to establish standards of response functions, models and procedures of specification relevant to photometry, colorimetry, colour rendering, visual performance and visual assessment of light and lighting.

Photometry is the science of measurement of visible light in terms of its perceived brightness to human vision and it plays an important part in, for example, assessing the quality of the living and working environment, lit by either artificial light or natural daylight. Colorimetry is the science of measurement of colour in terms of perceived attributes and it plays an important part in many aspects of, for example, industrial process control, imaging systems, and signalling systems.

The emphasis in Division 1 is on the perceptual aspects of these subjects leading to a further understanding of how we see what we see.

The annual meeting of CIE Division 1 commenced on Thursday 4 July with a Workshop on *Colorimetry, Graphic Arts and Colour Management* organised in association with ISO Technical Committee 130 *Graphic Technology* and the International Color consortium (ICC). In the evening, CIE-UK part-sponsored a dinner for the 50 participants at the Workshop.

Friday 5 July was devoted to meetings of twelve Division 1 Technical Committees held in two parallel sessions. The Division meeting was held on Saturday 6 July 2013 at Weetwood Hall which is part of the University of Leeds, UK.

On Sunday 7 July, many delegates moved by coach to Gateshead to attend the 12th Colour Congress of the International Colour Association (AIC) which was hosted and organised by the Colour Group (Great Britain), a member of the National Illumination Committee of Great Britain.

Mike Pointer attended the Division event as Division Secretary and UK Division Representative. Ronnier Luo was present as Division Director. Eighteen member countries were represented, 16 TC chairs and 1 reporter were present: a total of 44 people attended the meetings.

As will be noted in the list below, the number of people from the UK who are active in CIE Division 1 is declining and this gives cause for concern; and this scenario is not unique to the UK. The current Director of CIE Division 1, Ronnier Luo, completes two 4 year terms in 2015 and is not eligible to continue in that post. The Officers of Division 1 are actively seeking a nomination for a new Director but are finding it difficult to find someone with the time, energy and financial support to take on the role.

New Publications:

- CIE S 014-6/E:2012 *CIE Colorimetry - Part 6: CIEDE2000 Colour Difference Formula* is now published as a CIE Standard and will complete the process to become an ISO standard by the end of 2013. This document was prepared by TC1-57 *Standards in Colorimetry* chaired by Alan Robertson. This TC has now completed its work and was closed at the Leeds meeting. Mike Pointer was a member of this TC.
- 204:2013: *Methods for Re-defining CIE D Illuminants*. This report was written by TC1-74 *Methods for Re-defining CIE D Illuminants*, chaired by Janos Schanda.
- Report from R1-56 *Skin Colour Database* – led to the establishment of TC1-92 – see details below.
- Report from R1-57 *Border Between Luminous and Blackish Colours*.
- Report from R1-59 *Calculation of Self-luminous Neutral Scale* – led to the establishment of TC1-93 – see details below.

New Technical Committees:

TC1-93 (V) Calculation of Self-luminous Neutral Scale
Terms of To recommend a formula or computational method for an achromatic, neutral or gray
Reference: scale for self-luminous (i.e. non-reflective) surfaces. (This computation complements CIE
Lightness, L^* , which serves a similar purpose for reflective surfaces.)
Chairman: Robert Carter US

TC1-94 (V) Visually Meaningful Spectral Luminous Efficiency Functions
Terms of To propose new 2 degree and 10 degree photometric observers based on the work
Reference: described in CIE Publications 086-1990 and 165:2005, as well as that of CIE TC1-36
Fundamental chromaticity diagram, and study their use in practical photometry.
Chairman: Janos Schanda HU

New Reporter:

R1-60 (C) Future Colour-Difference Evaluation
Terms of To report on publications that relate to colour-difference evaluation and uniform colour
Reference: spaces.
Reporter: Guihua Cui CN

Next Meeting:

The 2014 meeting of CIE Division 1 will be held in the USA on 16, 17 June 2014. This will be followed on the 18 June by a Symposium organized by the Inter-Society Color Council, and on the 19, 20 June by a meeting of ASTM E12 *Color and Appearance*.

Active Technical Committees + UK Members:

TC1-36	Fundamental chromaticity diagram	John Mollon, Jack Moreland
TC1-55	Uniform colour space for industrial colour difference evaluation	Gui Cui, Ronnier Luo, Jim Nobbs, Mike Pointer, Bryan Rigg
TC1-61	Categorical colour identification	Mike Pointer, Ronnier Luo
TC1-63	Validity of range of CIEDE2000	Ronnier Luo, Jim Nobbs
TC1-64	Terminology for vision, colour and appearance	Mike Pointer
TC1-67	The effect of dynamic and stereo visual images on human health	Andrew Smedley (D6)
TC1-68	Effect of stimulus size on colour appearance	Ronnier Luo, Malcolm Nicholson
TC1-69	Colour rendition by white light sources	Ronnier Luo, Mike Pointer
TC1-70	Metameric samples for indoor daylight evaluation	
TC1-71	Tristimulus integration	Mike Pointer
TC1-73	Real colour gamuts	Mike Pointer
TC1-75	A comprehensive model of colour appearance	Ronnier Luo (TCC), Robert Hunt
TC1-76	Unique hue data	Galena Paramei, Kaida Xiao
TC1-77	Improvement of the CIE whiteness and tint equations	Phil Green, Ronnier Luo,
TC1-78	Evaluation of visual performance in the real lit environment	Ronnier Luo (Chair)
TC1-80	Research methods for psychophysical studies of brightness judgements	Steve Fotios (TCC), David Simmons
TC1-81	Validity of formulae for predicting small colour differences	Ronnier Luo
TC1-82	The calculation of colour matching functions as a function of age and field size	

TC1-83	Visual aspects of time-modulated lighting systems	Arnold Wilkins
TC1-84	Definition of visual field for conspicuity	
TC1-85	Update CIE Publication 15:2004 <i>Colorimetry</i>	
TC1-86	Models of colour emotion and harmony	Ronnier Luo
TC1-88	Scene brightness estimation	
TC1-89	Enhancement of images for colour defective observers	
TC1-90	Colour fidelity index	Ronnier Luo
TC1-91	New methods for evaluating the colour quality of white-light sources	Ronnier Luo
TC1-92	Skin colour database	Mike Pointer

Active Reporters:

R1-42	Extensions of CIECAM02
R1-49	Above threshold pulsed lights: Malcolm Nicholson GB
R1-51	Reconciling Maxwell vs maximum saturation colour matches
R1-52	Spectral data interpolation
R1-53	Gloss perception and measurement
R1-57	Border between luminous and blackish colours

For further details of the work of the Division, please refer to the 2013 Activity Report and the Minutes of the recent Division meeting held in Leeds both of which can be downloaded from the Division website.

