

Pre-TC meeting

Consistent¹ Colour Appearance

W Craig Revie (GB) and Yasuki Yamauchi (JP)

San Diego, 8th November 2016

¹Also called 'Common Colour Appearance'

Summary

- General problem statement (R8-13 Common Colour Appearance)
- Informal 'Focus Group' on LinkedIn
- Focus for the proposed CIE Technical Committee
- Planned research projects
- Discussion

General problem statement
R8-13 Common Colour Appearance

A



Question 1: why do images in set B have a similar appearance whereas the images in set A do not?

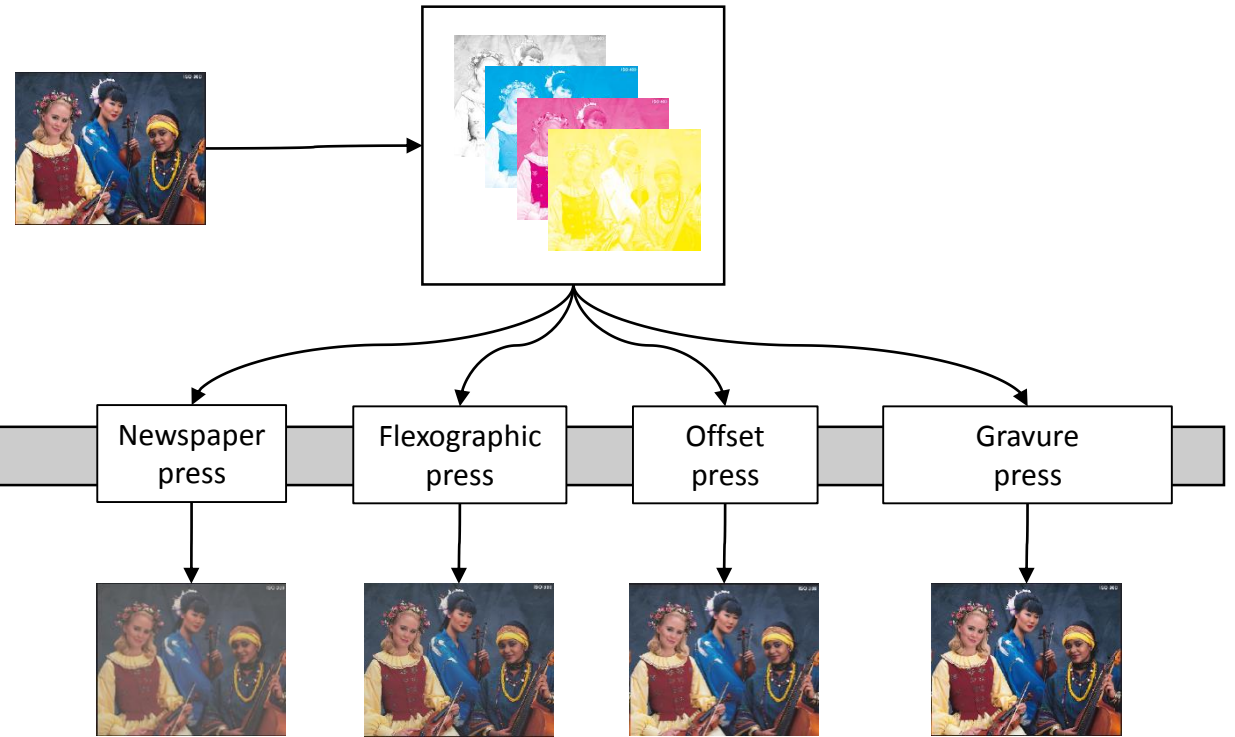
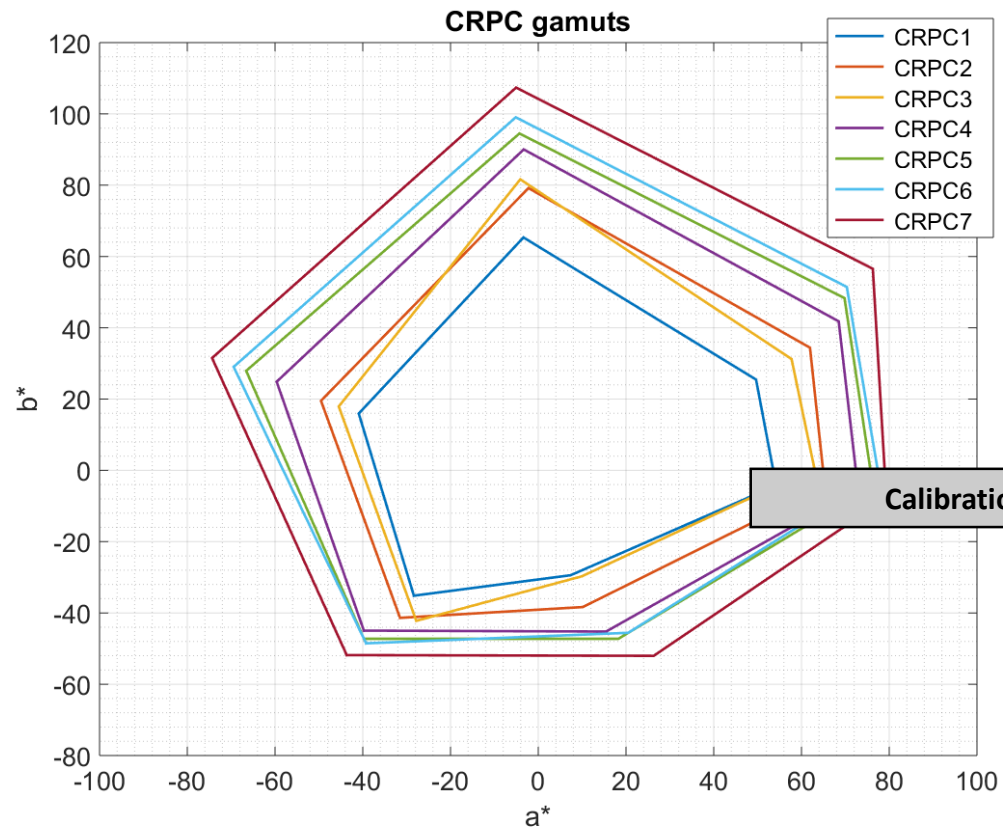
Question 2: Is the degree of similarity of a set of images something that could be measured?

