



International Commission on Illumination  
Commission Internationale de l'Éclairage  
Internationale Beleuchtungskommission

# Division 8 Annual Meeting

**9:00 am – 12:00 pm**  
**June 21, 2019**

**Room “Lincoln 5” at the Marriott Wardman Hotel**  
**&**  
**WebEx**

Internet connection:

<https://cie.webex.com/cie/j.php?MTID=m6514ab4a3c22f65094e88b579a7e8f6d>

**Meeting will not be recorded**



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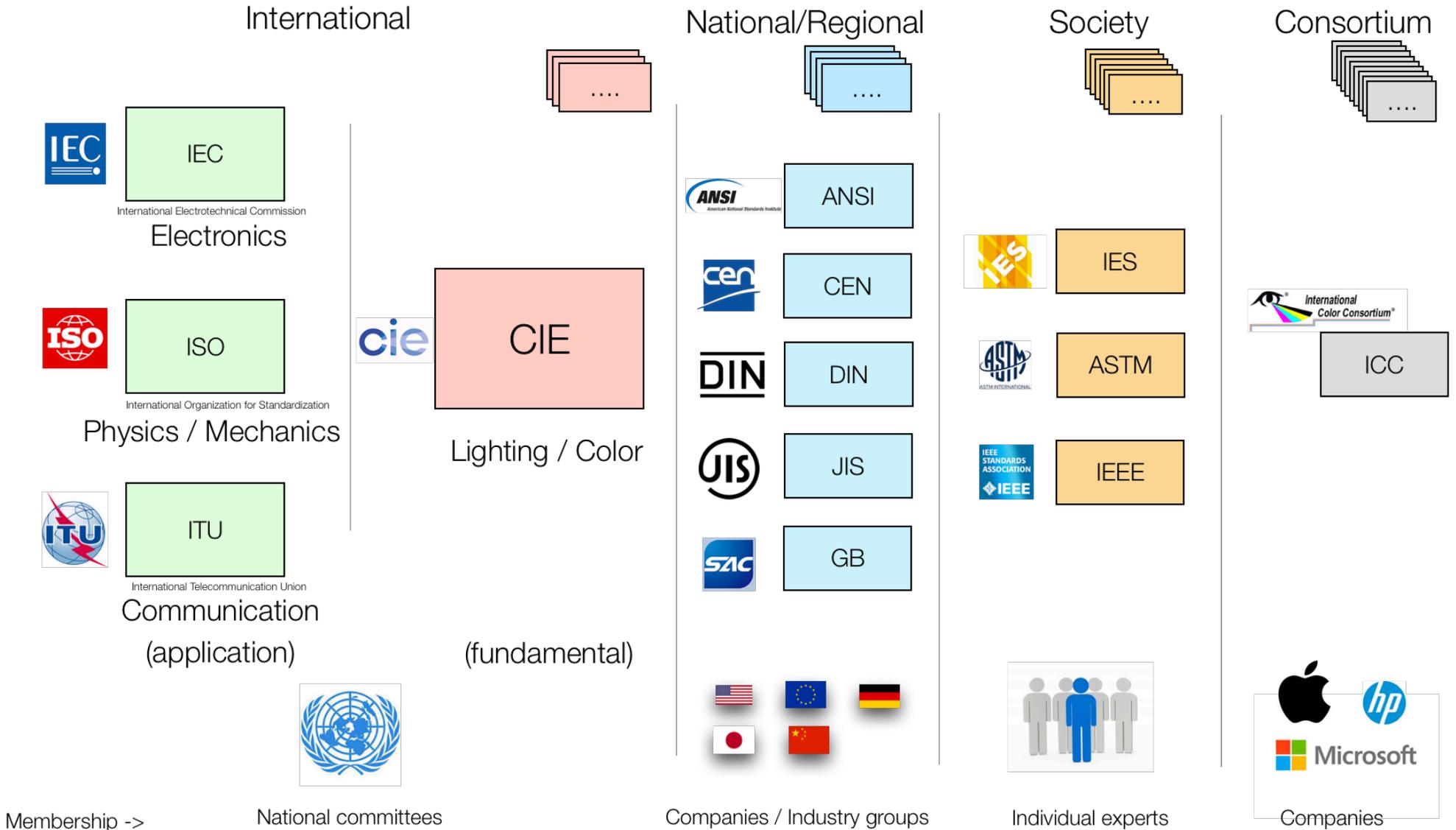
# **Welcome to CIE Division 8 Annual Meeting**



International Commission on Illumination  
 Commission Internationale de l'Éclairage  
 Internationale Beleuchtungskommission

# Welcome to Division 8

## Introduction of CIE





International Commission on Illumination  
Commission Internationale de l'Éclairage  
Internationale Beleuchtungskommission

## Welcome to Division 8

# Introduction of CIE

Type of Meeting	Frequency	Nearest future event
Session	Quadrennial	Ljubljana, SI, 2023
Mid-term Meeting	Quadrennial	Penang, MY, 2021
Tutorial /Symposium / Workshop / Training	Ad hoc	5th CIE Expert Symposium, HK, 2020
Topical conference	Ad hoc	TBD

# Welcome to Division 8

## Introduction of CIE

### Committee Activity and Output

Activity	Condition to establish	Output (publication)	Remarks
Reportership (DR)	1 expert	Internal report	Provide in the division only (not for publication)
		Technical Note	For free
Technical Committee (TC)	Experts from 5 or more countries	Technical Report	For purchase
		International Standard	
Research Fora (RF)	Multiple participants	(Not required)	To foster discussion on specific topic

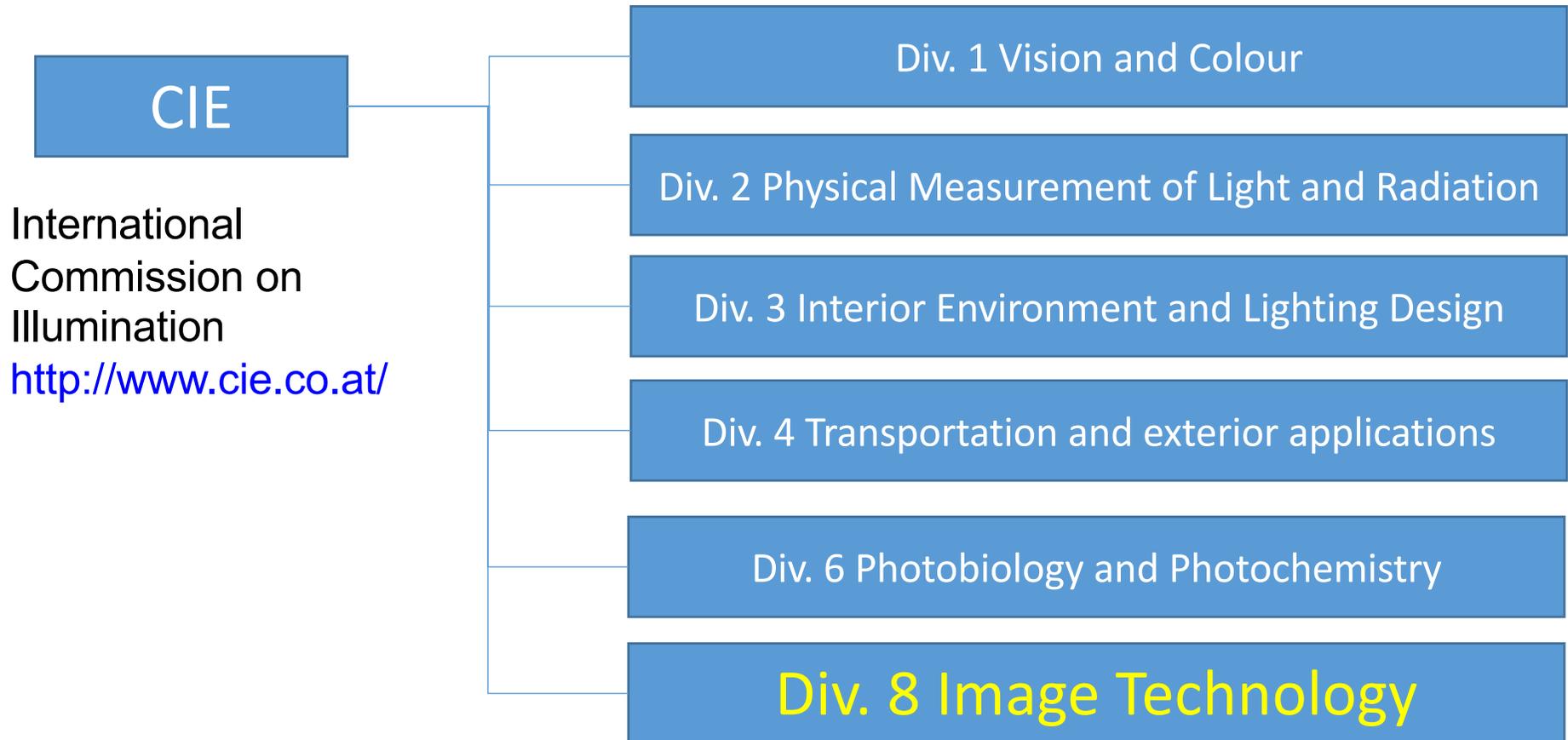
(See Code of Procedure for more information)



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# Welcome to Division 8

## Introduction of CIE





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Welcome to Division 8

# Scope of Division 8

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.

# Agenda

- (1) Welcome
- (2) Approval of agenda
- (3) Confirmation of NC voting members
- (4) Approval of the minutes of the last meeting
- (5) Division Director report
- (6) Division Secretary report
- (7) Division Editor report
- (8) Technical Committee report
  - TC 8-16: Craig Revie
  - TC 8-12: Pascal Bourdon
  - TC 8-13: Kiran Deshpande
  - TC 8-14: Noël Richard
  - TC 8-15: Melitte Buchman
  - TC 8-17: Kaida Xiao
  - JTC 10: Changjun Li
  - JTC 12: Noël Richard
  - JTC 16: Kaida Xiao
  - JTC 17: Danny Rich

# Agenda

## (9) Reportership report

- R8-14: Yasuki Yamauchi
- R8-15: Christine Fernandez-Maloigne, Jesus J. Moreno, Alessandro Rizzi
- R8-16: Max Derhak
- R8-17: Youn Jin Kim (Youngshin Kwak)

## (10) Research Forum report

- RF-01 Masahiro Yamaguchi

## (11) Liaison report

- ISO/TC 130: Danny Rich
- ISO/TC 42: Hideyasu Kuniba
- ISO/TC 159/SC 04/WG2: Po-Chieh Hung
- ISO/IEC/JTC1/SC29: Olfa Ben Ahmed
- IEC TC100/TA2: Naoya Katoh
- ASTM: Ellen Carter
- ISO/IEC/JTC1/SC28: Klaus Richter
- ICC: Marc Mahy (Max Derhak)