Mike Pointer
 UK Representative CIE Division 1
 Secretary, Division 1

CIE Division 2: Measurement of Light and Optical Radiation

Most of the work in CIE Division 2 relates to the provision of guidance on the correct measurement of the optical radiation (ultraviolet, visible and infrared radiation) emitted by lamps, luminaires and other sources and on the correct characterisation of detectors and materials. Such measurements are essential to ensure the safe and effective working of a very wide range of products with which the public come into regular contact, including: traffic lights, car headlamps, airport runway lights and railway signals; high visibility clothing; ultraviolet lamps used in medical treatment of skin conditions and for curing of dental epoxies etc; barcode readers in supermarkets; lighting in homes, offices, schools, shops etc; and visual displays used not only for entertainment applications (television, computer gaming, cinema etc) but also 'serious' applications such as medical diagnosis and surgical training. Optical radiation measurements are also essential for monitoring the impact of human activity on the environment e.g. ozone depletion, changes in land use, deforestation and global warming.

Activities and achievements of the Division during the year October 2012 – September 2013 were as follows:

- One new CIE standard has been published by Division 2 during this period:
 - CIE S 023/E:2013: Characterization of the Performance of Illuminance Meters and Luminance Meters
- The Division met in Paris, France, on 17 April 2013 in conjunction with the CIE Centennial Meeting. The meeting was attended by Teresa Goodman from the UK.
- A total of 12 Division 2 Technical Committees (TCs) also met during the period 18 – 19 April 2013, covering a range of topics such as characterising the performance of measurement equipment, measurement and testing of LEDs, and new technological developments in measuring equipment. UK representatives are actively contributing to the work of most of these TCs.
- The Division management team has been refreshed, following the resignation of two long standing Associate Directors (Guy Vandermeersch, BE and Georg Sauter, DE). The previous Secretary, Armin Sperling (DE), has been appointed as one of the two Associate Directors; Joanne Zwinkels (CA) continues as the other. A new Secretary, Tony Bergen (AU) has also been appointed.
- One new TC was agreed during the year, TC2-77 'Fundamental Concepts'. The purpose of this TC is to encourage and facilitate sharing of ideas and plans across the Division, with the intention that this will help to prioritise the work between different TCs and assist with defining future areas of activity.
- Five new Reporterships were also established:
 - R2-64 Technical Note on errors of measurement in spectrophotometry
 - R2-65 Multi-geometry colour measurements of gonio-apparent materials and metrics for evaluation
 - R2-66 Colour difference of light sources
 - R2-67 Technical Note on quantities relating photobiological and photometry
 - R2-68 Measurement of light output degradation of LED light sources
- Four TCs and three Reporterships were closed:
 - TC2-28 Methods of characterising spectrophotometers
 - TC2-32 Measuring retroreflectance of wet horizontal road markings
 - TC2-53 Multi-geometry colour measurements of effect materials
 - TC2-56 CIE/ISO standard on retroreflection measurements
 - R2-45 Measurement of the Illumination Uniformity for Critical Applications
 - R2-62 Revision of D2 documents related to luminous flux and luminous intensity distribution
 - R2-63 Revision of CIE 63-1984

- Much of the work of the Division continues to be focused on the measurement and characterisation of solid state lighting (SSL) products, particularly LEDs, and on topics relating to the use of measurement instruments and measurement uncertainty. Particular aspects currently being considered, either within TCs or Reporterships, are:
 - The fact that electrical and/or thermal measurement and control is a key limiting factor in many measurements
 - Measurement problems associated with high power LEDs
 - Methods for lifetime measurements and modelling of ageing mechanisms
 - Practical approaches to uncertainty evaluation for industrial applications
 - Methods for correcting for factors such as spectrometer bandwidth and stray light
 - Measurement approaches for mesopic photometry
 - Photobiological safety evaluations

The next meeting of Division 2 will be held in Kuala Lumpur, Malaysia, in April 2014, in conjunction with the CIE conference on energy and lighting quality.

Full details of recent activities within Division 2, including details of all the Technical Committees and Reporterships, are available on the Division 2 website: <http://div2.cie.co.at/>

Active Technical Committees + UK Members

JTC-02 (CIE-CCPR)	Principles Governing Photometry	Teresa Goodman (TC Co-chair)
TC2-17	Simulated solar radiation	
TC2-29	Measurement of detector linearity	Teresa Goodman Theo Theocharous
TC2-37	Photometry using detectors as transfer standards	Teresa Goodman
TC2-47	Characterisation and calibration methods for UV radiometers	Teresa Goodman
TC2-49	Photometry of flashing lights	Teresa Goodman, Ian Tutt
TC2-50	Measurement of the optical properties of LED assemblies	Teresa Goodman
TC2-51	Calibration of diode-array spectrometers	Teresa Goodman
TC2-57	Revision of CIE S014-2	Mike Pointer
TC2-59	Characterisation of imaging luminance measurement devices	
TC2-60	Effect of instrumental bandpass function and measurement interval on spectral quantities	Emma Woolliams, Teresa Goodman
TC2-62	Imaging-photometer-based near field gonio-photometry	
TC2-63	Optical measurement of high-power LEDs	
TC2-64	High speed testing methods for LEDs	
TC2-65	Photometric measurements in the mesopic range	Teresa Goodman TCC
TC2-66	Terminology of LEDs and LED assemblies	
TC2-67	Photometry of lighting and light-signalling devices for road vehicles	
TC2-68	Optical measurement methods for OLEDs used for lighting	
TC2-69	CIE classification system of illuminance and luminance meters	Teresa Goodman
TC2-70	Standards for the measurement of reflectance and transmittance properties of materials	
TC2-71	CIE Standard on test methods for led lamps, luminaires and modules	Paul Miller
TC2-72	Evaluation of uncertainties in measurement of the optical properties of solid state lighting devices, including coloured LEDs	Teresa Goodman

