CIE DIV. 8 影像科技發展近況

光與照明國際最新標準與技術發展現況研討會

10. 25. 2019@文大大夏館

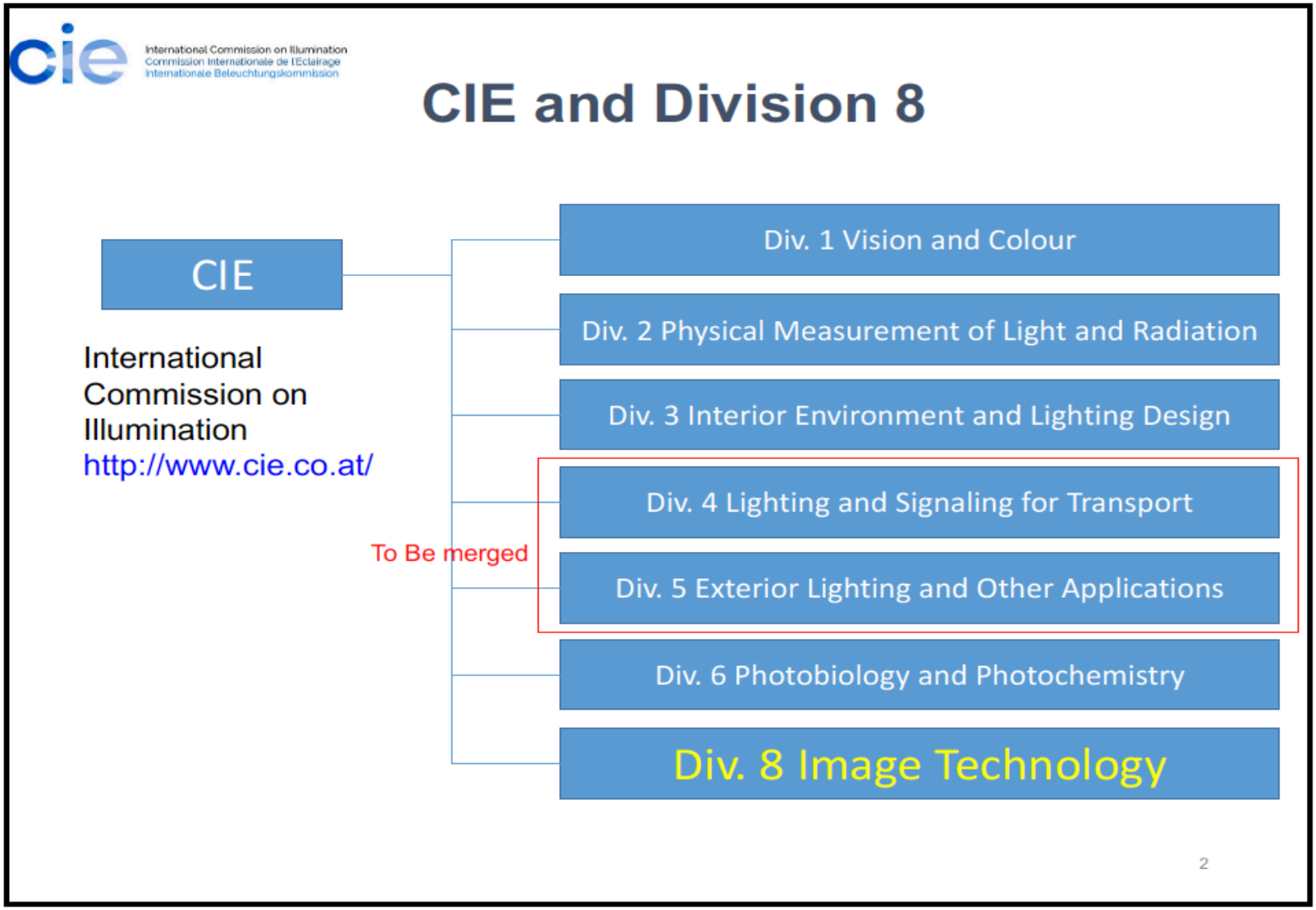
CIE-Taiwan

Div. 8 召集人 徐明景

大綱

- CIE Div. 8 簡介
- 大勢所趨的方向
- 相關工作小組的目前進度與關聯
- 未來的議題
- 結語

CIE 的架構


International Commission on Illumination
Commission Internationale de l'Eclairage
Internationale Beleuchtungskommission
CIE and Division 8
CIE
International Commission on Illumination
http://www.cie.co.at/
To Be merged
Div. 1 Vision and Colour
Div. 2 Physical Measurement of Light and Radiation
Div. 3 Interior Environment and Lighting Design
Div. 4 Lighting and Signaling for Transport
Div. 5 Exterior Lighting and Other Applications
Div. 6 Photobiology and Photochemistry
Div. 8 Image Technology
2

定位- 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.