## (12) Next and 2 next meeting

## (13) AOB

## (14) Taking a photo

## (15) Adjourn

# NC Voting Members 2019

Country	Representative	
Australia	Alp Durmus	
Belgium	Marc Mahy	
Bulgaria	Kiril Kasev	
Canada	Wolfgang Heidrich (P: by Tara Akhavan)	
China	Qingmei Huang	
Germany	Klaus Richter	
Spain	Manuel Melgosa Latorre	
France	Christine Fernandez- Maloigne	
United Kingdom	Kaida Xiao	
Hong Kong S.A.R., China	TM Chung	
Hungary	Krisztián Samu (P: Agnes Urbin)	
Israel	Amir Poznansky	
Japan	Masao Aizu	
South Korea	Jongho Chong (P: Youngshin Kwak)	

Country	Representative	
Malaysia	Mohammad Faizal Ahmad Fauzi	
Netherlands	Ad de Vaan	
Norway	Jon Y Hardeberg	
New Zealand	Andrew Chalmers (P: Po-Chieh Hung)	
Poland	Dariusz Sawicki	
Romania	Catalin Daniel Galatanu	
Russia	Vladimir Budak	
Sweden	Mikael Pettersson	
Slovenia	Gorazd Golob	
Turkey	Ismail Serkan Üncü	
Chinese Taipei	Ming-Jing Shyu	
United States	Maxim Derhak	
South Africa	Natasha Nel-Sakharova	

# Confirmation of Minutes of Last Meeting

- Minutes circulated Dec. 16, 2018

Division 8 annual meeting 2018  
November 12th 2018  
Vancouver, BC, Canada





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# Director Report

# Director Report

## ■ Personnel affair (effective now)

Division 1	Youngshin Kwak (KR)*
Division 2	Tony Bergen (AU)
Division 3	Peter Thorns (GB)
Division 4	Dionyz Gasparovsky (SK)*
Division 6	Luc Schlangen (NL)
Division 8	Po-Chieh Hung (US)*

\*: continuation

### *Officers of the Commission 2019-2023*



						
Peter Blattner President	Yoshi Ohno Past President	Jennifer Veitch VP Technical	Luoxi Hao VP Publication	John O'Hagan VP Standard	Volker Seibicke Treasurer	Ad de Visser BA Secretary
						
Ron Gibbons VP	Teresa Goodman VP	Erkki Ikonen VP	Anna Shakhparunyants VP	Annette Steinbusch VP	Lorne Whitehead VP	

# Approval of Officers

Role	Officer	
Division Director	Po-Chieh Hung (US)	
Division Secretary	Christine Fernandez-Maloigne (FR)	
Division Editor	Danny Rich (US)	



**Motion 19-1: To approve Christine and Dany as DS and DE respectively**

# Director Report

[From BA and GA meetings]

- Financially positive now
  - Publication/profit increase (e.g. CIE 15, CIE 150, CIE 224)
- New Code of Procedure (June, 2019 version)
  - [http://files.cie.co.at/CIE Code of Procedure 2019.pdf](http://files.cie.co.at/CIE_Code_of_Procedure_2019.pdf)
- Mid-term meeting
  - Penang, Malaysia, Apr 19~28, 2021
- 30<sup>th</sup> quadrennial Session
  - Ljubljana, Slovenia, Sep 15~23, 2013

# Director Report

[From DD meeting] (about operation)

- JTC chair
  - Distinguish “Lead Chair” and “Co-Chair(s)”
- TC duration
  - Must submit CD to CB (TCC’s job) by the end (4/8 years), at least.
  - Basic concept is to “publish” within the duration, but there is gray zone
- TN
  - Must be limited to be  $\leq 10$  pages
  - It must be followed (DR8-15)
- Inactive old TC
  - Has to be closed (TC8-12?)
- TN with Data
  - No problem (technically) (DR8-14)
- COLLTOOL quota issue
  - Use “Dropbox” Contact CB and get URL or others
  - Looking for a new COLLTOOL system. Stay tuned.



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# Activity after Vancouver Mtg.

Type	Title	(Co-)Chair / Convener	Action	Result (time/org)
Division	Next director approved by committee	-	-	Po-Chieh Hung will stay
Presentation	Presentation at Display Week of SID	Po-Chieh Hung upon request of Youngshin Kwak	Presentation was given on HDR/WGC imaging	-
Workshop	Co-event with OSA and IS&T held in this Quadrennial Session	(Po-Chieh Hung Youngshin Kwak Manuel Spitschan Francisco Imai)	Workshop was held	Next slide

# Workshop Report

Joint CIE–OSA–IS&T workshop

***Colour imaging, perception, and reproduction: New directions in colour science and technology***

**Location:** CIE 2019 29<sup>th</sup> Quadrennial Session  
**Date and time:** Wednesday, June 19, 2019, afternoon

## Topic

Revision of human cone fundamentals and color matching functions;  
Contributions of melanopsin to visual functions in humans;  
High-dynamic range imaging;  
Virtual reality and augmented reality.

## Format

First 120 min: 4 talks  
Latter 120 min: group discussion + Presentations from the groups

## Participants:

About 80



We had nice discussions.

# Outlook for the Next Term

- Quick publications from existing TCs/DRs
- Pushing the HDR/WCG activity
- More opportunities for new topics using DR



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# Secretary Report

# NC Voting Members 2019

Country	Representative
Australia	Alp Durmus
Belgium	Marc Mahy
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Canada	Wolfgang Heidrich
China	Qingmei Huang
Germany	Klaus Richter
Spain	Manuel Melgosa Latorre
France	Christine Fernandez-Maloigne
United Kingdom	Kaida Xiao
Hong Kong S.A.R., China	TM Chung
Hungary	Krisztián Samu
Israel	Amir Poznansky
Japan	Masao Aizu
South Korea	Jongho Chong

Country	Representative
Malaysia	Mohammad Faizal Ahmad Fauzi
Netherlands	Ad de Vaan
Norway	Jon Y Hardeberg
New Zealand	Andrew Chalmers
Poland	Dariusz Sawicki
Romania	Catalin Daniel Galatanu
Russia	Vladimir Budak
Sweden	Mikael Pettersson
Slovenia	Gorazd Golob
Turkey	Ismail Serkan Üncü
Chinese Taipei	Ming-Jing Shyu
United States	Maxim Derhak
South Africa	Natasha Nel-Sakharova



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# Division 8 annual meeting 2018

November 12th 2018  
Vancouver, BC, Canada  
(in conjunction with CIC 26)



# Technical Committees

TC#	Title	TC (lead-/co-) chair	Year	Remarks
TC8-12	Image and Video Compression Assessment	Pascal Bourdon (FR)	2007/ 2013	CD by end of July
TC8-13	Colour Gamuts for Output Media	Kiran Deshpande (GB)	2013	Extended
TC8-14	Specification of Spatio-Chromatic Complexity	Noël Richard (FR)	2015	Extension asked
TC 8-15	Archival Colour Imaging	Melitte Buchman (US)	2015	To close
TC 8-16	Consistency of colour appearance within a single reproduction medium	Craig Revie (UK)	2017	Working draft in process
TC 8-17	Methods for Evaluating Colour Difference between 3D Colour Objects	Kaida Xiao (GB)	2017	Working draft in process
JTC 10	A new colour appearance model for colour management systems: CIECAM16	Changjun Li (CN)	2017	Lead chair. Final draft in 2019
JTC 12	The measurement of sparkle and graininess	Noël Richard (FR)	2018	Co-chair
JTC 16	Validity of Chromatic Adaptation	Kaida Xiao (GB)	2018	Co-chair
JTC 17	Gloss measurement and gloss perception – A framework for the definition and standardization of visual cues to gloss	Danny Ritch (US)	2019	Co-chair



# Reportership

DR#	Title	Reporter	Year	Remarks
R8-14	Office Lighting for Imaging	Yasuki Yamauchi (JP)	2015	TC8-10 follow up
R8-15	A survey on Quality Metrics on Stereoscopic Imaging	Christine Fernandez-Maloigne (FR) Jesus Jaime Moreno (MX) Alessandro Rizzi (IT)	2015	TN is pending
R8-16	Material Adjustment Transforms	Max Derhak (US)	2016	Report is in progress
R8-17	Literature Survey on Uniform Colour Space for Imaging Applications including Wide Colour Gamut and High Dynamic Range Images	Youn Jin Kim (KR)-> Youngshing Kwak (KR)	2017	To be closed with a short report. Form a task group to discuss new (J)TC

# Research Forum

DR#	Title	Convener	Year
RF-01	Spectral Imaging	Masahiro Yamaguchi (JP)	2018

# Liaisons

No.	Title	Reporter
L8-1	ISO/TC 036: Cinematography	CIE Central Bureau
L8-2	ISO/TC 130: Graphic Technology	Danny Rich
L8-3	ISO/TC 042: Photography	Hideyasu Kuniba
L8-4	ISO/TC 159/SC 04/WG2: Ergonomics, SC 4: Signals and Controls, WG 2: Visual display requirements	Po-Chieh Hung
L8-5	ISO/IEC/JTC1/SC29: Joint Committee on information technology, SC29: Coding of audio, picture, multimedia and hypermedia information	Olfa Ben Ahmed
L8-6	IEC TC100/TA2 Multimedia Systems and Equipment	Naoya Katoh
L8-7	ASTM	Ellen Carter
L8-8	ISO/IEC/JTC1/SC28: Joint Committee on information technology, SC28: Office Equipment	Klaus Richter
L8-9	International Color Consortium	Marc Mahy*



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# Editor Report

## Report on Activities for 2018

- Documents Reviewed
  - Reviewed TC 8-12 draft and replied (12/21)
  - Reviewed DR 8-14 draft and replied (12/20)
  - Worked with TC 8-15 to continue the development of the final report on Archival Colour Imaging
- Collaboration Work with JTC 8 Terminology
  - Review the revision of the eILV for Div 8
  - Modify or explain definitions of terms to JTC and CIE editors



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# Technical Committee Report



# Technical Committee

TC#	Title	TC (co-) chair	Year
TC8-12	Image and Video Compression Assessment	Pascal Bourdon (FR)	2007
TC8-13	Colour Gamuts for Output Media	Kiran Deshpande (GB)	2013
TC8-14	Specification of Spatio-Chromatic Complexity	Noël Richard (FR)	2015
TC 8-15	Archival Colour Imaging	Melitte Buchman (US)	2015
TC 8-16	Consistency of colour appearance within a single reproduction medium	Craig Revie (UK)	2017
TC 8-17	Methods for Evaluating Colour Difference between 3D Colour Objects	Kaida Xiao (GB)	2017
JTC 10	A new colour appearance model for colour management systems: CIECAM16	Changjun Li (CN)	2017
JTC 12	The measurement of sparkle and graininess	Noël Richard (FR)	2017
JTC 16	Validity of Chromatic Adaptation	Kaida Xiao (GB)	2018
JTC 17	Gloss Measurement And Gloss Perception: A Framework for The Definition And Standardization of Visual Cues to Gloss	Danny Rich (US)	2018

# **TC8-16 Consistency of colour appearance within a single reproduction medium**

**Year established:** 2017

**Co-Chairs:** Craig Revie (UK)

## **Terms of Reference:**

To study and report on sets of reproductions of the same source image that have a consistent colour appearance and are most similar to a reference reproduction, including recommending assessment methods that measure the similarity of reproductions of an image with different colour gamuts, for printed images on substrates with approximately similar characteristics in a fixed viewing environment. Only the effect of colour reproduction on appearance will be considered by this TC and so the assessment will be performed using hard copy or soft copy proofing. To propose a metric which can measure consistency of colour appearance.