B



Why would such a metric be
useful?

Characterised Reference Printing Conditions (ISO/PAS 15339)



Consistent colour appearance?

Flexible print (RGB) workflow



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



RGB

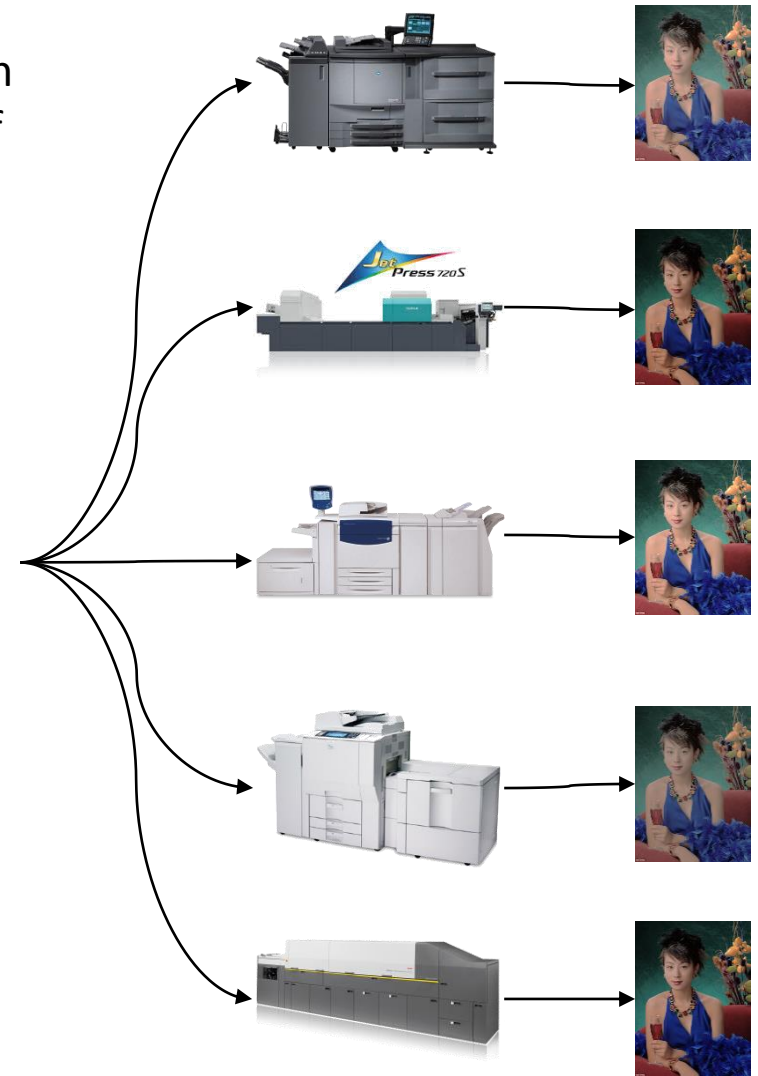


Printing should use all of the available printing gamut but must retain colour appearance of agreed reference



RGB

Colour conversion



Consistent colour appearance?