TC2-73	Measurement of quantities relating to photobiological safety of lighting products	Simon Hall
TC2-74	Goniospectroradiometry of optical radiation sources	Teresa Goodman
TC2-75	Photometry of curved and flexible OLED and LED sources	
TC2-76	Characterisation of AC-driven LED products for SSL applications	
TC2-77	Fundamental concepts	Teresa Goodman

Active Reporters

R2-33	Measurement of laser based projection displays
R2-49	Standardisation of broad-band UV measurements
R2-50	Metric for comparison of luminous intensity distributions
R2-51	Characterisation and measurement of LED lighting sources with dynamic control
R2-52	Flicker measurement and flicker index study on SSL
R2-53	Glare rating measurement by image luminance measuring devices (IMLD)
R2-54	Internal quantum efficiency measurement for SSL products
R2-55	Simple practical guide for measurement uncertainty estimations
R2-56	Monitoring progress in regional metrology organisations (RMOs)
R2-57	Monitoring progress of IEC TR 62778
R2-58	Standard lamps: availability of and alternatives to commercially available incandescent sources
R2-59	Discussion on the definition of BRDF
R2-60	Discussion on the definition of luminance/radiance
R2-61	Review of published D2 publications
R2-64	Technical Note on errors of measurement in spectrophotometry
R2-65	Multi-geometry colour measurements of gonio-apparent materials and metrics for evaluation
R2-66	Colour difference of light sources
R2-67	TN on quantities relating photobiological and photometry
R2-68	Measurement of light output degradation of LED light source

Teresa Goodman
 UK Representative CIE Division 2

CIE Division 3: Interior Environment and Lighting Design

Division 3 of the CIE has an overall aim to examine the various factors which influence the satisfaction of the occupants of a building with their environment, including the effects of both daylighting and electric lighting. The objectives of the Division are to study and evaluate those factors, to provide guidance on relevant design criteria, to study design techniques (including relevant calculations) for the interior lighting of buildings, to incorporate the findings and those of other CIE divisions into lighting guides for interiors in general or of particular types. These aims and objectives are focussed on providing illuminated environments which are of direct benefit to the users of those environments. The international nature of the Division allows those benefits to be disseminated to all member countries including the UK. In particular the Division draws on the contribution of several members from the UK who are active on 14 technical committees (TC). The Division 3 Editor, responsible for all publications is also from the UK. The output of these committees is expected to be available in 2013 and 2014 and would then begin to influence the nature and content of UK lighting design guidance. All references to Annex etc. refer to the minutes of the Division 3 meeting held in Paris at the Centenary Conference.

- The Division Executive held a WebEx meeting on 27th March 2013. The updated action item list (status 17-Apr-13) can be found in Annex 1.
- The main event of the 2012/2013 season was the CIE Centenary Conference “Towards a New Century of Light” held in Paris 15-16 April 2013, with TC meetings taking place on the following three days (17-19 April). Overall there was strong UK representation with three of the seven plenary presentations given by UK speakers (Fotios, Porritt and Mardaljevic), and two of those falling within the Terms of Reference of Division 3. There was a restatement of the Director’s goals for D3:

1. What ought to be the strategic priorities for Division 3 activities over the coming 3-5 years?
2. How can Division 3 encourage the participation of young professionals and students?
3. Are there subjects within Division 3’s scope that ought to be captured in standards?

The Director noted that some of these questions were posed at previous meetings.

- Three new TCs and one Reportership have been established:
TC3-54, to review the Technical Report CIE TR-16 on Daylight that was originally published in 1970.
TC3-55, to propose metrics to assess contribution of sunlight to the daylighting of a building, and to rate lighting contribution of daylight and sunlight passing through sunshading systems.
A Joint Technical Committee JTC 4 (also referred to as TC3-56) related to visual, health, and environmental benefits of windows in buildings during daylight hours.
And a Reportership R3-29, on current trend and future prospects of variable transmission glazing.
- TC3-39 *Discomfort glare from daylight in buildings* (W. Osterhaus) The Division agreed that, based on the report of the TCC, the deadline for the Working Draft of TC3-49 is extended to April 2014: PASSED all votes in favour.
- TC3-47 (J. Mardaljevic) The TCC indicated that the TC was put on hold for a while and will be re-launched when a PhD student is found. The PhD project has ToR like the TC. A PhD student has been appointed and will begin at Loughborough University on 1 October 2013.
- All TCs in the domain of electric lighting proceeded favourably with their work in 2012. TC3-45, TC3-48 and TC3-49 will finish the Working Drafts this year. TC3-50 (UK member: Peter Thorns) successfully completed the Working Draft in 2012. Subsequently, through the vote on the Committee Draft and handling of the voting results, the vote on the Enquiry Draft was closed in February 2013. Only TC3-34 (UK member: Peter Boyce) has got stuck after the vote on the Working Draft. It is a procedural issue

related to the Code of Procedure that requires a consensus among all TC members to proceed from the Working Draft to Committee Draft stages. It is hoped that the situation will be resolved promptly.