CIE Div. 8 組織架構

- Chair: Po-Chieh Hung (洪博哲 美國)
- Secretary: Christine Fernandez-Maloigne (法國)
- Editor: Danny Rich (美國)

- CIE-Taiwan Div. 8
  - 召集人
    - 徐明景（文化大學資訊傳播系教授）
  - 副召集人
    - 胡國瑞（台灣科技大學照明與色彩科技研究所助理教授）
  - 執行秘書
    - 孫沛立（台灣科技大學照明與色彩科技研究所副教授）

CIE Div. 8 2019 年會

CIE Division 8: Image Technology
Annual meeting 2019 Minutes
June 21st, 2019
Time: 9:00 am-12:10 pm in local time
Place: Room "Lincoln 5," Washington Marriott Wardman Park,
Washington D.C. U.S.A.
(in conjunction with CIE2019)

各國出席之代表

National committee representatives: 14

Australia	Alp Durmus	In person
Canada	*Wolfgang Heidrich represented by Tara Akhavan*	*by web*
Chinese Taipei	M. James Shyu	In person
France	Christine Fernandez-Maloigne	In person
Germany	Klaus Richter	In person
Hong Kong S.A.R., China	TM Chung represented by Minchen Tommy Wei	In person
Hungary	Krisztián Samu represented by Agnes Urbin	In person
Japan	*Masao Aizu*	*by web*
Netherlands	*Ad de Vaan*	*by web*
New Zealand	Andrew Chalmers represented by Po-Chieh Hung	In person
Norway	Jon Y Hardeberg	In person
South Korea	Jongho Chong represented by Youngshin Kwak	in person
United Kingdom	Kaida Xiao	In person
United States	*Maxim Dermak*	*by web*

最新的動態

- 本週一晚上

Division 8 Mini Meeting

October 21, 2019
Meeting room Salle 116
Sorbonne Université
Campus Pierre & Marie Curie
Centre International de Conférences Sorbonne Université
Barre 44-54, 1er étage
4, Place Jussieu 75005 Paris
&
WebEx

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

Technical Committees

TC#	Title	TC (lead-/co-) chair	Year	Remarks
TC8-12	Image and Video Compression Assessment	Pascal Bourdon (FR)	2007/ 2013	CD submitted
TC8-13	Colour Gamuts for Output Media	Kiran Deshpande (GB)	2013	Extended
TC8-14	Specification of Spatio-Chromatic Complexity	Noël Richard (FR)	2015	Extended
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