# Members

Name		Affiliation
Timothy Baechle	US	Idealliance
Chris Bai	TW	BenQ
Claas Bickeboeller	CH	Konica Minolta
Michael Brill	US	Datacolor
Robert Chung	US	RIT
Max Derhak	US	Onyx Graphics
Susan Farnand	US	RIT
Elena A. Fedorovskaya	US	RIT
Christine Fernandez-Maloigne	FR	University of Poitiers
Phil Green	NO	Gjøvik University College
Gregory High	UK	Gjøvik University College
Po-Chieh Hung	US	(Konica Minolta)
David Hunter	US	Pilot Marketing
Don Hutcheson	US	Hutch Color
Andy Kraushaar	DE	Fogra

Name		Affiliation
Ronnier Luo	UK	Leeds / Zhejiang University
Marc Mahy	BE	Agfa
Marco Mattuschka	DE	Fogra
David McDowell	US	Retired
Jan Morovic	UK	HP
Peter Nussbaum	NO	Gjøvik University College
Nikolaus Pfeiffer	DE	Heidelberg
Yuan Jiang Ping	CN	Yuncheng University
Craig Revie	UK	Fujifilm
Danny Rich	US	Sun Chemical
Muhammad Safdar	CN	Zhejiang University
Jürgen Seitz	DE	GMG
Philipp Tröster	DE	GMG
Yasuki Yamauchi	JP	Yamagata University

# Meetings

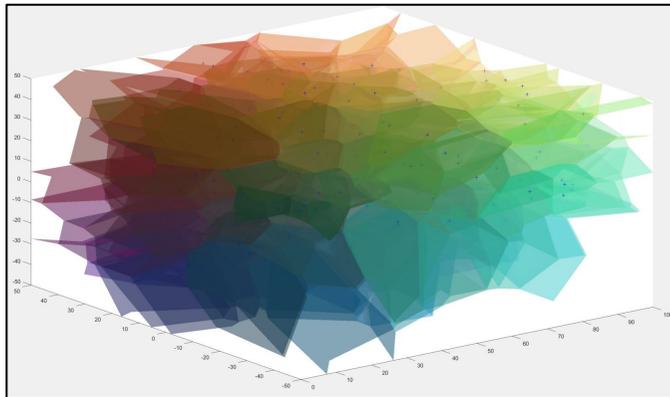
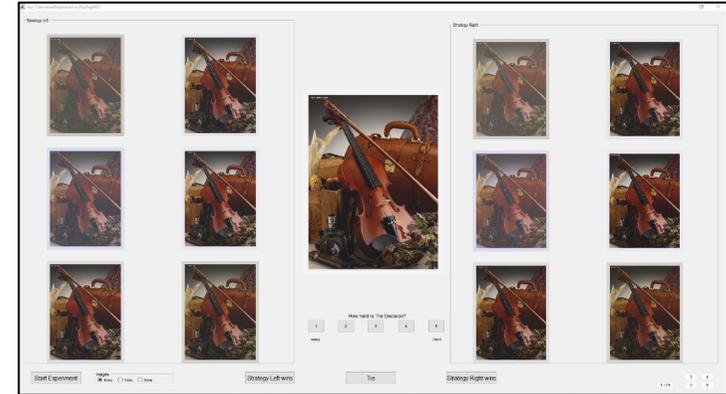
- **12 November 2018 Face-to-face meeting in Vancouver**
- 8 January 2019 teleconference
- 8 April 2019 teleconference
- **21 June 2019 CIE D8 meeting**
- 21/22 October planned face-to-face meeting in conjunction with CIC25 in Paris

**Meeting notes and presentations available in CIE COLLTUOL**

# Fogra approach for the evaluation of CA

## Does Common Appearance exist?

Conducting a paired comparison experiment using sets of images assumed to have a common colour appearance (mapped into different output gamuts using already available / commonly used tools)

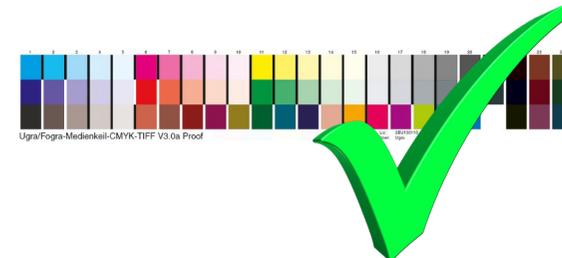


- Measuring Common Appearance
- Comparison of different approaches → using colour names (via Voronoi diagrams) as a metric to evaluate larger colour differences = „different colours“

•(based on Fogra report 10.057 and in collaboration with the experiment conducted by Mylonas, MacDonald, Griffin: <https://colornaming.net>)

## • Metric for evaluation of Common Appearance

•Developing an approach for an easy evaluation of common appearance in everyday production (like a Fogra Media Wedge)



# Consistent Color Appearance in Print Images

*E. Fedorovskaya, R.Chung, P. Urbain, D. Hunter & D. Hutchison. RIT, USA*

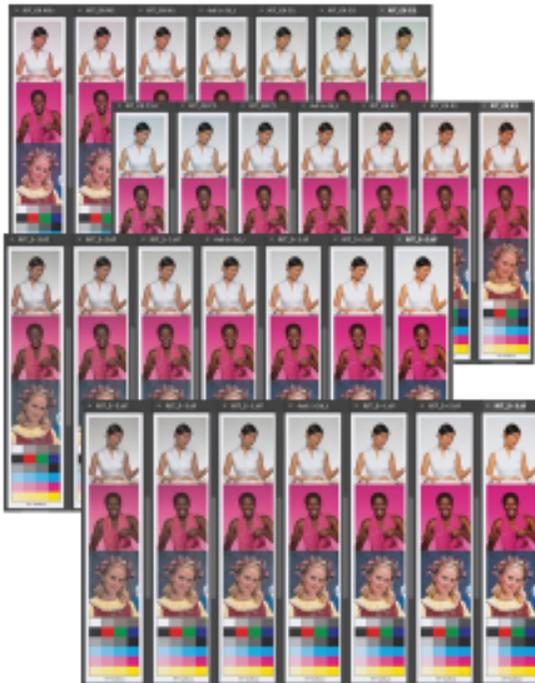
- Consistency of color appearance (CCA) is a degree of visual consistency or shared visual appearance that a set of images possesses in the presence of visual differences.
- The CCA varies according to printing conditions and can be affected by paper substrates, inks, environments, printing devices and printing parameters, such as, color balance, tonality, and color gamut.
- Hypothesis 1: In a print reproduction system, CCA for a set of images depends predominantly on similar tonality, gray balance and hues relative to substrate, and is maintained if only the gamut size is varied.
- Hypothesis 2: A systematic variation of CCA can be achieved by shifting device characterization datasets along print reproduction dimensions using constant values of the 95<sup>th</sup> percentile  $\Delta E_{00}$ .



Images based on 7 datasets derived from one reference dataset by scaling white point, black point and chroma while preserving primary hue angles, tonality and gray balance, such that the 95th percentile difference between any two adjacent datasets equals  $3 \Delta E_{00}$ .

## Stimuli

Variations in gray balance and tonality using shifts of the 95<sup>th</sup> percentile  $\Delta E_{00} \approx 3$



## Experiments

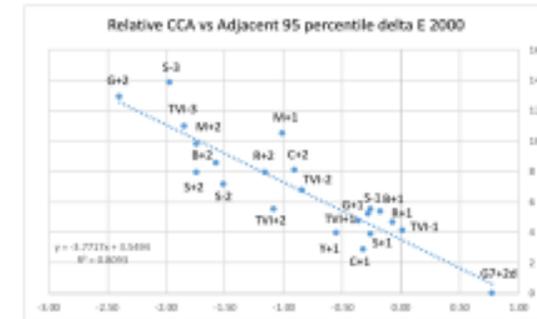
Rank samples that fit in the image set for best CCA.



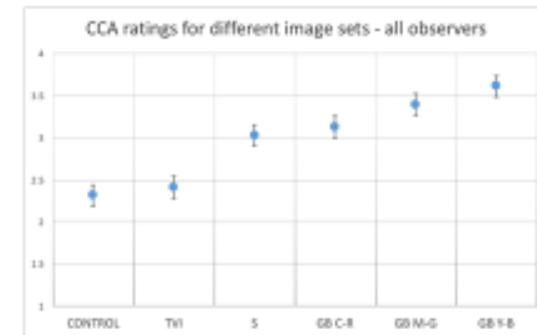
Compare and rate sample sets for demonstrating CCA.



## Results



CCA scale from the ranking experiment (x-axis) vs measured 95-percentile  $\Delta E_{00}$  between consecutive adjacent datasets (y-axis).