- TC3-44 *Lighting for older people and people with visual impairment in buildings* (Y. Akashi). The TCC provided a written report (Annex 2.6). The TCC indicated that he needs help to get experts. DD proposed that TCC sends an email to DD and AD/E with request for new members, and they will help out.
- TC3-46 *Research roadmap for healthful interior lighting applications* (J. Veitch). There was not a lot of progress, only one committee member provided the required information. The meeting on April 20 2013 was a working meeting to move towards completion.
- TC3-50: *Lighting quality measures for interior lighting with LED lighting systems* (M. Knoop). A Vote on the TC3-50 Enquiry Draft was finished (April 2013), it is expected that the report will be published in due time.
- TC3-51 *CIE Standard general sky guide* (S. Darula) The text of working draft WD#4 “CIE Standard General Sky Guide” was finalized and uploaded in the TC3-51 CollRoom for balloting by TC members. TC ballot on this document was finished on February 25, 2013. Voting of all TC3-51 members is positive. Several comments of TC members for improvement of texts and grammatical corrections were sent to TCC. These comments were collected in the Report of the Technical Committee Voting and also used in the corrected text of Guide as WD#5. Activities of the TC3-51 are moved from process stage 5 in the stage 6 of the CIE Code of Procedure.
- TC3-52 *Energy performance of buildings – Energy requirements for lighting* (S. Moghtader) The TCC provided a written report (Annex 2.14). The TC has a new TCC, Mr. Soheil Moghtader. The DD talked to the TCC on April 16, and will discuss the work plan of the TC with the TCC, AD/E and CIE GS, to avoid overlap with the ISO TC274. Mr. Peter Thorns informed that the CEN working on this topic as well, but in confidentiality, as it is work under European Mandate *TC3-53: Revision of CIE S 008 Joint ISO*CIE Standard: Lighting of Work Places - Part 1: Indoor* (Y. Koga) This newly formed TC is to review and, if necessary, revise S008/E: 2001 (ISO 8995-1:2002): Joint ISO/CIE Standard: Lighting of Work Places - Part 1: Indoor [incl. Technical Corrigendum ISO 8995:2002/Cor. 1:2005(E)].
- Prof. John Mardaljevic proposed to have a Reportership to collate and maintain a list of daylight metrics since a number of proposals for new formulations are currently under discussion/review in the EU/CEN, US and beyond. The AD/D confirms that this might be the fast solution to tackle the topic. Prof. John Mardaljevic and the AD/D will draw up ToR for a Reportership.
- TC3-55 *Metrics for sunlighting and daylight passing through sunshading device* had its first meeting at the Paris Centenary Conference.
- Mr. Peter Dehoff proposed to have the Division meeting during the CIE conference in Kuala Lumpur, Malaysia in April 2014. Because of ecological and financial reasons, it was decided to have alternating face-to-face and WebEx meetings, e.g.: the next meetings will be: 2014, Spring Online WebEx meeting (not during the Malaysia meeting); then, 2015, 29 June – 3 July, CIE Session, Manchester (UK).
- John Mardaljevic attended a session of the Brazilian CIE D3 (Brasilia, 4 Sep 2013) as a guest observer.

Active Technical Committees + UK Members

TC3-34	Protocols for describing lighting	P. Boyce, L. Bedocs
TC3-39	Discomfort glare from daylight in buildings	-
TC3-44	Lighting for older people and people with visual impairment in buildings	G Cook
TC3-45	Luminance based design approach	G.Cook, P.Thorns
TC3-46	Research roadmap for healthful interior lighting applications	L.Bedocs, G. Cook, P.Thorns

TC3-47	Climate-based daylight modelling	J. Mardaljevic TCC, F. Anselmo, E. Brembilla
TC3-48	Standard method of UF table calculation for indoor luminaires	Peter Thorns TCC, L. Bedocs
TC3-49	Decision scheme for lighting controls for tertiary lighting in buildings	L. Bedocs, P. Littlefair, P. Thorns
TC3-50	Lighting quality measures for interior lighting with LED systems	P. Thorns
TC3-51	CIE Standard general sky guide	J. Mardaljevic
TC3-52	Energy performance of buildings – energy requirements for lighting	P. Thorns
TC3-53	Revision of CIE S 008 Joint ISO*CIE Standard: Lighting of Work Places - Part 1: Indoor	P. Thorns
TC3-54	Revision of CIE 16-1970: Daylight	J. Mardaljevic, F. Anselmo
TC3-55	Metrics for sunlighting and daylight passing through sunshading device	J. Mardaljevic
JTC 4 / TC3-56	Benefits of windows in buildings during daylight hours	J. Mardaljevic, L. Price

Active Reporters

R3-29	Variable transmission glazing (VTG): Current trends and future prospects for uptake by the building sector (J. Mardaljevic)
R3-30	Daylight system metrics – Evaluation of daylight systems and products (M. Fontoynt) As indicated in the action item list (Action 1), the DE, DD and Reporter will start the reviewing process to transform the report into a Technical Note.

John Mardaljevic
UK Representative CIE Division 3

CIE Division 4: Lighting for Signalling and Transport

The Terms of Reference of Division 4 are:

To study lighting and visual signalling and information requirements of transport and traffic, such as road and vehicle lighting, delineation, signing and signalling for all types of public roads and all kinds of users and vehicles, and visual aids for modes other than road transport.

Division Officers:

Director: Ad de Visser (NL)
Associate Directors: Ron Gibbons (USA), Yandan Lin (CN)
Secretary: Ans van den Broek (NL)
Editor: Nigel Parry (GB)

The primary aim of the work of the Division is to enhance safety in transport by the publication of relevant technical reports and standards. The Division currently has 14 active technical committees working on a wide variety of topics.

The CIE conference 2013 was held at Paris, France during 15/16th April this year and the annual meeting of the Division was held 17-19th April. The UK delegate, Nigel Parry attended: he was also present in his capacity as Division Editor.

The following Technical Committees met: at Paris, and where I attended the TC a short comment on each.

- JTC 01 Mesopic Lighting in Outdoor Lighting.
 - The chair had identified three principal areas of work and a number of research studies were presented to a packed meeting. Div 4 concern is that at this time all of the research is based upon the driver.
This meeting attracted a huge attendance reflecting the importance of the tasks to be undertaken by the committee. Teresa Goodman has been appointed co-chair from D2 and a co-chair from D4 will be nominated in the near future. Seven groups presented their studies aimed at defining the visual adaptation field for drivers, the key parameter for implementing the CIE's Recommended System for Mesopic Photometry Based on Visual Performance (CIE 191:2010). The aim is to complete this task by September 2014. The next meetings will be in Krakow in September as part of Lux Europa followed by Kuala Lumpur on April 2014.
- TC4-32 Surface Colours for Traffic Signs
- TC4-33 Discomfort Glare in Road Lighting
- TC4-45 Performance assessment method for vehicle headlamps
- TC4-46 300 mm Roundel signals (reported that it requires another week to complete)
- TC4-47 Application of LED's in transport lighting and signalling
 - The chair advised that this report is now two reports , one for road lighting and the other for signally. Although a comprehensive draft exists for both Steve felt that more input is required and the report will not be finalised until next year
- TC4-49 Guide to the properties and uses of retroreflectors at night
- TC 4-51: Optimizing of Road Lighting
 - Carl Andersen has resigned as chair of this committee following a change in his professional responsibilities. Ron Gibbons chaired this meeting. Per Ole Wanvik has accepted the nomination to be the new chair. The meeting agreed to undertake the following tasks: Review of CIE publication 93; Collection and analysis of reports from studies of the effects of road lighting, such as comparison of night to day crash ratios; Review of implications of lighting controls for road lighting on electricity supply companies and highway agencies, e.g. overall energy demands, peak load times, peak load demand, unmetered billing.
 - The next meetings will be via WebEx in mid-November followed by Kuala Lumpur in April 2014.