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

Reportership

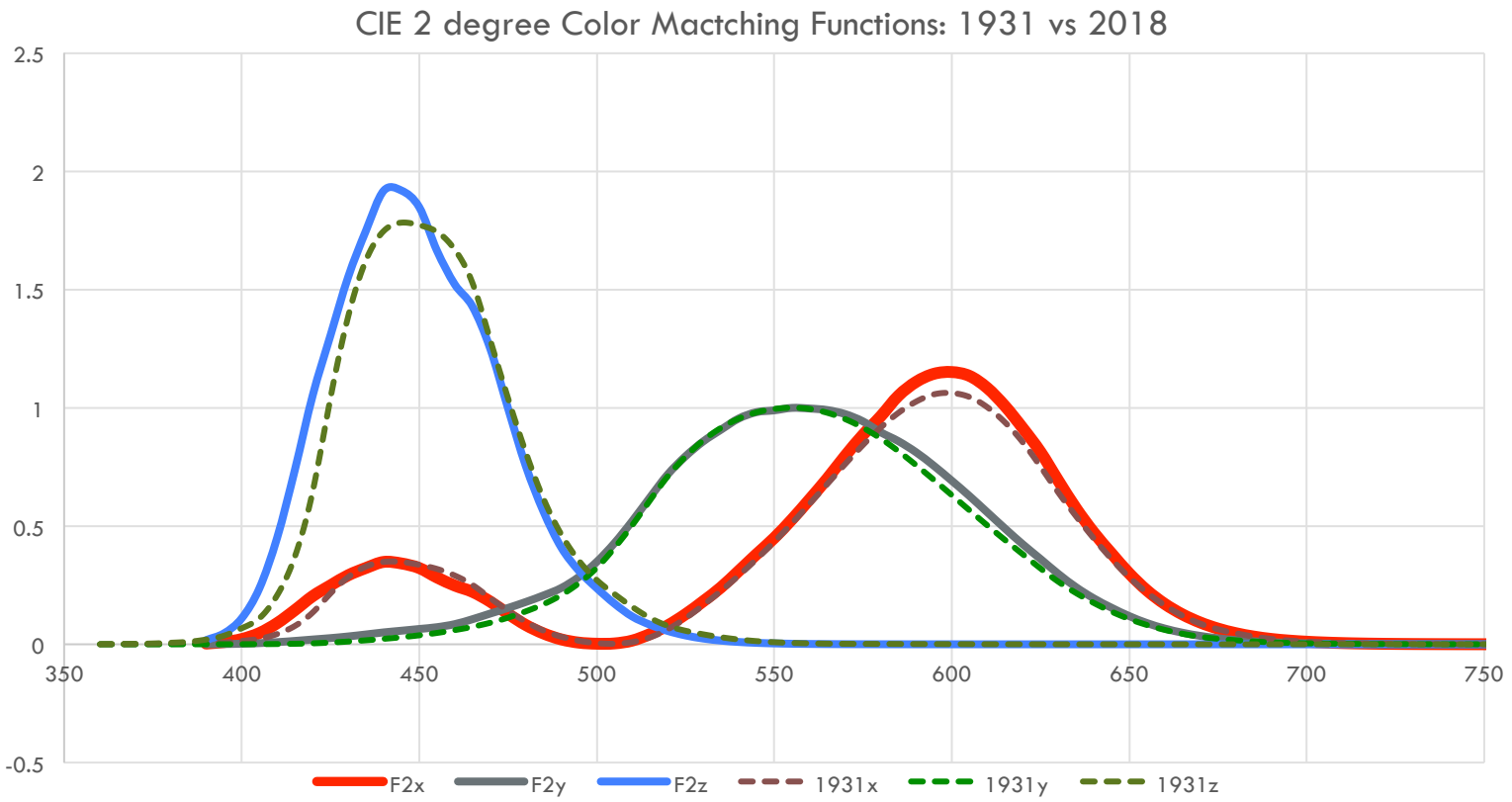
DR#	Title	Reporter	Year	Remarks
R8-14	Office Lighting for Imaging	Yasuki Yamauchi (JP)	2015	TC8-10 follow up
R8-15	A survey on Quality Metrics on Stereoscopic Imaging	Christine Fernandez-Maloigne (FR) Jesus Jaime Moreno (MX) Alessandro Rizzi (IT)	2015	TN is reviewed and voted
R8-16	Material Adjustment 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 and to promote to a new TC

Color Science and Technology的趨勢

- 色匹配函數
  - Revision of human cone fundamentals and color matching functions
- 高動態域影像
  - High-dynamic range imaging
- 3D與虛擬實境
  - Virtual reality and augmented reality
- 影像複製品質
  - Image reproduction quality

1. 色匹配函數的議題

- CIE15: 2018 Colorimetry 4.0, 1931到2018



色匹配函數的運用

- 運算的參數全面更動

$$X = k\sum_{\lambda}\varphi_{\lambda}(\lambda)\,\bar{x}(\lambda)\,\Delta\lambda \qquad X_{10} = k_{10}\sum_{\lambda}\varphi_{\lambda}(\lambda)\,\bar{x}_{10}(\lambda)\,\Delta\lambda$$

$$Y = k\sum_{\lambda}\varphi_{\lambda}(\lambda)\,\bar{y}(\lambda)\,\Delta\lambda \qquad Y_{10} = k_{10}\sum_{\lambda}\varphi_{\lambda}(\lambda)\,\bar{y}_{10}(\lambda)\,\Delta\lambda$$

$$Z = k\sum_{\lambda}\varphi_{\lambda}(\lambda)\,\bar{z}(\lambda)\,\Delta\lambda \qquad Z_{10} = k_{10}\sum_{\lambda}\varphi_{\lambda}(\lambda)\,\bar{z}_{10}(\lambda)\,\Delta\lambda$$