CCA ratings for different image sets. 1 - excellent, 5 - unacceptable

# Trend-line approach to predict CCA

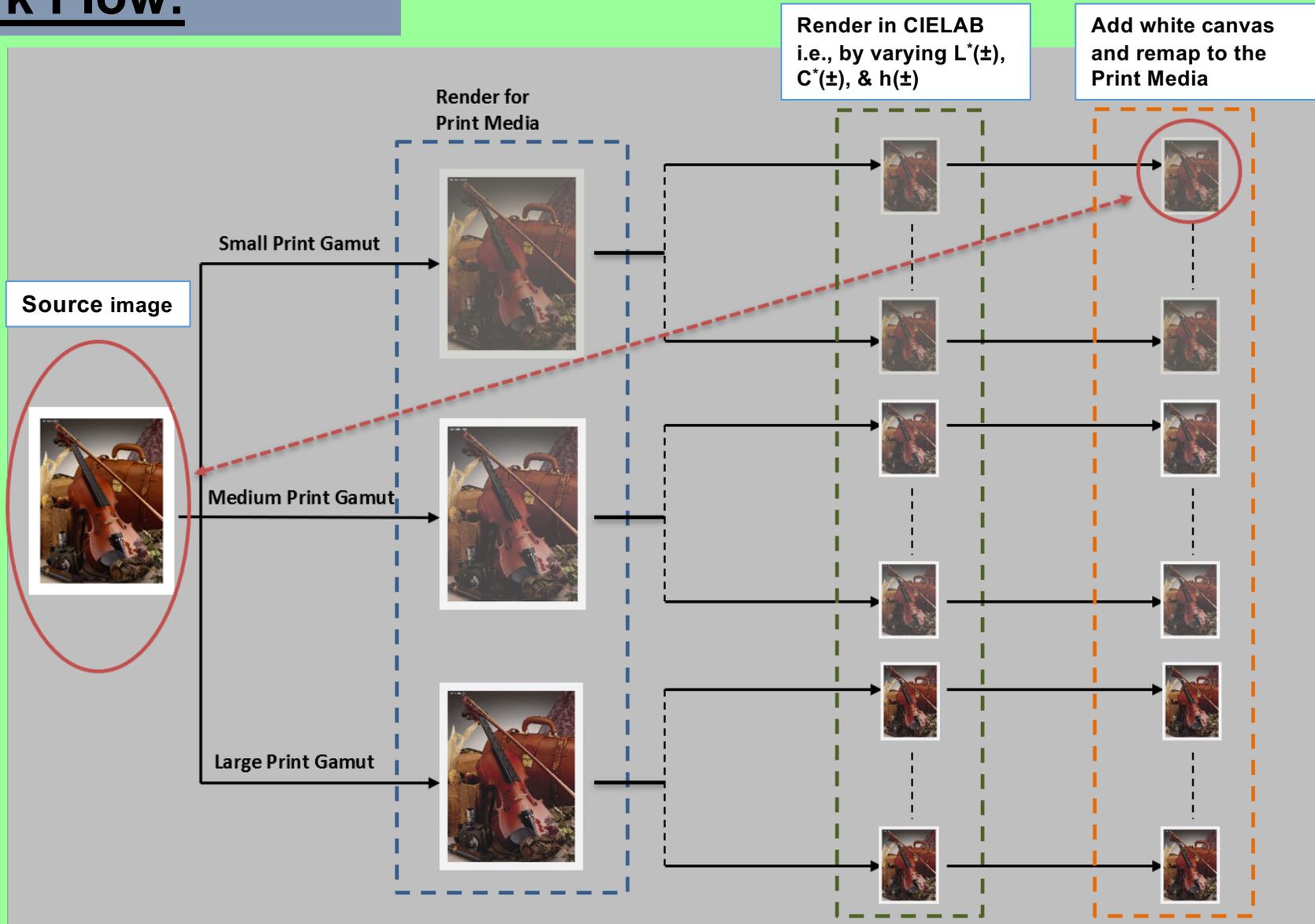
## Yasuki Yamauchi



- Purpose: Propose an evaluation method (metric) to describe how the degree of consistent color appearance can predict for different mapping algorithms for different gamuts.
- Hypothesis: Euclidian distance between the mapped color and trend line for that specific reference color can be used to predict CCA.
- Experiment: Psychophysical evaluation experiment (Paired comparison) for several images completed.
- Euclidian distances between the trendline of the reference color (RGBCMY of AdobeRGB) and mapped color were calculated.



## Work Flow:





## Current status

- Fogra work is complete and a CCA web tool will shortly be available from the Fogra web site
  - Provides a CCA metric to allow renderings of a reference to be compared
- RIT study shows some positive results that suggest the proposed gamuts allow sets of images to be created with CCA
  - Does not provide a metric to allow renderings to be compared
- Yamagata University pilot study is complete and a new study is being planned. Details are expected to be available shortly
- NTNU pilot study by Muhammad Safdar is complete but data has not yet been presented to the group
- An outline of a proposed research report has been started



# TC8-12 Image and Video Compression Assessment

**Year established:** 2007

**Chair:** Pascal Bourdon (FR)

## **Terms of Reference:**

To establish and report on the display and viewing conditions and materials for image and video compression quality evaluation in different applications including, but not limited to, web, mobile phones, HDTV, home cinema and digital cinema.

## **Current status and work plan:**

- Balloted on WD on 12/5/18,
- Reviewed/ was returned by DE on 12/21/18
- TR reformatted to Latex. Issues with source files solved. Resubmission to Div. Editor expected by the end of July

## **Members:**

Bodrogi P. Germany

Bourdon P, France

Bovik A. USA

Charrier C. France

Fernandez-Maloigne C.  
France

Hardeberg J. Norway

Larabi M.C. France

Lopez J.M Spain

Otazu X. Spain

Pedersen M. Norway

Richard N. France

Rizzi A. Italy

Saad M. USA

Saadane H France

# TC8-12 Image and Video Compression Assessment

## Motion 19-2:

- If it cannot be submitted CD to CB with a reasonable quality by Oct 21, Division 8 will vote on its closure then.



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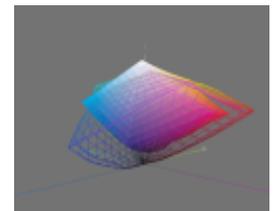
# TC8-13 Colour Gamuts for Output Media

**Year Established:** 2013

**Chair:** Kiran Deshpande (GB)

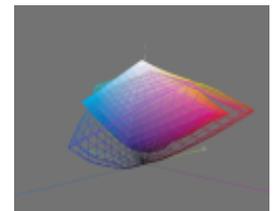
## **Terms of Reference:**

To study and recommend methods for computing and communicating colour gamuts for output colour reproduction media.



## Members – 13

- Kiran Deshpande – Great Britain (Chair)
- Frans Gaykema – The Netherlands
- Phil Green – Great Britain
- Everding Holger – Germany
- Akihiro Ito – Japan
- Naoya Katoh – Japan
- Andreas Kraushar – Germany
- Changjun Li – China
- Marc Mahy – Belgium
- Kenichiro Masaoka – Japan
- Jan Morovic – Great Britain
- Craig Revie – Great Britain
- Awadhoot Shendye – United States





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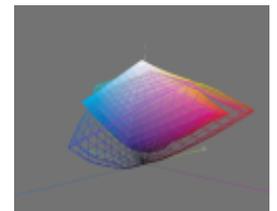
# Colour Gamuts for Output Media

## Meetings

- November 21, 2018
- January 23, 2019
- April 17, 2019

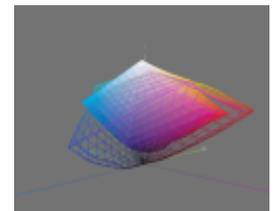
## Next meeting

- July 10, 2019



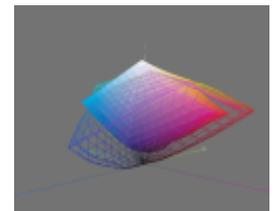
## Progress – Current Status

- Discussions
  - Measured gamut vs. perceived gamut
  - Appearance of a colour gamut affected by viewing conditions
  - Alignment with gamut ID document IEC 61911-12-2 for display gamuts
- WD – initial draft revisions, discussed with TC members, current version v9
- Draft format – changed according to CIE template



## Work Plan – Next Actions

- WD TC Ballot – Aug 2019
- CD preparation & ballot – Jan 2020
- ED/ST – Apr 2020
- AD/ST – Sept 2020
- ~~FDIS preparation & ballot – Jan 2021~~



# TC8-14 Specification of Spatio-Chromatic Complexity

**Year established:** 2015

**Chair:** Noël RICHARD (Fr)

**Secretary :** Mihai IVANOVICI (Ro)

## **Terms of Reference:**

To produce a **state-of-the-art report** on the existing definitions of *the complexity notion* related to the aspect of non-uniform surfaces, generally defined as textured.

To combine these definitions in order **to produce a single definition** embedding both spatial and chromatic variations in a generic and vector form.

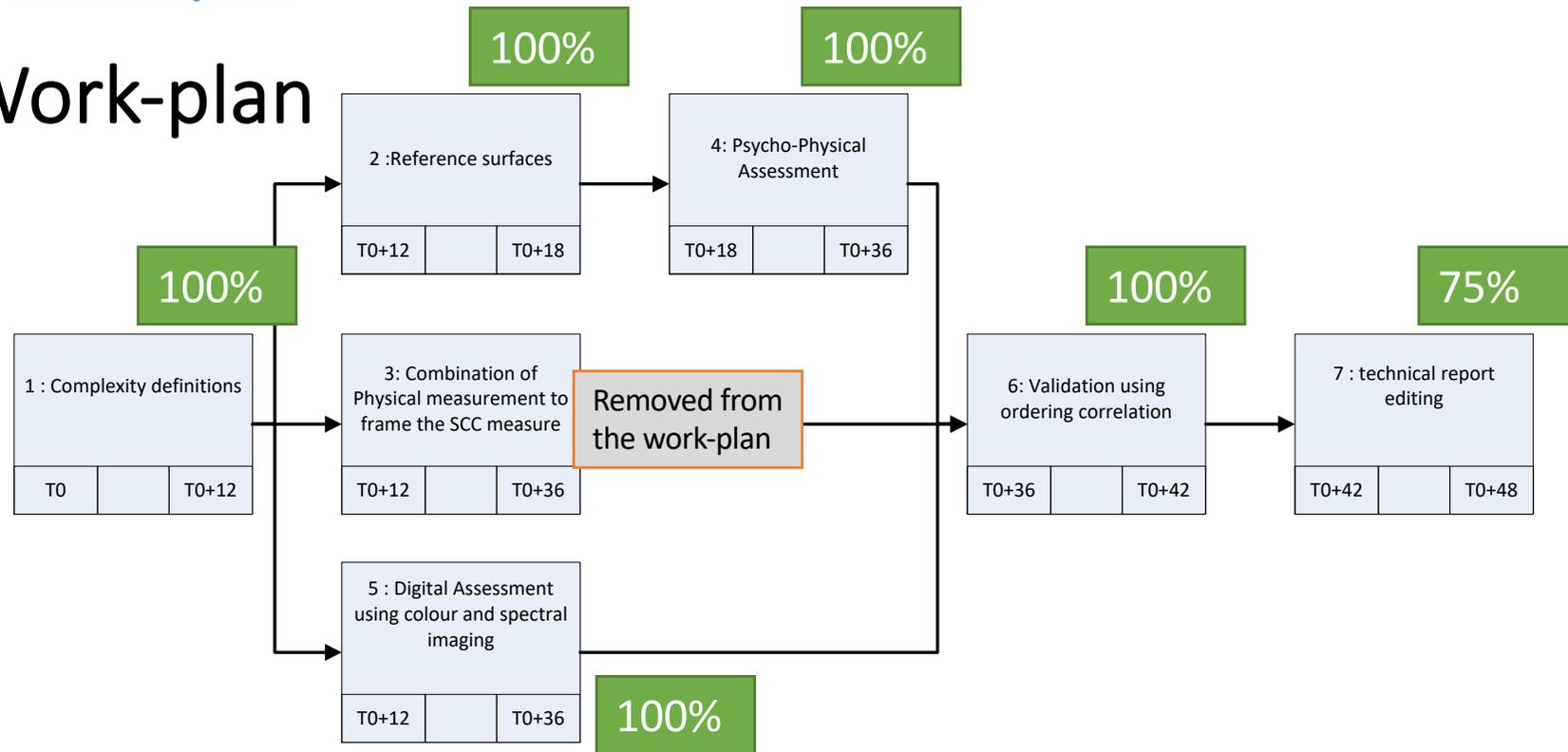
**Current status and work plan:** **one-year extension asked to finish the report**