- Workshop Lighting Standards – where did they come from
 - Extremely popular session where Steve Fotios highlighted the differing road lighting standards across the globe and challenged their validity as little detailed history is available. The meeting agreed further research is required and thus agreement for a new TC was agreed.
- R4-40 – Lighting for the Elderly –
A busy meeting where it became clear the work being done in other divisions would not be entirely applicable to the outdoor environment and thus at the Div 4 meeting on Friday it was agreed a new TC should be considered.

Division Meeting

Ad advised the following points for information:

- CIE General Sec will be chair of ISO TC274 'Light & Lighting'
- IEC are working to improve the Coll Tool.
- CIE194 – Glossary should be updated in June 2013
- Addendum to 115 on use of colour in road lighting to be agreed (or as a Technical Note).

Proposed Reports

ISO TC "Light and Lighting"

- Colour of light
- TC4-48
- LED allow many colours (colour pollution)

Lighting controls

R4-45, Pål Larssen link to:

TC4-51, Carl Andersen resigned – new chair appointed

- Lighting "on demand"
- Radar?
- Adjacent areas, surroundings?
- TUE

- New TCs proposed at the last meeting in Paris. Following an enthusiastic workshop on trying to ascertain and even understand why we have the road lighting levels we do today it was agreed a new TC would be formed. TC4-52 Lighting for Pedestrians (*could get changed*) was established with Steve Fotios (GB) as chair, Otto Letamendi (US) as secretary and Stuart Mucklejohn and Nigel Parry as UK reps. The TC objectives are yet to be finalised.
- Following the R4-40 meeting the division agreed a new TC4-53 should be formed for Lighting for the elderly in the exterior environment – terms and title to be agreed. Cyril Chain to chair.

Future Division 4 meetings

- 2014: Malaysia, date t.b.c. probably second half of April
- 2015: Session Manchester, 28 June-3 July
- 2016: Australia TBC

Active Technical Committees + UK Members

TC4-15	Roadlighting calculations	Rescheduled to complete 2013
TC4-21	Interference by Light with Astronomical Observations	Decided to wait until TC5-28 is complete
TC4-32	Surface Colours for Traffic Signs	On Going
TC4-33	Discomfort Glare in Road Lighting	Been little activity - ongoing
TC4-36	Visibility Design for Roadway Lighting	Edited

TC4-40	Requirements for Retroreflective Traffic Signs	With Editor	
TC4-45	Performance assessment method for vehicle headlamps	On going	Terry Carter, Geoff Draper
TC4-46	300 mm Roundel signals	Report is imminent	Hugh Barton
TC4-47	Application of LED's in transport lighting and signalling	Two drafts exist – road lighting and signalling. Will be ready in 2014	Hugh Barton, Ian Tutt
TC4-48	White light in road lighting	Edited and awaiting vote	Steve Fotios
TC4-49	Guide to the properties and uses of retroreflectors at night	On going	
TC4-50	Road surface characterization for lighting applications	On going	
TC4-51	Optimization of road lighting	New chair appointed	
TC4-52	Lighting for pedestrians	Following workshop new TC set up with Steve Fotios as chair	
TC4-53			
JTC1	Mesopic Vision	On going	
JTC2	Merge TC2-67 with D4	Consider Joint committee?	

Active Reporters

R4-34	Retroreflective and other passive devices as Energy Savers	Bob Parks has taken over
R4-35	Crime and Road Lighting	Otto Letamendi will combine into new TC 4-52
R4-36	CEN/TC169, Lighting Applications	Axel Stockmar
R4-37	CEN/TC226, Road Equipment	Pentti Hautala
R4-38	IAU (International Astronomical Union)	Elizabeth M. Alvarez del Castillo
R4-39	GTB (Association for the Preparation of UNECE Automotive Regulations)	Ad de Visser
R4-40	Lighting for elderly	Axel Stockmar and Cyril Chain. Proposed to move towards new TC 4-53 (TBC)
R4-41	LUCI (Lighting Urban Community International)	Cyril Chain
R4-42	PIARC	vacancy
R4-43	IALA (International Association of Marine)	Malcolm Nicholson
R4-44	Enabling technologies for energy savings.	Pål Larssen – link to TC4-51

Symposiums and conferences 2012

- 2014: 'Lighting quality and Energy efficiency' Conference proposed for 23-26th April.
The next meeting of Division 4 will take place in Kuala Lumpur, Malaysia 28- 30th April
- 2015: Manchester
- 2016: Steve Jenkins invited D4/5 to Melbourne, Australia in April 2016 with proposed symposium on 'Mesopic Photometry and its application to Streets and Public Places.'

Nigel Parry
UK Representative CIE Division 4
Editor, Division 4

CIE Division 5: Exterior Lighting and Other Applications

The Terms of Reference of Division 5 are:

To study procedures and prepare guides for the design of lighting for exterior working areas, security lighting, flood lighting, pedestrian and other urban areas without motorized traffic, areas for sports and recreation, and for mine lighting.

The Technical Committees in Division 5 tend to provide indirect/long-term benefits for the public. Examples of long term benefits are improvements to night-time ambience that will result from TC5-21 *Urban master planning* and the TC's reviewing aspects of Obtrusive Light: TC5-27. *Artificial lighting and its impact on the natural environment* and TC5-28. *Guide on the limitations of obtrusive Light*.

- Meetings of the technical committees of D5 were held in Paris, France, 17-18 April 2013. UK attendees being Nigel Pollard and Alan Smith. Four TCs were able to meet.
- The Division Director Peter Schwarz presided over the meeting.
- Following the death of Mary Crawford, Warren Julian had offered and had been approved as the new Division Editor.
- There are no new publications from D5 this year, but three TCs (5-20, 5-21 and 5-22) have submitted final reports for editing and approval.
- There are no new Technical Committees from D5 this year.
- The next D5 meeting will be held in Kuala Lumpur, Malaysia. 23-26 April 2014.

