

CIE TC 8-16  
Consistent Colour Appearance (CCA)  
in a Single Reproduction Medium

Informal Workshop at RIT

1<sup>st</sup> June 2017

W Craig Revie

# Agenda

- 10:00 Introductions, CIE Technical Committee TC8-16 overview (Craig Revie)
- 10:20 Research plan for Yamagata University (Yasuki Yamauchi)
- 10:50 Research plan for NTNU (Greg High)
- 11:20 Research plan for Fogra (Roman Byshko)
- 11:50 Research plan for RIT (Elena Fedorovskaya)
- 12:00 Lunch
- 13:00 Conceptual visual assessment experiment (Craig Revie)
- 13:30 Prior work done by CGATS (Ken Elsman)
- 14:00 Discussion
- 15:00 Tour of Munsell Colour Lab
- 16:00 Close of meeting



A

Increasing gamut size



B

Q1: why do images in set B have a similar appearance whereas the images in set A do not?

Q2: is the degree of similarity of a set of images something that could be measured?

Q3: are all observers in agreement as to when Consistent Colour Appearance is achieved?

# Flexible print (RGB) workflow



Print contract is agreed based on a **reference display image** or **prototype print** from a standard digital printing system



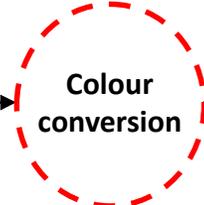
RGB



Printing should use all of the available printing gamut but must retain colour appearance of agreed reference



RGB



Consistent colour appearance?

# CIE TC8-16

**Title:** Consistency of Colour Appearance within a Single Reproduction Medium

**Scope:** 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.

**Chairs:** Craig Revie (GB) & Yasuki Yamauchi (JP)

# CIE TC 8-16 members

Marc Mahy	BE	Gregory High	UK
Claas Bickeboeller	CH	Jan Morovic	UK
Yuan Jiang Ping	CN	Ronnier Luo	UK
Andy Kraushaar	DE	Danny Rich	US
Jürgen Seitz	DE	David McDowell	US
Nikolaus Pfeiffer	DE	Elena A. Fedorovskaya	US
Philipp Tröster	DE	Max Derhak	US
Christine Fernandez-Maloigne	FR	Michael Brill	US
Yasuki Yamauchi (chair)	JP	Po-Chieh Hung	US
Peter Nussbaum	NO	Robert Chung	US
Phil Green	NO	Timothy Baechle	US
Chris Bai	TW		
Craig Revie (chair)	UK	24 members, 10 countries, 4 research sites	

CIE Reportership R8-13 Co x

www.color.org/resources/commonappearance.xalter

**International Color Consortium**  
 MAKING COLOR SEAMLESS BETWEEN DEVICES AND DOCUMENTS

ABOUT ICC RESOURCES INFORMATION MEMBERS GETTING STARTED V4 iccMAX

**ICC: EVENTS:**

- All ICC Events
- 2017
  - Tokyo, April 19-20
  - Prague Graphic Arts Experts' Day, June 29
  - Upcoming ICC Meetings
- 2016
  - 2016 ICC DevCon
  - ICC Meetings, 4-5 Nov San Diego
  - Medical Imaging, 5 Nov San Diego
  - Displays & 3D print, 5-6 May Taipei
  - ICC Meetings - Taipei
  - Print Business Outlook Conference, Mumbai, March 15
  - NPES-ICC Color Management Conference, Jakarta, March 17
- 2015
  - iccMAX Webinar April 22
  - Medical Imaging Experts Day Mar 4
  - Other ICC Medical Imaging meetings
  - NPES-ICC Color Management Conference Feb 12
- ICC Specifications
- Technical Notes
- ICC Resource Center
- ICC Slide Presentation
- ICC Logos

**CIE Reportership R8-13 Common Colour Appearance**

**Reporters:** Craig Revie (Fujifilm), Yasuki Yamauchi (Yamagata University)

This reportership is now closed and a CIE Technical Committee will continue this work. This Technical Committee will follow the CIE rules for confidentiality which does not permit general disclosure of documents. **Should you wish to join the Technical Committee, please contact one of the committee chairs (Craig Revie or Yasuki Yamauchi).**

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When a set of colour reproductions are judged to have a high degree of similarity, they are often said to have a 'Common Colour Appearance'. The degree of similarity is generally judged by subjective assessment. Although this term and similar terms are widely used it has no clear definition and there is currently no standard means of assessing whether a set of colour reproductions has common colour appearance.