# Actual member List

- **Richard Noël, Dominique Lafon**, Christine Fernandez-Maloigne : FR
- **Mihai Ivanovici** : RO
- **Kinjiro Amano** : GB
- **Kaida Xiao** : GB
  - Linked to TC8-17 about colour difference in 3D printing
- Manuel Mengoza: ES
- Deborah Hilda : NO
- Alessandro Rizzi : IT
- Jon Hardeberg : NO
- Masayuki Tanaka : JP
- Ghorbel Faouzi : TU

# Work-plan



WP	Duration	Activity
1	T0 → T0+12	State of the Art on existing definition of complexity, to propose a definition of SCC
2	T0+12 → T0+18	Production of Reference surfaces (real and synthetic)
3	T0+12 → T0+24	Combination of physical measurements to frame the SCC measure
4	T0+24 → T0+36	Psycho-physical experiments to rank the surface images in accordance to the SCC
5	T0+12 → T0+36	Protocol and imaging systems to assess the SCC in images
6	T0+36 → T0+42	Ordering correlation between the different experiments
7	T0+42 → T0+48	Technical Report editing and validation

# TC Meeting : 10-12 July 2018 (Poitiers)

1. Measuring the complexity : state-of-the-art
  - From Psycho-physical point-of-view to mathematical one
2. Generating non-uniform and complex surfaces
  - From theoretical color space to perceptual uniform ones
  - State-of-the-arts to last propositions using Clifford algebras
3. Assessing the spatio-chromatic complexity
  1. From Colour image according to the human observer
  2. From spectral image according to the physical properties
4. A first psycho-physical study about the human sensitivity to SCC
5. Relationship to the Physic and Material sciences
  1. Relationship between non-uniform surfaces, complexity measures and human perception
  2. Optical models of surfaces,
6. Applications
  1. Quality control of Varnished wood sample
  2. Skin Colour and metrology of the skin
  3. Relationship to the graininess and sparkling measurements
7. In parallel during the 3 days, collective work : toward a definition of the SCC
  - Collective thinking and writing

- 17 participants (F, RO, GB, SP, NO, TU)
  - 23 were planned

# Report organization

1. Introduction
2. State of the Art on complexity
  1. Aesthetic, beauty and complexity
  2. Complexity in signal and Image processing
    1. Entropies
    2. Fractal dimension
    3. Relationship with semantic
  3. Limits in the existing definitions for application in Color and Spectral domain (visible range)
3. A proposed definition
  1. Limits and constraints for the definition
  2. Proposition of a definition for the Spatio-Chromatic Complexity
4. Possible References and measurement models
  1. Colour fractal image generation
  2. Complexity assessment in the color and spectral domain
    1. An under-estimation based on Entropy
    2. Fractal dimension assessment
  3. Human sensitivity to differences in SCC : a first psycho-physical study
5. Relationship between SCC and metrology of non-uniform surfaces
  - A framework to assess the uncertainties of texture features whatever is a colour/spectral distribution and the spatial frequencies (assessed in a vector way) (joint probability)
6. Conclusion



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# Planned activity

- First version of the report : End of July 2019
  - For discussions in parallel to the TC8-17 meeting of Kaida Xiao
  - End of August : round-robin between the TC members
- December 2019: First complete version
  - To propose to the CIE
- July 2020 : final version

## Motion 19-3:

- To approve 1-year extension for TC 8-14.

# TC8-15 Archival Colour Imaging

**Year Established:** 2015

**Chair:** Melitte Buchman (USA)

## **Terms of Reference:**

To recommend a set of techniques for the accurate capture, encoding and long-term preservation of colour descriptions of digital images that are either born digital or the result of digitizing 2D static physical objects including documents, maps, photographic materials and paintings.

**Motion 19-4:**  
**To close this TC.**

# **TC8-17 Methods for Evaluating Colour Difference between 3D Colour Objects**

**Year established:** 2017

**Co-Chairs:** Kaida Xiao (GB)

## **Terms of Reference:**

To study the subjective assessment methods and recommend a dataset for colour difference evaluation of pairs of 3D colour objects. To prepare a report on the investigations of the effects on the perception of colour difference that may be caused by differences of 3D shape, gloss and material.

## **Members:**

Guihua Cui, CN; Manuel Melgosa, ES; Richard Noel FR; Ester Perales, ES; Pei-Li Sun, TW; Guangxue Chen, CN; Peter Morovic, ES; Suresh Ramasamy US; Yoav Bressler, IL (Advisor); Michael Pointer, GB (Advisor)

**Next TC Meeting: July 2019, Leeds**

## Current status:

New experiments are conducting in Wenzhou University to assess colour difference of simple 3D objects under diffused light and spotlight

### Sample preparation

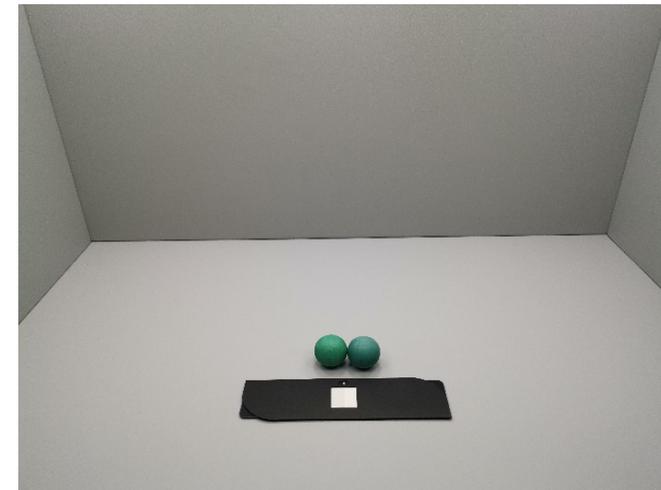
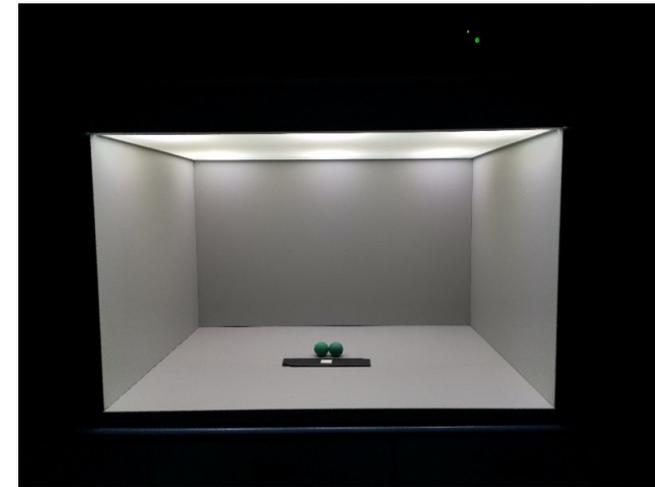
- Material: paper-based color 3D printing
- Shape: sphere and flat sample (cube to be print)
- Groups: red, yellow, green, blue, grey
- Each group: 5 colour center \* 15 colours /per center (  $3 \Delta L^*$ ,  $\pm 3 \Delta C^*$ ,  $\pm 3 \Delta H^*$ ).



## Current status:

### Experiment

- Diffuse lighting: D65 (LED)
- Color center: red, yellow, green, blue, grey
- Three set of experiment
  - Colour difference for flat samples
  - Colour difference for sphere
  - Colour difference for cube (to be conducted)
- No. of Observer: 10 (repeat twice)
- Scaling Method: Gray scale method



More results will be reported in TC meeting in July, Leeds





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## **Work plan 2019-2020:**

- 3D colour printing simple 3D objects using different materials (in China, United Kingdom and Israel)
- Collect new colour difference data in different universities
- Test CIE DE2000 for new colour difference data

# **JTC-10 A new colour appearance model for colour management systems: CIECAM16**

**Year Established:** 2017

**Lead Chair:** Changjun Li (CN)

## **Terms of Reference:**

To recommend a new colour appearance model, CIECAM16, to replace the CIECAM02 model for colour management systems.

# (JTC-10: Members)

Marc Mahy (Belgium)	Guihua Cui (China)
Changjun Li (Chair, China)	Minchen Tommy Wei (HK, China)
Xiandou Zhang (China)	Christine Fernandez-Maloigne (France)
Ichiro Katayama (Japan)	Yoko Mizokami (Japan)
Hideki Sakai (Japan)	Kees Teunissen (Netherlands)
YungKyung Park(South Korea)	Manuel Melgosa (Spain)
Suchitra Sueeprasan (Thailand);	Jan Morovic (UK)
Ming Ronnier Luo (Co-Chair, UK)	Michael Pointer (UK)
Kaida Xiao (UK)	Michael H Brill (USA)
Eric Walowit (USA)	

# (JTC-10: Current Status)

1. The JTC had an open meeting in October 2017 during the CIE meeting in Jeju Island, Korea.
2. The first draft of the TR was finished by the end of September 2017. Now it is in improving and currently draft version 4 is available.
3. CIECAM16 is mainly based on the following work :
  - Zhifeng Wang, Cheng Gao, Yang Xu, Manuel Melgosa, Michael H. Brill, Michael Pointer, and Changjun Li\*, Further Investigation on the Modified Hyperbolic Function in the CAM16 Color Appearance Model, Color Res Appl. Volume44, Issue3, June 2019, Pages 359-366
  - Changjun Li, Yang Xu, Zhifeng Wang, Ming Ronnier Luo\*, Guihua Cui, Manuel Melgosa, Michael H. Brill and Michael Pointer, Comparing two-step and one-step chromatic adaptation transforms using the CAT16 model, Color Res Appl. 2018;43:633–642.
  - Changjun Li, Zhiqiang Li, Zhifeng Wang, Yang Xu, Ming Ronnier Luo, Guihua Cui, Manuel Melgosa, Michael H. Brill and Michael Pointer, Comprehensive colour solutions: CAM16, CAT16 and CAM16-UCS, Color Res Appl. 2017;42:703–718.



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# (JTC-10: Work Plan)

1. The final draft TR will be completed by the end of 2019.
2. Final stage is to complete the TR publication process and close the JTC by the end of 2020, if not earlier.

# JTC-12 The measurement of sparkle and graininess

**Year Established:** 2017

**Co-Chair:** Noël Richard (FR)

## **Terms of Reference:**

To provide a methodology to measure sparkle and graininess, and to develop a measurement scale. Measurands will be defined and the requirements for their measurements will be well normalized, in such a way that different instruments can provide the same spectrophotometric data from the same specimen. A psychophysical method will be recommended to obtain visual data, and its correlation with the spectrophotometric data will be worked out to develop the measurement scale for sparkle and graininess.

**Members:** 21

**Meetings:** 2 + 1 working session during the CIE TC8-14

**Current status and work plan:** Active

## JTC12 (Div. 2, 1, and 8)

# The measurement of sparkle and graininess

**Year Established:** 2017

**Terms of Reference:** To provide a methodology to measure sparkle and graininess, and to develop a measurement scale. Measurands will be defined and the requirements for their measurements will be well normalized, in such a way that different instruments can provide the same spectrophotometric data from the same specimen. A psychophysical method will be recommended to obtain visual data, and its correlation with the spectrophotometric data will be worked out to develop the measurement scale for sparkle and graininess.