Active Technical Committees + UK Members

TC5-18	Practical design guidelines for the lighting of exterior work areas	Kelvin Austin
TC5-20	Guide for Sports lighting	Kelvin Austin
TC5-21	Urban master planning	Nigel Pollard
TC5-22	Beam patterns for exterior floodlighting luminaires	Nigel Pollard
TC5-23	Guidelines for the use of different Illuminance parameters in outdoor applications	(none)
TC5-24	Guide for architectural and decorative lighting	Nigel Pollard
TC5-26	Guide for the lighting of sports events for colour TV and film systems	Alan Smith
TC5-27	Artificial lighting and its impact on the natural environment	Martin Morgan-Taylor
TC5-28	Guide on the Limitation of the Effects of Obtrusive Light	Nigel Pollard; Martin Morgan-Taylor

Technical Committee Progress

TC5-18: *Practical Design Guidelines for the Lighting of Exterior Work Areas*. Short message, having not the form of a report but acceptable, was sent by e-mail together with new draft of the document (Draft 7a).

TC5-20: *Guide for Sports Lighting*. Since Tom Lemons resigned as TCC, unavailable for CIE anymore, TC is currently not active. Gy. Major sent an e-mail explaining the situation stating that the draft is too old and not used by the main target players. DD warned that if restarting of works fails, CB will advice to close this TC. Several participants expressed their opinion that ToR needs a total revision and extension, having LEDs included. It has been concluded that a small Task Force Group (Smith, Lecocq, Major) will be set up to harmonize ToRs of two TCs (5.20 and 5.26) within 1 month deadline, i.e. end of May 2013.

TC5-21: *Urban Master-Planning*. TCC could not attend the meeting. TC almost finalized the work last year but FR voted against in TC ballot because social aspects of urban lighting were not properly worded out. C. Chain (FR) explained his position on the negative vote. As the main problem it was the lack of opportunity to contribute, although FR and even LUCI wanted to volunteer. The document itself is not bad but social aspects are underestimated. Last 9 months was a stand-still without any progress. The draft should be extended by one chapter on social aspects, with involvement of C. Chain in its preparation and contribution of LUCI possibly in September 2013. Thus, new draft is expected in September 2013 what depends on negotiations. N. Pollard and L. Djokic (amongst others) wish to have the document published as soon as possible because years have been spent on its elaboration. As further steps, current draft will be put on CollTool and DD P. Schwarcz will meet with TCC to discuss the problems (not decisions but action plan), informing Div5 about the results afterwards. Membership of C. Chain in the TC has to be communicated.

TC5-22: *Beam Patterns for Exterior Floodlighting Luminaires*. TC was chaired by Tom Lemons and has the same status as TC 5-20 though this document is of less interest. Upon proposal of DD and unanimous approval of Div5 the TC will be closed without publication. DD will thank Tom Lemons for his valuable contribution to CIE during his active period in spite of his last document will remain unfinished.

TC5-23: *Guidelines for the Use of Different Illuminance Patterns in Outdoor Applications*. P. Rombauts gave a brief report on the progress of this TC.

TC5-24: *Guide for Architectural and Decorative Lighting*. The last TC meeting was held two years ago in Sun City (ZA). TCC required to hire a professional writer to complete the document. DD together with CB tried to work out the funding but failed. As such, TC is inactive 2 years. N. Pollard pointed to ToR that aim is to update an older CIE document and not to write a book. Chain, Timmings and Djokic together with DE Warren Julian volunteer to form a Task Force Group in order to review the document (which should be complementary to the urban master-planning) and to establish links with LUCI and IALD.

TC5-25: *Guide for the Photometric Specification and Measurement of Sports Lighting*. Having been confirmed that a chairman and committee members must be obtained before the Board will allow this committee to proceed with the revision of Publication # 67, this TC is currently in suspension.

TC5-26: *Guide for the Lighting of Sports Events for Colour TV and Film Systems*. Alan Smith gave a brief report. The TC can be possibly merged with TC 5-20 (see above).

TC5-27: *Artificial Lighting and its Impact on the Natural Environment*. TC met on April 17. Before, last TC meeting was held in 2009 in Budapest. B. Parks volunteered to take over the TC chairmanship after P. Strasser but has no information on the progress in period 2009-2013. TCC would like to have 2-3 new members, new NL representative is working in research in this field, willing to contribute. N. Pollard offered his contribution for TC as well. DD reminded that ToR is to collect data and documents on the topic. IDA can help to collect research data and there also exist a document (IDA guidelines) for national parks. China works on night-time impact on the natural environment. Recommendations should focus on spectrum and illumination levels. Within 1 month, TCC is required to write the scope of TC. By the end of year 2013 there should be the 1st draft available. Next TC meeting is planned in Germany.

TC5-28: *Guide on Obtrusive Light*. TC was very active during last couple of weeks. TC will hold a meeting in Paris the same day afternoon (April 18) to agree on the final work document. P. Soardo explained the existing problems and knowledge with the scope of the document. J. Lecocq emphasized that obtrusive light is the issue not only for astronomers. Review of the most sold publication CIE 150 should be finalized as soon as possible.

Reporters & Liaison Officer Reports

R5-17: *Environmental Assessment*. - M Morgan-Taylor

No Report.

R5-18: *Comparison of Glare Assessment Methods*. - S. Volker

No Report

R5-19: *IAU (International Astronomical Union – E. Alvarez*

Report from E. Alvarez is available at DD and will be uploaded to CollTool. Memorandum of Understanding between IAU and CIE is available in draft version. IAU recommends:

1. Full cut-off luminaires
2. Spectral output
3. Limits of lighting levels (helping astronomers) IAU is not happy with progress of TC 4-21 which will continue in D5.

R5-21 *CEN/ISO*: EN 12464-2 is out and the obtrusive light is not updated. It is not expected to have any update upcoming 4 – 5 years. CEN WG14 is handling a funded project (500.000 €) regarding the outdoor maintenance; measurements are to be performed in 4 countries.