Brand management



Product packaging



Magazine advert



Newspaper advert



Billboard advert

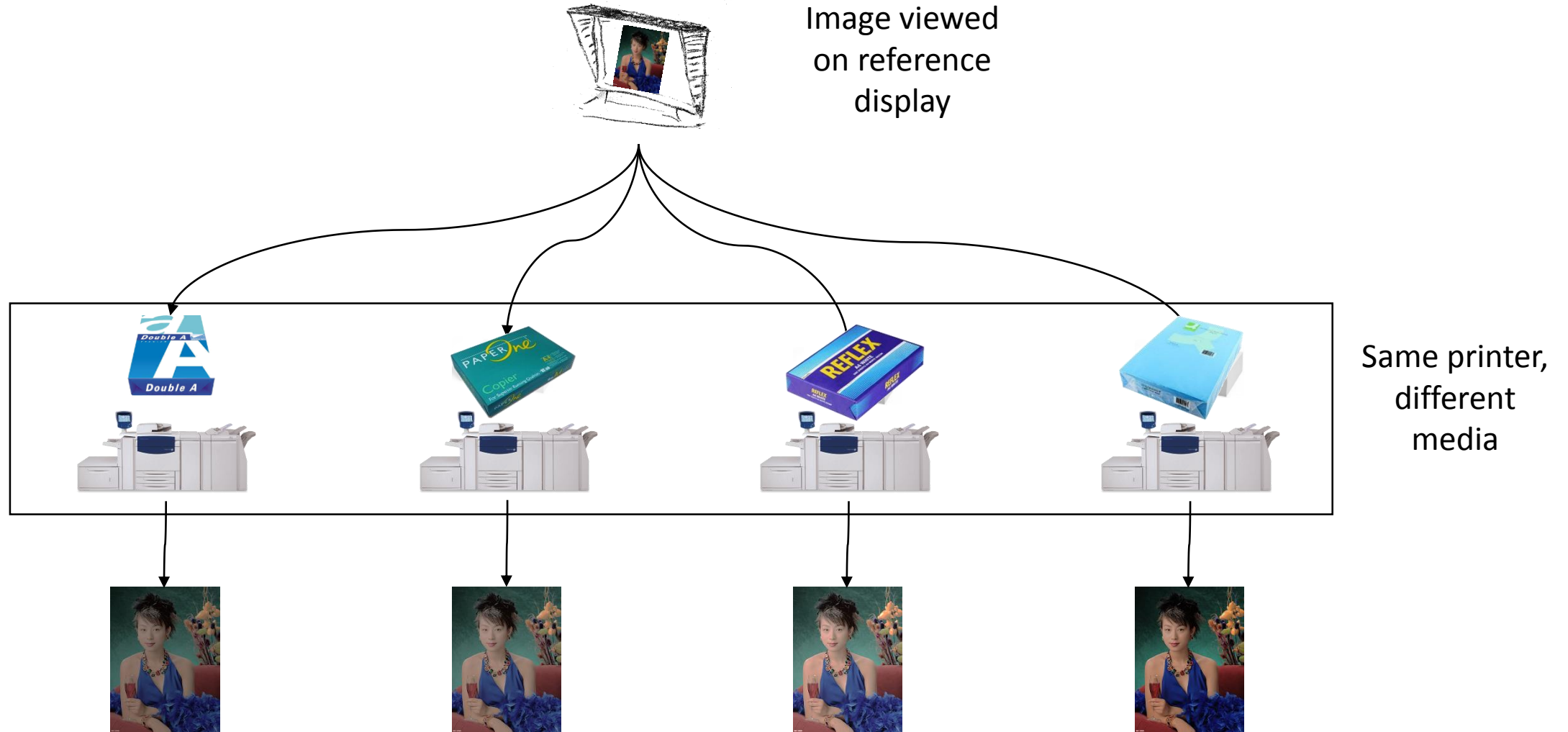


Vehicle wrap



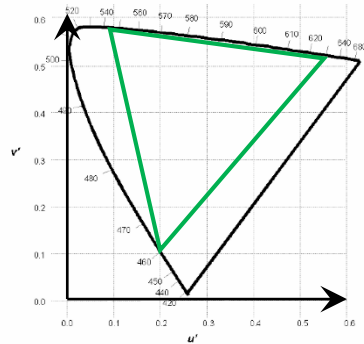
Television / internet

Consistency across different print media



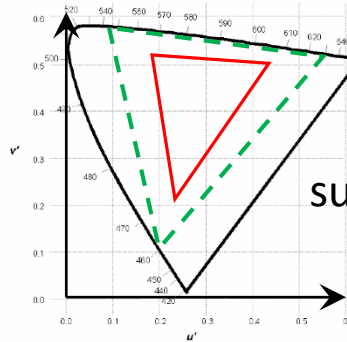
Consistent colour appearance between prints and with display image?

Consistency across displays (UHDTV)

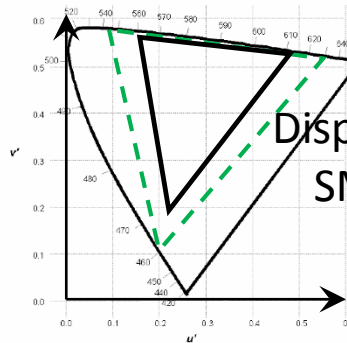


Transmitter uses BT.2020 encoding with very large colour gamut

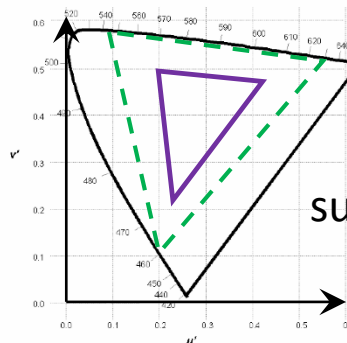
What is needed to achieve consistent colour appearance?



Display A supports BT.709



Display B supports SMPTE DCI-P3



Display C supports sRGB

R8-13 Common Colour Appearance Focus Group on LinkedIn

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
- 2016
- 2016 ICC DevCon
- 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
- Upcoming ICC Meetings
- 2015
- iccMAX Webinar April 22
- Medical Imaging Experts Day Mar 4
- Other ICC Medical Imaging meetings
- NPES-ICC Color Management Conference Feb 12
- 2014
- ICC Developer Conference: iccMAX
- DevCon iccMAX Q&A session
- Video of DevCon iccMAX
- Medical Imaging WG, Nov 2014
- Medical Imaging WG, March 2014

■ ICC Specifications
■ Technical Notes
■ ICC Resource Center
■ ICC Slide Presentation
■ ICC Logos
■ Information on Profiles

CIE Reportership R8-13 Common Colour Appearance

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

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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.

Second Teleconference on Common Colour Appearance
CIE R8-13 Focus Group, Tuesday 23rd August 2016(14:00 GMT)

Agenda

Start time	Presentation
0:00	Introductions and background
10:00	1. Review of the CIE R8-13 report