**Chair:** A Ferrero, ES (Div 2) Y Kwak, KR (Div 1), N. Richard (Div 8)

# JTC12 (Div. 2, 1, and 8)

## The measurement of sparkle and graininess

- **Status:** Active
- **Meetings:**
  - Eindhoven, after the CIE Division 2 Annual meeting (15/6/2018).
  - Next meeting to be held June 20<sup>th</sup> in Washington.
- **Working draft:**
  - Version 2.1. prepared to be discussed in Washington D. F. (USA).
  - Modifications were done at section “Effect coatings” by Daniela Schier and Alejandro Ferrero, and at “Instrumentation for special effect coating” by Peter Ehbets, Miloš Šormaz and Alejandro Ferrero.
  - Text suggest by Michael Becker for “sparkle in displays” section.

# JTC12 (Div. 2, 1, and 8)

## The measurement of sparkle and graininess

- **Activity:**

- The content and objectives of JTC12 were presented and discussed:
  - (January 2019) At X-Rite, Regensdorf, Switzerland.
- Revisions by **Milos Sormaz** and **Peter Ehbets** (X-Rite) were accounted in the new draft.
- **Esther Perales** (University of Alicante) carried out psychophysical experiments for scaling graininess.
- Proposed graininess and sparkle measurement methodologies were carried out by NMIs: META, CMI and PTB.

# JTC12 (Div. 2, 1, and 8)

## The measurement of sparkle and graininess

- **Open discussions:**
  - Discussion on the definition of sparkle: What is and what is not sparkle? How it must be described to an observer?
  - Terminology: Graininess, diffuse coarseness or coarseness. Which term can be regarded as more generic (less specific to an instrument)?
  - Must chromaticity be included in the measurement scale of sparkle? If yes, how?
  - How must be addressed measurement geometries or living sparkle on the report?

# JTC12 (Div. 2, 1, and 8)

## The measurement of sparkle and graininess

### News:

- New JTC members: Ana María Rabal (CNAM), Rafael Huertas (University of Granada) and Sophie Jost (ENTPE – University of Lyon).
- Alejandro Ferrero was invited by the Group of Research (GDR 2044) on Materials Appearance, created in 2019 and labelled (at French level) by the CNRS, to give a talk on “the measurement of sparkle and graininess” at its first scientific day at Saint-Etienne, France, the 11 of June 2019.



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**CIE2019**  
29TH SESSION  
WASHINGTON DC

# JTC 16 (D1/D8)

## Validity of Chromatic Adaptation

- **Year Established:** 2018
- **Co-Chair:** Kaida Xiao
- **Terms of Reference:** The TC will review the existing CATs and propose modifications by including a two-step transform to take the effect of white light chromaticity on degree of chromatic adaptation into consideration and will write a TR.
- The TC will review the existing CATs and propose modifications by including a two-step transform to take the effect of white light chromaticity on degree of chromatic adaptation into consideration



## JTC 16 (D1/D8) Validity of Chromatic Adaptation

- Membership:
  - Chair: Minchen Wei (HK) – D1; Kaida Xiao (GB) – D8
  - Member: Guihua Cui (CN), Youngshin Kwak (KR), Changjun Li (CN), Qiang Liu (CN), Ronnier Luo (GB), Yungkyung Park (KR), Michael Royer (US), Kevin Smet (BE), Shining Ma (BE), Kees Teunissen (NE)
- First meeting will be held during CIE 29<sup>th</sup> Session
- Tentative schedule:
  - Jun 2019 - Jun 2021: carrying out new experimental work
  - Jun – Dec 2021: discussing and evaluating new experimental work
  - Jun 2022: Preparing Draft Technical Report
  - Oct 2022: TC balloting of Draft Technical Report
  - Dec 2022: Submitting to CIE CB

# **JTC-17 Gloss Measurement And Gloss Perception: A Framework for The Definition And Standardization of Visual Cues to Gloss**

**Year Established:** 2018

**Co-Chair:** Danny Rich (US)

**Terms of Reference:**

To describe recommendations for standardised visual assessment conditions of individual, established cues to gloss, to make recommendations for the definition of a standard gloss observer for individual diagnostic cues and, based on the findings from the above, to suggest optical methods and metrics for describing gloss in correlation with the established gloss cues.

**Members:**

**Meetings:** The first meeting at CIE 2019 was cancelled.

**Current status and work plan:** Yet to be developed



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# Reportership Report



# Reportership

DR#	Title	Reporter	Year
R8-14	Office Lighting for Imaging	Yasuki Yamauchi (JP)	2015
R8-15	A survey on Quality Metrics on Stereoscopic Imaging	Christine Fernandez-Maloigne (FR) Jesus Jaime Moreno (MX) Alessandro Rizzi (IT)	2015
R8-16	Material Adjustment Transforms	Max Derhak (US)	2016
R8-17	Literature Survey on Uniform Colour Space for Imaging Applications including Wide Colour Gamut and High Dynamic Range Images	Youn Jin Kim (KR)	2017

# R8-14 Office Lighting for Imaging

**Year Established:** 2015

**Reporter:** Yasuki Yamauchi (JP)

## **Terms of Reference:**

To publish a Technical Note on the spectral power distribution and illumination levels used to view images in office lighting conditions, collected through the activity of TC8-10.

## **Current status and work plan:**

- submitted a draft to the Editor (Nov. 2018), waiting for the input
- checking the file style of the collected data

Work plan:

- Modify the draft.
- Prepare (edit) the data in the same format

# R8-14 Office Lighting for Imaging

## Motion 19-5:

- If a draft TN and the formatted data cannot be submitted to CB with a reasonable quality by Oct 21, Division 8 will vote on its closure then.

# **R8-15 A survey on Quality Metrics on Stereoscopic Imaging**

**Year Established:** 2015

**Reporter:** Christine Fernandez-Maloigne (FR)  
Jesus Jaime Moreno (MX)  
Alessandro Rizzi (IT)

## **Terms of Reference:**

To publish a Technical Note to describe the state of the art of the Stereoscopic Image Quality Assessments (SIQA), and psychophysical experiments to evaluate the Metrics on Stereoscopic Imaging.

**Current status: Draft TN pushed back from CB and is stuck.**

# R8-15 A survey on Quality Metrics on Stereoscopic Imaging

## Motion 19-6:

- If a draft TN cannot be submitted to CB with a reasonable quality by the 2020 division meeting, Division 8 will vote on its closure then.

# R8-16 Material Adjustment Transforms

**Year Established:** 2016

**Reporter:** Max Derhak (US)

## **Terms of Reference:**

To study the topic of adjusting tristimulus values of material (object) colours to predict how they change due to differences in both lighting spectral power distribution and observer functions with the purpose of recommending one or more approaches that can be used in advanced colour management systems.

## **Current status and work plan:**

Draft document in progress

# Basic understanding

- General Sensor Adjustment Transforms (SATs) are often used in imaging application to adjust sensor values
- Adjustments are typically based on some form of color equivalency
  - White balancing relies on equivalency of white points
  - Chromatic adaptation relies on corresponding color (sameness of appearance)
    - Predict tristimulus/sensor values for color that appears the same
  - Material adjustment relies on material color equivalency
    - Predict how tristimulus/sensor values for a material object change for different lighting/observers)
- Wpt normalization utilizes linear operations to transform cone/tristimulus/sensor values of material colors to a reference coordinate system with  $W$  coordinate corresponding to CIE- $Y$ , and  $p/t$  coordinates corresponding to  $r-g$  /  $y-b$  axes
  - MAT created by transforming into and out of Wpt

# R8-16 Draft Document Outline

- **Introduction**
  - Preface and introduction to Color Equivalency representations
- **Material Adjustment Transforms**
  - **Sensor Adjustment Transforms**
    - CATs versus MATs
  - **Deriving a spectrally based Material Adjustment Transform (Wpt)**
    - Linear and non-linear
  - **Material Color Equivalency**
  - **Comparisons between CATs and MATs**
- **Direct (non-spectral) Wpt Normalization Approaches**
  - From physical target
  - From illuminant's sensor excitation values
- **Manipulating Colour Matching Functions**
  - Relationships between Cone Fundamentals and Colour Matching Functions
  - Transforming Cone Fundamentals to Colour Matching Functions
    - Primary based, tristimulus based, MAT based
- **Conclusions and next steps**

# R8-16 Material Adjustment Transforms

## Motion 19-7:

- If it cannot be submitted the Reportership report to Div. 8 with a reasonable quality by June 20, 2020, R8-16 will be automatically closed.

# **R8-17 Literature Survey on Uniform Colour Space for Imaging Applications including Wide Colour Gamut and High Dynamic Range Images**

**Year Established:** 2017

**Reporter:** Dr. Youn Jin Kim (KR)

**Collaborators:** Dr. M. Safdar (NO), Prof. M. R. Luo (GB), Youngshin Kwak (KR)

## **Terms of Reference:**

To survey the literature on modern uniform colour spaces for Wide Colour Gamut and High Dynamic Range imaging applications, including picture quality evaluation and image compression. The report will identify trends in the technology and make recommendations for one or more technical committees or joint technical committees with Division 1.

## **Current status and work plan:**

A short report was submitted.

Will review it and vote to close the DR 8-17.

Form a task group to discuss new JTC

# R8-17 Literature Survey on Uniform Colour Space for Imaging Applications including Wide Colour Gamut and High Dynamic Range Images

## Action Item:

- To circulate the Reportership report for review and to close the Reportership

## Action item:

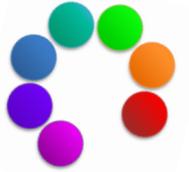
- To form a Task Group to prepare a new JTC proposal with a new TCC. The members are: Po-Chieh Hung, Youngshin Kwak, Ronnier Luo,. To invite more people.



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# Research Forum Report

DR#	Title	Convener	Year
RF-01	Spectral Imaging	Masahiro Yamaguchi (JP)	2018



## RF-01 Spectral Imaging

**Year Established:** 2018

**Convener:** Masahiro Yamaguchi (JP)

**Scope:** Discuss the future prospect of multispectral and hyperspectral imaging technology and identify the work items to be performed in the next step.

**Members:** 15 (9 countries)

**Current status and work plan:**

- Research Forum Proposal Form and Membership Form were submitted (Mar and Aug, 2018).
- Official registration has been announced:  
<http://www.cie.co.at/research-strategy/research-forum>
- We will use mailing list to discuss the work items for the next step.
- Face-to-face meeting: TBD
- Any suggestion would be appreciated.