For this reportership we plan to describe some example cases where sets of images share a common colour appearance and propose assessment methods that could be used to explore this idea further. One objective is to determine whether common colour appearance is a shared concept across observers and, if so, whether the degree of colour similarity of a set of colour reproductions can be measured objectively.

Images that are colour matched have a 'common colour appearance'. Colour matching, including media-relative colour matching is widely used for print production today but has a serious limitation when reproductions are to be made across a range of printing systems and displays as the reproductions must use the smallest colour gamut of all of the systems. The aim of this project is to explore ways of using the full colour gamut of all systems and at the same time retain common colour appearance.

This work is being done as part of CIE Reportership R8-13 Common Colour Appearance with a view to establishing a CIE Technical Committee to develop suitable objective measures.

A set of **test images** have been proposed for use in research on this topic. A set of **print gamuts** are recommended for testing.

**NTNU Workshop on Consistent Colour Appearance**  
 NTNU in Gjevik, Norway  
 9 January 2017, 9:00am - 12:00am

**Agenda**

Start time	Presentation
14:43	Outline of CIE technical committee (Yasuki Yamauchi)
48:15	Research at NTNU on Consistent colour appearance (Greg High)
01:26:52	Research at Yamagata University (Yasuki Yamauchi)
02:20:27	Methods for measurement of consistent colour appearance (Yuteng Zhu, Zhejiang University)
02:28:13	Psychophysical experiments for determining consistent colour appearance (Shining Ma, Zhejiang University)
02:55:19	Reflections on experiment for media-relative gamut mapping (Theresa Deschner)

Start times indicate the time the presentation started in the **meeting recording**.

**Pre-TC meeting of the CIE Common Colour Appearance Focus Group (R8-13)**  
 Westgate Hotel, San Diego, California in conjunction with IS&T/CIE 24

SEARCH ICC:  GO

Got a question about ICC Profiles or colour management?  Ask Phil...

**ICC: LIVE TOPICS:**

- iccMAX
- New ICC video
- iccMAX Reference Implementation - v2.1.7 released
- Research fund
- ICC Medical Imaging Working Group
- Profile security
- New ICC White Paper on visualisation of colour on medical displays
- Display calibration
- New PRMG-based exchange profile for digital print
- Profiling tools
- ICC Profile Registry
- sRGB profiles
- ICC user forum
- Why join ICC?
- What is an ICC Profile?
- Using CxF for printing spot inks
- What is FOGRA39?
- Consistent colour appearance

CIE - INTERNATIONAL COI x

www.cie.co.at/index.php/Technical+Committees

**TC 8-16: Consistency of Colour Appearance within a Single Reproduction Medium**

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.

Chairs: [Craig Revie](#) (GB) & [Yasuki Yamauchi](#) (JP)

<http://www.cie.co.at/index.php/Technical+Committees>

<http://www.color.org/resources/commonappearance.xalter>

# Key dates

- |                   |   |
|-------------------|---|
| 9 Jan 2017        | NTNU Workshop on Consistent Colour Appearance   |
| 2 Mar 2017        | TC 8-16 "Consistency of Colour Appearance within a Single Reproduction Medium" fulfilled all requirements to be active according to the CIE CoP |
| 24 Apr 2017       | Mini Workshop on Consistent Colour Appearance in Yonezawa (Yamagata University)   |
| <b>1 Jun 2017</b> | <b>RIT Workshop on Consistent Colour Appearance within a single medium (day will include a tour of the Munsell Color Science Lab)</b>           |
| 6 July 2017       | Virtual CIE TC 8-16 inaugural meeting   |
| 11-15 Sep 2017    | Face-to-face meeting in conjunction with IS&T CIC25 in Norway (Lillehammer or Gjøvik)   |
| TBD Jan/Feb 18    | Virtual CIE TC 8-16 meeting to finalise details of evaluation method  |