14:40	2. Proposal for CIE TC on Common Colour Appearance
	Possible research methods or tools
33:10	3. Philipp Tröster: Fogra research plans
40:40	4. Yasuki Yamauchi: Yamagata research plans
51:30	5. Greg High: Gjovik research plans
1:05:00	6. Elena Fedorovskaya/Bob Chung RIT research plans
	John Seymour: See paper below
1:14:45	7. Dave McDowell: Why the CRPCs produce common colour appearance
1:27:15	Jack Holm: explanation of what Jack thinks could be achieved
	Clas Bickeboeller: explanation of what Clas thinks could be achieved
1:33:15	8. Craig Revie Standardisation of assessment method

John Seymour: **Using the ISO 15339 reference print conditions**


Start times indicate the time the presentation started in the **meeting recording**. Individual presentations are available by clicking on the presentation title.

First Teleconference on Common Colour Appearance
CIE R8-13 Focus Group, Monday 7th December 2015 (15:00 GMT)

Agenda

Start time	Presentation
3:24	1. Po-Chieh Hung: Clear definition of Common Colour Appearance and suggested plan of work
12:20	2. Jürgen Seitz: References for color communication
21:40	3. Philipp Tröster: Fogra common colour appearance metric

SEARCH ICC: GO

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

ICC: LIVE TOPICS:

- iccMAX
- iccMAX Reference Implementation - v2.1.5 released
- ICC DevCon2016 program now available
- Profile security
- ICC Medical Imaging Working Group
- New ICC White Paper on visualisation of colour on medical displays
- Research fund
- Display calibration
- New PRMG-based exchange profile for digital print
- Profiling tools
- ICC Profile Registry
- sRGB profiles
- ICC user forum
- Membership benefits
- What is an ICC Profile?
- Using CxP for printing spot inks
- What is FOGRA50?
- Consistent colour appearance