## Members (with the membership form)

Name	Country	Affiliation
Masahiro Yamaguchi	JP	Tokyo Institute of Technology
Markku Hauta-Kasari	FI	University of Eastern Finland
Bernhard Hill	DE	RWTH Aachen University
Francisco Imai	US	Apple
Jussi Parkkinen	FI	University of Eastern Finland
Fumio Nakaya	JP	Fuji Xerox
Javier Hernandez-Andres	ES	University of Granada
Norimichi Tsumura	JP	Chiba University
Stephen Helling	DE	Caddon color technology GmbH
M. James Shyu	TW	Chinese Culture University
Marcello Melis	IT	Profilocolore Srl
Juan Luis Nieves	ES	University of Granada
Kenro Osawa	JP	Olympus Corporation
Noël Richard	FR	Université de Poitiers
Yohei Takara	JP	Eba Japan

To become a member, please contact the allocated convener sending the complete the TC and RF Membership Application form (See <http://www.cie.co.at/research-strategy/research-forum>).  
 The e-mail address of the convener is: [yamaguchi.m.aa@m.titech.ac.jp](mailto:yamaguchi.m.aa@m.titech.ac.jp)



# RF-01 Spectral Imaging

## Action Item:

- To make a concrete plan how to manage the RF and to execute it



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# Liaison Report

# Liaisons

No.	Title	Reporter
L8-1	ISO/TC 036: Cinematography	CIE Central Bureau
L8-2	ISO/TC 130: Graphic Technology	Danny Rich
L8-3	ISO/TC 042: Photography	Hideyasu Kuniba
L8-4	ISO/TC 159/SC 04/WG2: Ergonomics, SC 4: Signals and Controls, WG 2: Visual display requirements	Po-Chieh Hung
L8-5	ISO/IEC/JTC1/SC29: Joint Committee on information technology, SC29: Coding of audio, picture, multimedia and hypermedia information	Olfa Ben Ahmed
L8-6	IEC TC100/TA2 Multimedia Systems and Equipment	Naoya Katoh
L8-7	ASTM	Ellen Carter
L8-8	ISO/IEC/JTC1/SC28: Joint Committee on information technology, SC28: Office Equipment	Klaus Richter
L8-9	International Color Consortium	Marc Mahy

# L8-2 ISO/TC 130: Graphic Technology

Danny Rich

## ■ Actions of ISO/TC 130 Since November 2018

### • ISO/TS 10128

- *Graphic technology -- Methods of adjustment of the colour reproduction of a printing system to match a set of characterization data*
- The systematic review confirmed this document for another 5 year term

### • ISO/TS 15311-1

- *Graphic technology – Print quality requirements for printed matter – Part 1: Measurement methods and reporting schema*

### • ISO/TR 16066

- *Graphic technology – Standard object colour spectra database for colour reproduction evaluation (SOCS)*
- TR was confirmed for another 5 years

# L8-2 ISO/TC 130: Graphic Technology

- **ISO/TS 18621-11**
  - *Graphic technology – Measurement of visual attributes of printed materials – Part 11: Colour gamut analysis*
  - Technical Specification was published
- **ISO/TS 18621-21**
  - *Graphic technology – Image quality evaluation methods for printed matter – Part 21: Measurement of 1D distortions of macroscopic uniformity utilizing scanning spectrophotometers*
  - Technical specification was published
- **ISO/TS 18621-31**
  - *Graphic technology – Image quality evaluation methods for printed matter utilizing digital printing technologies in commercial and industrial production – Part 31: Evaluation of the perceived resolution of printing systems with the contrast – resolution chart*
  - *Technical specification was published*

# L8-2 ISO/TC 130: Graphic Technology

- **ISO 20677**
  - *Image technology colour management – Extensions to architecture, profile format and data structure*
  - Standard was published. (iccMax)
- **ISO/TS 23534-1**
  - *Image technology colour management – Interoperability conformance specification: Architecture for process colour plus spot colour overprint simulation – Part 1: Colorimetric processing*
  - Published
- **ISO/TS 23564**
  - *Image technology colour management – Evaluating colour transform accuracy in ICC profiles*
  - Published

# L8-3 ISO/TC 042: Photography

Hideyasu Kuniba

## WG18, JWG20 meetings in **2019**

- Feb. 26-Mar. 1, Yokohama, Japan
- May 13-16, Lisbon, Portugal - *TC42 Plenary*
- Oct 28-30, Cologne, Germany

## WG18, JWG20 meetings in **2020**

- Feb. 25-28, Yokohama, Japan
- June 17-19, NY, NY, USA
- Sept. 22-25, Tampere, Finland

## ■ **Published or Soon-to-be-published deliverables**

- ISO 516 Ed. 4 Mechanical shutter measurements
- ISO 12232 Ed. 3 Exposure index, ISO speed
- ISO 15781 Ed. 2 Shooting time lag, shutter release time lag
- ISO 20954-1 Image stabilization performance (Optical systems)
- ISO/TS 19567-2 Texture analysis using stochastic pattern

## ■ **Current topic(s)**

### • **ISO 15739 Annex B “visual noise”**

- Pilot psychophysical experiments were conducted in order to accommodate high noise level and  $L^*a^*b^*$ -based model. The next steps will be discussed at the Cologne meeting.

# L8-4 ISO/TC 159/SC 04/WG2: Ergonomics, SC 4: Signals and Controls, WG 2: Visual display requirements

Po-Chieh Hung

## ▪ Meetings

- Tokyo, Dec 8-9
- San Jose, May 18-19

## ▪ Topics

- **Reflective Electronic Visual displays**
  - Measurement methods are discussed.

- **TR on readability of electronic paper displays (EPD)**

- The revised version of N1605 to SC4 has been submitted as N1613.

- **TR on head-mounted display (HMD) characteristics**

- A draft NP of the optical characteristics of HMD (ISO/PDTR 9241:2017(E) “Requirements for optical characteristics of head-mounted displays related to human-system interaction” has been submitted (N1627).

- Dr. Ujike took over Dr. van Nes’s position as acting convener



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**L8-5**

# ISO/IEC/SC29 activity report for CIE Div.8

Olfa Ben Ahmed



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# ISO/IEC/SC29 activity report for CIE Div.8

- The ISO/IEC/JTC 1/SC 29 Coding of Audio, Picture, MultiMedia and Hypermedia Information has met 4 times since the last CIE Division 8 liaison report in November 2018
  - **SC 29/WG 11** meeting, 2019-01-14/18, Marrakech, Morocco
  - **SC 29/WG 1** meeting, 2019-01-19/25, Lisbon, Portugal
  - **SC 29/WG 1** meeting, 2019-03-16/22, Geneva, Switzerland
  - **SC 29/WG 11** meeting, 2019-03-25/29, Geneva, Switzerland

# ISO/IEC/SC29 activity report for CIE Div.8: Relevant topics

- **WG11: Coding of moving pictures and audio**
  - **ISO/IEC 23090-5:** MPEG promoted its Geometry-based Point Cloud Compression (G-PCC) standard to Committee Draft (CD) stage. G-PCC addresses lossless and lossy coding of time-varying 3D point clouds with associated attributes such as color and material properties.
  - **ISO/IEC 23090-7 and ISO/IEC 23090-8:** MPEG has issued a Call for Proposals (CfP) on 3DoF+ Visual. The objective is to develop a solution for coding of 3DoF+ videos that is built on the existing HEVC standard for texture and depth information, with 3DoF+ metadata to be standardized in MPEGI Part 7.
- **WG1 : Coding of digital representation of images**
  - The meeting reports of the WG1 are missing in the ISO platform, the following information have been taken from the Press release founded in the JPEG website.
    - The meeting of WG1 highlighted the progress on JPEG XL, JPEG XS (JPEG XS **ISO/IEC 21122**), HTJ2K (**ISO/IEC 15444-15** High-Throughput JPEG 2000), JPEG Pleno and JPEG Systems.



# ISO/IEC/SC29 activity report for CIE Div.8

## Next Meetings:

- **SC 29/WG 11** meeting, July 08 to 12, 2019, Gothenburg, sweden
- **SC 29/WG 11** meeting, October 07 to 11, 2019, Geneva, Switzerland
- **SC 29/WG 11** meeting, January 13 to 17, 2020, Brussels, Belgium
- **SC 29/WG 1** meeting, April 20 to 24, 2020, Alpbach, Austria
- **SC 29/WG 1** meeting, March 16 to 22, 2019, Geneva, Switzerland
- **SC 29/WG 1** meeting, July 13 to 19, 2019, Brussels, Belgium

## L8-6 IEC TC100/TA2 Multimedia Systems and Equipment

Naoya Katoh

IEC/TC100/TA2 related meetings were held on 2019-5-20 and 22, at London, UK.

### ■ IEC/TR 61966-2-6

- TAM/TS, PL and related experts agreed to withdraw the current Korean NC's TR proposal (HDR with HLG and DCI-P3/D65), and to restart with new scope. It was reported that similar activities were ongoing in ITU-R. Experts will review the ITU document before restarting.

### ■ MT 61966-2-4

- Maintenance Team: MT 61966-2-4: "Extended-gamut YCC colour space for video applications - xvYCC", was formed to discuss new Korean NC's proposal to utilize the headroom of xvYCC for HDR. The proposal will be amendment to current IEC 61966-2-4.

### ■ PT 63207

- Chinese NC proposed IEC 63207 "Measuring methods of blue-light characteristics and related optical performances for visual display terminal".
- Dr. S. Takeshita (CIE/Div.6 associate director, and IEC/TC76/WG9 member) attended PT 63207 meeting and made a presentation, asking for document reconstruction based on the scientific evidence.
- After experts' discussion, it was agreed that
  1. There were no scientific evidences to prove the blue light from VDT is harmful to human health. Therefore, the word, hazard, will be removed entirely from the document and an appropriate word will be used.
  2. Accordingly, unnecessary parts will be removed from the document.
- PL (Mr. Zhang) will revise the document, and the 3rd WD document will be uploaded to the IEC collaboration platform by the end of June.