R5-23 *LUCI*: C. Chain gave a presentation and report. Four events are planned for 2013. Documents on LUCI will be distributed in D5 later on.

Nigel Pollard

Acting UK Representative CIE Division 5

CIE Division 6: Photobiology and Photochemistry

The Terms of Reference of Division 6 are:

To study and evaluate the effects of optical radiation on biological and photochemical systems (exclusive of vision).

The work of Division 6 is directly related to the health of people and more generally to the ecosystem. It considers both the beneficial and detrimental implications of exposure to optical radiation.

- The annual meeting of Division 6 took place on 17th April 2013 in Paris in conjunction with the CIE Centennial Conference. 19 people attended: the UK was represented by John O'Hagan, Andy Smedley and Luke Price.

The General Secretary, Martina Paul, attended the meeting and introduced the proposed revised Code of Procedure. She also mentioned the new ISO TC274 on Light and Lighting, of which she was the Chair.

A new Joint Technical Committee (JTC5) had been approved for the revision of CIE S009/IEC 62471 Photobiological safety of lamps and lamp systems. This JTC is joint with Division 2 and also with IEC TCs 34 Lamps and related equipment and 76 Optical radiation safety and laser equipment.

- John O'Hagan remains as DD6 with Andy Pearson as DE6. Andy Smedley stood down as DS6 recently after 6 years in post and has been replaced with Luke Price. Therefore, all three officers remain from the UK.

D6 has two Associate Directors: Karl Schulmeister from Austria and Kohtaro Kohmoto from Japan.

- No D6 reports have been published during the year:
- A number of reports are being, or have been, edited and are in progress:
 - Guidelines for Obtaining Action Spectra Definitions (TC6-08)
 - Sensitivity of Human Skin to Ultraviolet Radiation, Expressed as Minimal Erythema Dose (MED) (TC6-48)
 - Low Level UV-A Cataract (TC6-21)
 - Rationalising UV Units (JTC3 – joint TC with the WMO)
 - Definition of UV Wavebands (R6-37 Masako Sasaki)
- The next meeting is planned for Kuala Lumpur, Malaysia, in conjunction with the CIE Lighting Quality and Energy Efficiency conference, April 2014. It is expected that the 2015 meeting will be held in Manchester in conjunction with the Quadrennial Meeting. There is an outstanding invitation to hold a D6 meeting in Hangzhou, China, and that may be considered for 2016.

Active Technical Committees

TC6-08	Guidelines for obtaining action spectra	Report with TCC to rebalot.
TC6-21	Cataractogenesis by low-level exposure to ambient ultraviolet radiation	Awaiting TC amendments following DE6 comments
TC6-28	Standardization of sunscreen testing: Method of UV-A sunscreen testing	Awaiting report, but may be closed if consensus cannot be reached
TC6-36	UVR protective materials used in shading	Closed due to lack of progress
TC6-37	Light and retinal disease	Mature draft available, but some problems with contacting TC members for voting.

TC6-42	Lighting aspects for plant growth in controlled environments	Awaiting report
TC6-44	Illuminators for treatment of infant hyperbilirubinemia	Further work required. Converted to reportership with 2 UK authors
TC6-45	Optical radiation hazard measurements in the work space	Draft report has been produced, but the exposure limits appear to be out of date. Being reviewed for possible revision. Report is with CB.
TC6-48	Typical minimal erythema doses	
TC6-49	Infrared cataract	Draft report is due by the end of 2013.
TC6-50	Photodegradation of pharmaceuticals	Closed because the TCC has published the work in the open literature.
TC6-52	Proper measurement of passive UV air disinfection sources	Draft report expected by the end of 2013.
TC6-55	Photobiological safety of light emitting diodes	Closed due to lack of support from TC Members.
TC6-61	Measurement of radiation using the phytometric system for plant applications	TCC presented work at D6 meeting in Paris. Working towards final draft.
TC6-62	Action spectra and dosimetric quantities for circadian and related neurobiological effects	Nothing received from TCC
TC6-63	Photobiological strategies for adjusting circadian phase to minimize the impact of shift work and jet lag	TCC has promised a report, but nothing has been received.
TC6-64	Optical Safety of Infrared Eye Trackers Applied for Extended-Durations	Awaiting final draft.
TC6-65	Photobiological Dosimetry for Low Level Laser/Light Phototherapy	Closed due to lack of interest from TC Members
TC6-66	Maintaining summer levels of 25OH vitamin D during winter by minimal exposure to artificial UV sources; requirements and weighing the (dis)advantages	Has been approved and work is to commence.

Joint Technical Committees

JTC3	Rationalising UV Units	In final stages of being published.
JTC4	Visual, Health, and Environmental Benefits of Windows in Buildings during Daylight Hours	Work started in Paris in April 2014. UK TC Members include Luke Price and John Mardaljevic.
JTC5	Review of IEC 62471/CIE S009	Work started in Paris in April 2014. UK TC Members include John O'Hagan (JTC Chair), Marina Khazova, Leslie Lyons, Eric Liggins and Neil Haigh.

Reporterships

R6-37	Definition of UV wavebands	With CB, but some concerns over the appropriateness for publication
R6-40	A survey of action spectra in the scientific literature: 19XX – 200X	Almost complete
R6-41	The issues of vitamin D kinetics	Has been seen by DE6 and returned to reporter

R6-42 Report on the 1st International Workshop for
Action Spectra of Non-Image Forming
Photobiological Effects of Light, IWAS 2013

Reporter has completed first draft.
Awaiting confirmation of online
publication of Workshop peer-
reviewed paper.

John O'Hagan
UK Representative CIE Division 6
Director, Division 6

CIE Division 8: Image Technology

The Terms of Reference of Division 8 are:

To study procedures and prepare guides and standards for the 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 overall goal of Division 8 can be summarized as seeking to provide methods for better understanding the components of imaging systems with a view to providing both the professional user and home picture-taker with consistent colour images over a wide variety of media.