$$L^* = 116\,f(Y/Y_n) - 16$$

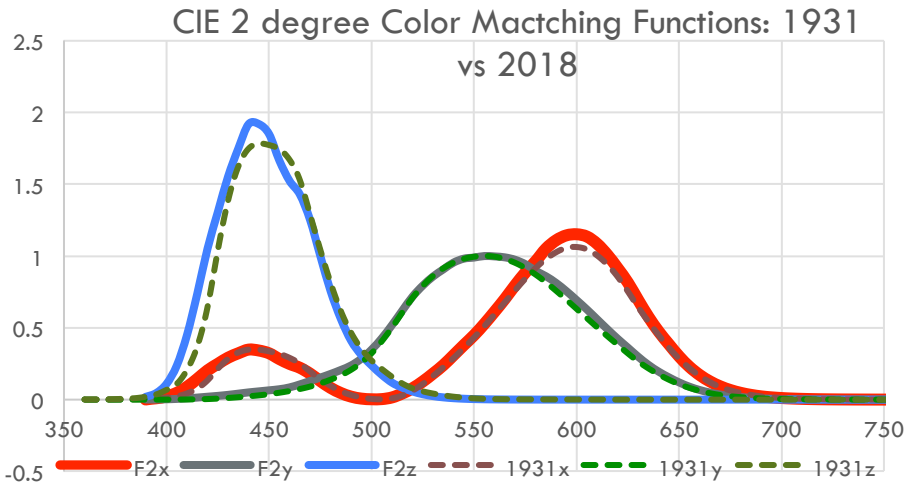
$$a^* = 500\,[f(X/X_n) - f(Y/Y_n)]$$

$$b^* = 200\,[f(Y/Y_n) - f(Z/Z_n)]$$

- 基本色刺激積分時光譜的權重會更動
- 色彩空間參考白的計算亦受影響

變動色匹配函數的潛在影響

- 局部光譜反應如藍色的影像可能有所影響



- 儀器內部校正的更新
  - 不是單純的更新數字 視覺上的差異程度尚需比對
  - 對要求高精密色彩的領域值得留意

變動色匹配函數相關Div. 8 TC

- JTC 10 (D8/D1) - A new colour appearance model for colour management systems: CIECAM16
  - To propose a new Color Appearance model, CIECAM16, to replace the CIECAM02 model for colour management systems
  - 除了新的運算方式 基本的參數應受影響

2. 高動態域影像

- 高動態域可以涵蓋影像內容與顯示媒材
  - 影像內容與相機或手機的HDR 功能相關

- 顯示媒材與顯示器產業息息相關
- 韓國開始在此著墨值得關注
- R8-17: Literature Survey on Uniform Colour Space for Imaging Applications including Wide Colour Gamut and High Dynamic Range Images

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

- **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.
  - **Reporter:** Dr. Youn Jin Kim (KR)
  - **Collaborators:** Dr. M. Safdar (NO), Prof. M. R. Luo (GB), Youngshin Kwak (KR)

- 潛在的影響
  - **on New TC ("HDR/WCG imaging")**
  - HDR顯示器產業的新規格發語權

3. 3D與虛擬實境

- 3D VR AR 方興未艾

- TC8-17 Methods for Evaluating Colour Difference between 3D Colour Objects
- R8-15 A survey on Quality Metrics on Stereoscopic Imaging

- JTC-12 (D1/D2/D8) The measurement of sparkle and graininess.
- JTC-17(D1/D2/D8) Gloss measurement and gloss perception – A framework for the definition and standardization of visual cues to gloss definition and standardization of visual cues to gloss

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

- Chair: 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.
- 8 members and 2 advisors.
- New experiments in Wenzhou University to assess color difference of simple 3D objects under diffused lighting and directional spotlighting.
- Recommendations of experimental protocol and viewing conditions were defined for this TC

4. 影像複製品質

- TC8-12 Image and Video Compression Assessment
- TC8-13 Colour Gamuts for Output Media
- TC8-16 Consistency of colour appearance within a single reproduction medium

TC Status

- **TC8-12: Image and Video Compression Assessment,**
  - Chair: Pascal Bourdon (FR)
  - Technical Report under CIE review

- **TC 8-13: Colour Gamuts for Output Media,**
  - Chair: Kiran Deshpande (GB)
  - **Terms of Reference:** To study and recommend methods for computing and communicating colour gamuts for output colour reproduction media.
  - 本週在巴黎會議進行中

TC 8-16 Consistency of colour reproduction within a single reproduction medium

- Effect of colour reproduction on appearance
- Chair: Craig Revie (GB), Yasushi Yamauchi (JP), 2017
- **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.
- 本週在巴黎會議進行中

總結：趨勢發展的重點

- 新的色匹配函數的影響值得關注
- 顯示器產業在 HDR的技術規格發展中
- 3D與虛擬實境的發展持續進行並擴大中
- 影像品質與色彩管理仍是產業重點

下次CIE Div. 8 會議

- 5th CIE Symposium on Colour and Visua Appearance
- April 20-25, 2020
- Hong Kong

- 謝謝聆聽
- 敬請指教