# L8-7 ASTM E12 COLOR AND APPEARANCE

Ellen Carter

- **ASTM E12 met last week June 13 and 14, at NIST, Gaithersburg, MD. **The highlights include :****
  - **Presentation by Roland Connelly, - Comparison of LED Lighting Adopted by Retailers to Typical LED Spectra Adoption by the CIE;**
  - **Presentation on “Progress on CIE characterization of sparkle and graininess” by Francisco Verdu, who is now at Axalta in the US;**
  - **Cameron Miller, from NIST gave a report on SI Traceability of Night Vision Goggles, which is information that will come up for a future ballot.**

# L8-7 ASTM E12 - continued

Ellen Carter

## ■ New work:

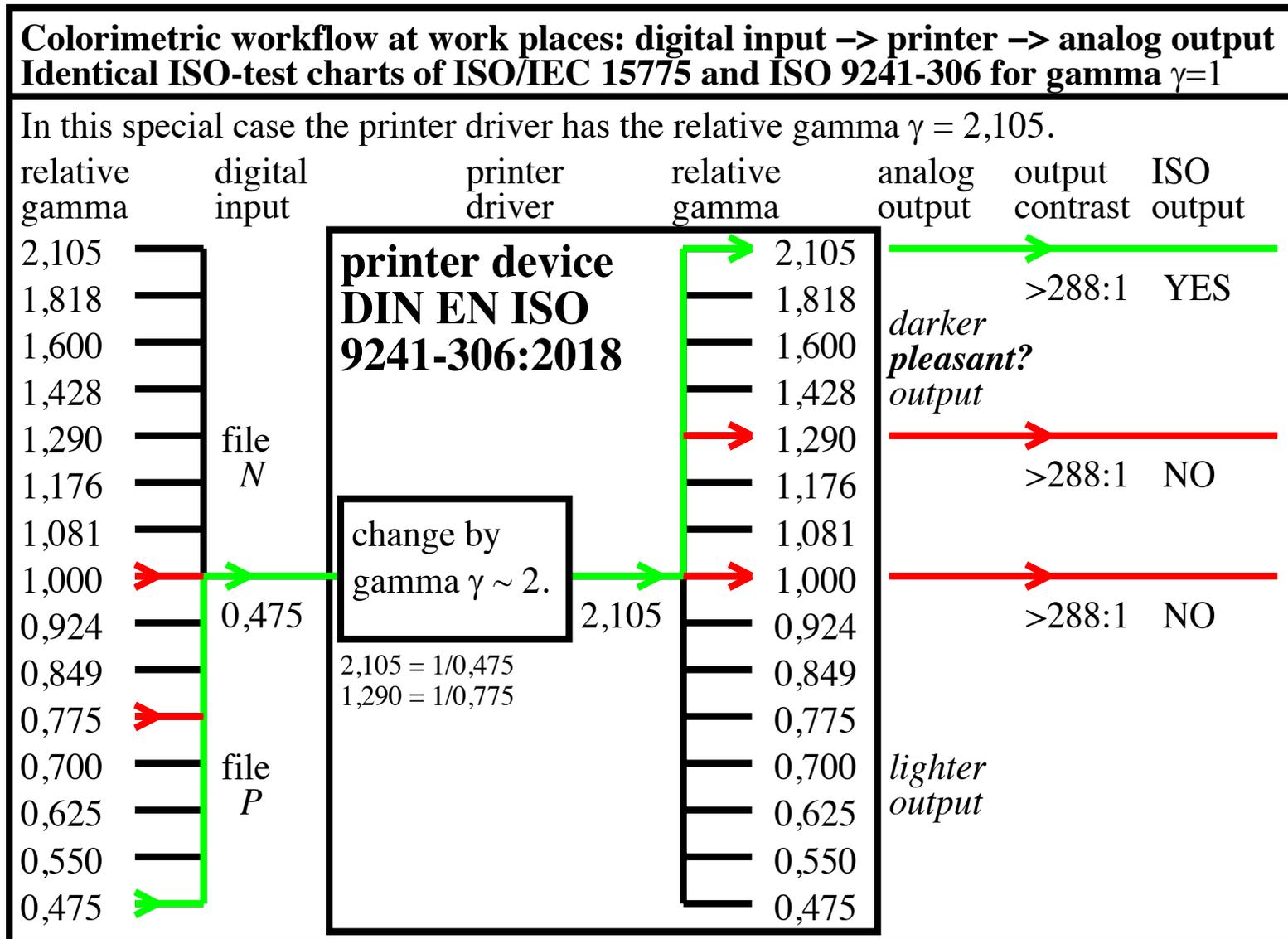
- A new standard is under development led by Hugh Fairman titled “Figure of merit for a distribution of color differences” will be balloted in subcommittee before the next meeting.
- **Next meeting: Feb 5-6, 2020 in Atlanta, Georgia**
  - All interested persons are invited

# L8-8 ISO/IEC/JTC1/SC28: Joint Committee on information technology, SC28: Office Equipment

Klaus Richter

- ISO/IEC JTC1 SC28 *Information Technology -- Office Equipment* had its plenary meeting in 2018 in Zhuhai, CN. • As results of WG4 *Image Quality* and WG5 *Office Colour* the review of ISO/IEC 15775 for colour copiers and ISO/IEC TR 24705 for printers, displays and scanners lead at first to a confirmation. However, instead of 5 countries only 4 marked an equivalent National Standard. Therefore a revision of ISO/IEC 15775 has started. ISO EN 9241-306:2018 for the ergonomic display output uses 3 test charts of ISO/IEC 15775. Equal colour spacing on displays is destroyed by different reflections of the ambient light. However, usually reached by 8 different gamma values, see Table 1.

Table 1: On page with input gamma near 0,5 in the digital *P* file of ISO 9241-306 produces an ISO output with 16 distinguishable steps (minimum requirement).





The hardcopy output of this standard includes *three* of the eight pages. Only for **one** output the 16 achromatic or colour steps are distinguishable, and for the other two only 11 or 13 steps. This leads to the conclusion, that the printer driver or workflow changes the output by a gamma value 2, see Table 1. ISO 9241-306 describes such a case and identifies this property as a goal of the printer manufacturers to sell more toner and ink. In this case the colorant consumption of images increases roughly by 25%.

### **Test your colour device and solutions**

For example the output of the achromatic page (1,8 MB)

<https://standards.iso.org/iso/9241/306/ed-2/AE09/AE09F0PX.PDF>

may **not** allow to distinguish all steps on page 1. If the user wishes to distinguish the 16 steps, users may ask the device manufacturer for **help**. For professional solutions, see

[http://farbe.li.tu-berlin.de/OUTLIN16\\_01.PDF](http://farbe.li.tu-berlin.de/OUTLIN16_01.PDF)

ISO/IEC 15775, ISO/IEC TR 24705, and ISO 9241-306.



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# L8-9 International Color Consortium

**Marc Mahy**

**Motion 19-9:**

- **Max Derhak will be the liaison to ICC instead of Marc Mahy.**



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# ICC Update (June 2019)

Since last Division 8 Meeting (Nov. 2018)



# ICC Activities

- The iccMAX specification was approved as an international standard in February as ISO 20677:2019 which is now available on the ISO web site!
- In process of releasing ICC-2:2019 based on ISO 20677 later this summer
- Working to conduct security risk analysis of scripted calculator element
- Architecture Working Group
  - Internally produced white paper giving guidance on iccMAX PCS connection – in process of formatting for presentation as web pages from [www.color.org](http://www.color.org)
  - Working on multi-tiered core set of Interoperability Conformance Specifications (ICSs) for:
    - Extended Dynamic Range RGB displays/colour spaces
      - Extended Dynamic Range
      - Alternate illuminants
      - Late binding using alternate observers
    - Extended Output printer
    - Colorimetric encoding with alternate observer/illuminance
    - Spectral encoding with alternate observer illuminances
  - iccMAX reference implementation improvements and updates
    - <https://github.com/InternationalColorConsortium/RefIccMAX>



## ICC Activities (Part 2)

- Profile Assessment Working Group
  - Work on profile validation relative to ICS using schema validation based on XML representation of ICC profiles
  - Developing schema for XML representation of ICC profiles
- Display Working Group
  - Discussion of needs for colour management of HDR color images and relationship to HDR displays
  - Participating with AWG on Extended Range RGB ICS
- Graphic Arts Special Interest Group
  - Participating in CMYKOGB standard swatch generation
  - Revision of Perceptual Reference Medium Gamut exchange space profile
  - Working with ISO TC 160 to better support N-Color ICC profiles as input
  - Working to standardize methods of embedding iccMAX profiles in image/file formats



## ICC Meetings

- ICC Meeting held in Feb 2019 in Tel Aviv, Israel
- ICC Meeting held in May 2011 in Bressanone, Italy
- ICC Color Experts Meeting also in May on subject “Colour Management for Wider-Format Printing on Non-Paper Substrates”
  - Presentations can be found at [www.color.org/events/bressanone/program.xalter](http://www.color.org/events/bressanone/program.xalter)
- Next ICC Meeting held in Chiba, Japan on Sept 24-25, 2019

# Next and 2 next Meetings

## [Next]

A short 2<sup>nd</sup> Division Meeting in conjunction with IS&T Twenty-seventh Color and Imaging Conference

Date: Oct 21 or 22 (lunch time)

## Main agenda:

- Confirmation of progress / closure
- Discussion on new TC (HDR/WCG)

**Motion 19-10: To hold the next meeting in Paris.**

## [2 next]

Normal Division meeting

## Option (in conjunction with):

- 5th CIE Symposium on Colour and Visual Appearance, Hong Kong (April 20-25, 2020)
- 28<sup>th</sup> Color and Imaging Conference, TBD (Oct/Nov, 2020)

**Motion 19-11: When to hold the next meeting.**



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# Any Other Business?

# Results of Motions

Motion #	Content	Result
19-1	Approval of DS and DE	Yes
19-2	Giving the deadline to TC8-12 Image and Video Compression Assessment	Yes (with modification)
19-3	1-year extension for TC 8-14	Yes
19-4	Closure of TC 8-15	Yes with one “No”
19-5	Giving the deadline to R8-14 Office Lighting for Imaging	Yes (with modification)
19-6	Giving the deadline to R8-15 A survey on Quality Metrics on Stereoscopic Imaging	Yes (with modification)
19-7	Giving the deadline to R8-16 Material Adjustment Transforms	Yes (with modification)
19-8	Forming a task group to prepare a new JTC proposal with TCC. On HDR/WCG. The members are: Po-Chieh Hung, Youngshin Kwak, Ronnier Luo)	Changed to A/I (no vote)
19-9	Liaison change from Marc Mahy to Max Derhak	Yes
19-10	Next meeting	Yes (to be discussed exact time)
19-11	2 next meeting	Hong Kong

**Group photo**





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# Thank you!

Participants

- PH Po-Chieh Hung (me)
- CB Central Bureau (Host)
- AV Ad de Vaan NL
- AI Akihiro Ito JP
- C cie-aizu JP
- CR Craig Revie GB
- DR Danny Rich US
- EL Eric Luo US
- HK Hideyasu KUNIBA JP
- KM Kenichiro Masaoka (NHK) JP
- K Kiran GB
- MY Masahiro Yamaguchi JP
- MD Max D US
- TA Tara Akhavan CA

CIE Div. 8 meeting, Attendance sheet

Name	Country	Delegate/Member/Observer (circle one)	Relevant TC /DR#	affiliation	E-mail address
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Jon V. Handberg	NO	<input checked="" type="radio"/> D/M/O		NTNU	jon.handberg@ntnu.no
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Hideko Motomura	JP	<input checked="" type="radio"/> D/M/O	TC8-17	Parasonic	hideto@parasonic.com
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Ellen Carter	US	<input checked="" type="radio"/> D/M/O		Color Res & Applications	Ellen.Carter@color.com
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CIE Div. 8 meeting, Attendance sheet

Name	Country	Delegate/Member/Observer (circle one)	Relevant TC /DR#	affiliation	E-mail address
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Changjun Li	China	<input checked="" type="radio"/> D/M/O		Univ. of Sci. & Tech. Beijing	cjli@ustb.edu.cn
Jim Shyu	TW	<input checked="" type="radio"/> D/M/O		Culture University	jshyu@faculty.pc.edu.tw
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Yoko Mizokami	JP	<input checked="" type="radio"/> D/M/O		Chiba University	mizokami@faculty.chiba-u.jp
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