- A formal meeting of CIE Division 8 was held using WebEx on 6 December 2012. Twenty people attended including 5 Country Representatives, 5 Technical Committee Chairmen and one Reporter.
- A new Technical Committee was approved:
 - TC8-13 Colour Gamuts for Output Media
 - Terms of Reference: To study and recommend methods for computing and communicating colour gamuts for output colour reproduction media.
 - Chairman: Kiran Deshpande GB
 - UK Members: Phil Green GB, Jan Moravic GB, Craig Revie GB
- A new Reporter was approved:
 - R8-09 Full-Reference Image Quality Metrics: Classification and Evaluation
 - Background: Full-reference image quality metrics include metrics specifically designed to evaluate image quality, but also metrics for image difference, image fidelity, and more. These metrics have in common that they try to predict the perceived difference between an original image and a modified version of it, where this modification can typically be compression, halftoning and blurring. They output one numerical value and/or an image difference map.
 - Terms of Reference: To provide a survey of full-reference image quality metrics, where metrics are classified and evaluated against perceptual data, and to make a recommendation about the feasibility of a TC being formed about this topic.
 - Reporter: Marius Pedersen NO
- The next meeting will probably be held by WebEx in late 2013 although an informal meeting may take place in November 2013 in Albuquerque, USA, in conjunction with the IS&T Color Imaging Conference.

Active Technical Committees

TC8-07	Multispectral imaging	
TC8-09	Image archiving	
TC8-10	Office illumination for imaging	
TC8-11	CIECAM02 mathematics	Ronnier Luo
TC8-12	Image and video compression assessment	

Active Reporters:

R8-09	Output linearization methods for displays and printers
-------	--

Mike Pointer
UK Representative CIE Division 8

APPENDIX A

THE CIE & NIC

Each country participating in the work of the International Commission on Illumination (the CIE) forms a National Illumination Committee (NIC). This Committee is representative of all bodies in that country which have an interest in light and lighting.

The CIE:

- provides an international forum for the discussion of all matters relating to science technology and art in the fields of light and lighting
- co-ordinates the international activities of individuals and organisations, to identify outstanding and fundamental issues pertaining to light and lighting and to find solutions
- develops basic standards for measurement and application design
- publishes Technical Reports and Standards and maintains liaison with other international standards organisations.

The CIE technical programme is divided into seven Divisions covering 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; and Image Technology. Each Division establishes Technical Committees (TCs) with international representation of experts, to undertake specific tasks. Each TC is disbanded when the work is complete.

The CIE holds a Sessional Conference every four years, which reviews the latest developments in the field and plans the work of the divisions and their Committees for the next quadrennium.

The CIE Central office is based in Vienna. The Secretary General and her assistants are responsible for the administration associated with co-ordinating the activities of all member countries and for publishing the Commission's Technical Reports and Standards.

The CIE is supported through the time and expertise of individuals, most of whom are associated with companies, institutions and organisations interested in light.

The CIE is supported financially by each country's National Illumination Committee which contributes according to a Central Office allocation based on the scale of assessments for the contribution of Member States of the United Nations Organisation, but with modified upper and lower limits. Each NIC depends on contributions from supporting organisations, income from the sale of published Technical Reports and Standards and from the organisation of seminars.

The National Illumination Committee of Great Britain is supported by sponsoring and co-operating organisations. Many universities and colleges participate, as do Government Departments and official bodies interested in or concerned with the design, development and use of light. There are also representatives of the lighting industry as well as independent consultants and architects representing professional bodies.

The NIC selects and sends delegates to the sessions of the CIE. It keeps in close touch with developments throughout the world, both in research and in practical applications, by personal contact as well as via the issues of the CIE News and CIE Division Activity Reports. It also ensures that the British contributions are made known and properly recognised in other countries.

Great Britain, one of the founder members of the CIE, established its National Illumination Committee in 1913 and since then has played a major part in the development of the Commission. The original decision to establish the CIE was considerably influenced by Leon Gaster, the founder of the British Illuminating Engineering Society, now the Society of Light and Lighting.

APPENDIX B

CONSTITUTION OF THE NATIONAL ILLUMINATION COMMITTEE AT 30 SEPTEMBER 2013

Officers and Trustees

Chairman	Nigel Pollard
Vice Chairman	Teresa Goodman
Vice Chairman	John O'Hagan
Honorary Secretary	Peter Raynham
Honorary Treasurer	Peter Clarke

Secretariat

Executive Secretary	Michael Pointer 9 Bishops Drive, East Harnham, Salisbury SP2 8NZ
---------------------	---

Sponsoring Organisations

Institution of Lighting Professionals	Stuart Bulmer Nigel Parry Allan Howard
---------------------------------------	--

Society of Light & Lighting	Steve Langford Peter Raynham Vacancy
-----------------------------	--

Cooperating Organisations

Ceravision Limited	Stuart Mucklejohn
College of Optometrists	Alan Smith
Colour Group (Great Britain)	Valerie Bonnardel
Public Health England	John O'Hagan
International Association of Lighting Designers	Kevin Theobald, Emma Cogswell
Institute of Physics	Lawrence Whittaker
Lighting Industry Association	Bernard Pratley
National Physical Laboratory	Teresa Goodman
Society of Dyers and Colourists	Ronnier Luo
Thorn Lighting Ltd	Peter Thorns
Trinity House Lighthouse Service	Malcolm Nicholson
Urbis Lighting Ltd	Patrick Baldrey
VeriVide Ltd	John Dakin

Participating Universities

University of Liverpool	David Carter
Loughborough University	John Mardaljevic
University of Manchester	Ann Webb
University of Reading	Geoff Cook
University of Sheffield	Steve Fotios
University College, London (The Bartlett)	Kevin Mansfield

Individual Members

Enrico Bianchi
Peter Clarke
Mike Hall
Gareth Johns
Gareth Jones
Leslie Lyons
Martin Morgan-Taylor
Nigel Pollard
Nick Smith
Ian Tutt
Christopher Wilkes

Bianchi Lighting Associates
The Tintometer Ltd
Mike Hall Technical Services
Photometric and Optical Testing
LUX-TSI Limited
Bentham Instruments Ltd
De Montfort University
Consultant
Nick Smith Associates
Consultant
Holophane Europe Ltd

CIE Division Representatives

Division 1
Division 2
Division 3
Division 4
Division 5
Division 6
Division 8

Michael Pointer
Teresa Goodman
Geoff Cook
Nigel Parry
Steve Fotios
John O'Hagan
Michael Pointer