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CIE R8-13 Focus Group CIE R8-13 Common Colour Appearance Focus Group
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Conversations Jobs

 **Craig Revie**
Principal Consultant at Fujifilm/FFEI
OWNER 1w

Teleconference on Common Colour Appearance

The presentations, minutes and meeting recordings from the Common Colour Appearance teleconference held last December are available from the ICC Web Site (see below). The presentations were well focused and I think a number of useful points were rais... [Show more](#)

ABOUT THIS GROUP

Terms of reference:
To study the topic of common colour appearance to determine whether people mean the same thing when they use this term. The report will collect examples of what people refer to as common colour appearance including for displays, pr... [Show more](#)

MEMBERS 36 members

[Invite others](#)

<https://www.linkedin.com/groups/CIE-R8-13-Common-Colour-8349689/about>

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

Focus group members

Chris Smyth	CA
Claas Bickeboeller	CH
Changjun Li	CN
Muhammad Safdar	CN
Yuan Jiang Ping	CN
Andy Kraushaar	DE
Dennis Couzin	DE
Dietmar Fuchs	DE
Jan de Mayer	DE
Jürgen Seitz	DE
Klaus Richter	DE
Michael Gall	DE
Nikolaus Pfeiffer	DE
Philipp Tröster	DE
Christine Fernandez-Maloigne	FR
Yann Neymarc	FR
Akihiro Ito	JP
Hirokazu Kondo	JP
Kenji Kagitani	JP
Makoto Matsuki	JP

Po-Chieh Hung	JP
Yasuki Yamauchi	JP
Yasunari Kishimoto	JP
Dr Choon-Woo Kim	KO
Peter Nussbaum	NO
Phil Green	NO
Chris Bai	TW
Craig Revie	UK
Gregory High	UK
Jan Morovic	UK
Paul Sherfield	UK
Ronnier Luo	UK
Sean Hillman	UK
Tushar Chauhan	UK
Abhijit Sarkar	US
David McDowell	US
David Steinhardt	US
Donald Schroeder	US
Elena A. Fedorovskaya	US
Gerry Gerlach	US

Jack Holm	US
John Seymour	US
Ken Elsmann	US
Mike Rodriguez	US
Raymond Cheydleur	US
Rebecca Gilden	US
Robert Chung	US
Steve Bonoff	US
Veronika Lovell	US

Proposed scope for CIE Technical Committee

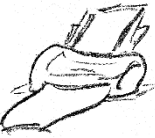
Objective: printed images



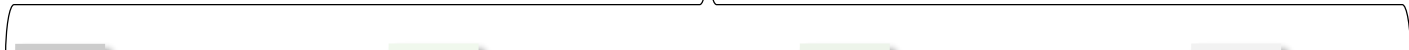
Reference Printer
Includes media, inks and printer configuration



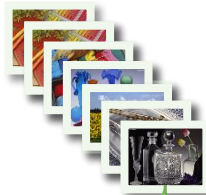
Production Printers
Includes media, inks and printer configuration



Production Prints



Reference Prints

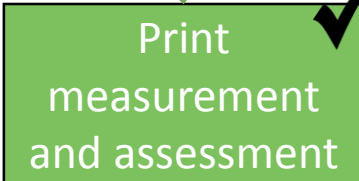


Print Visual Assessment

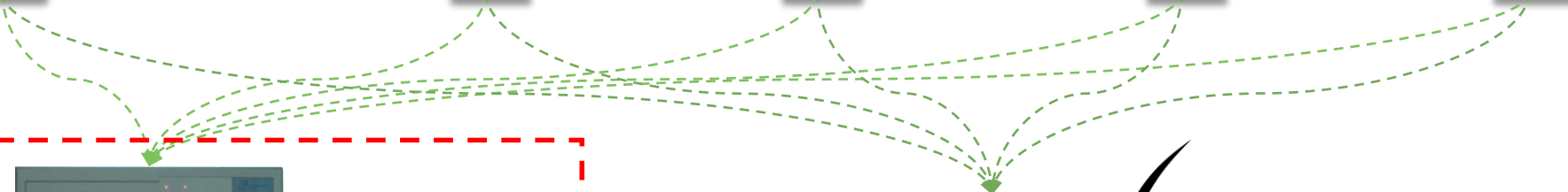


Print Viewing Environment

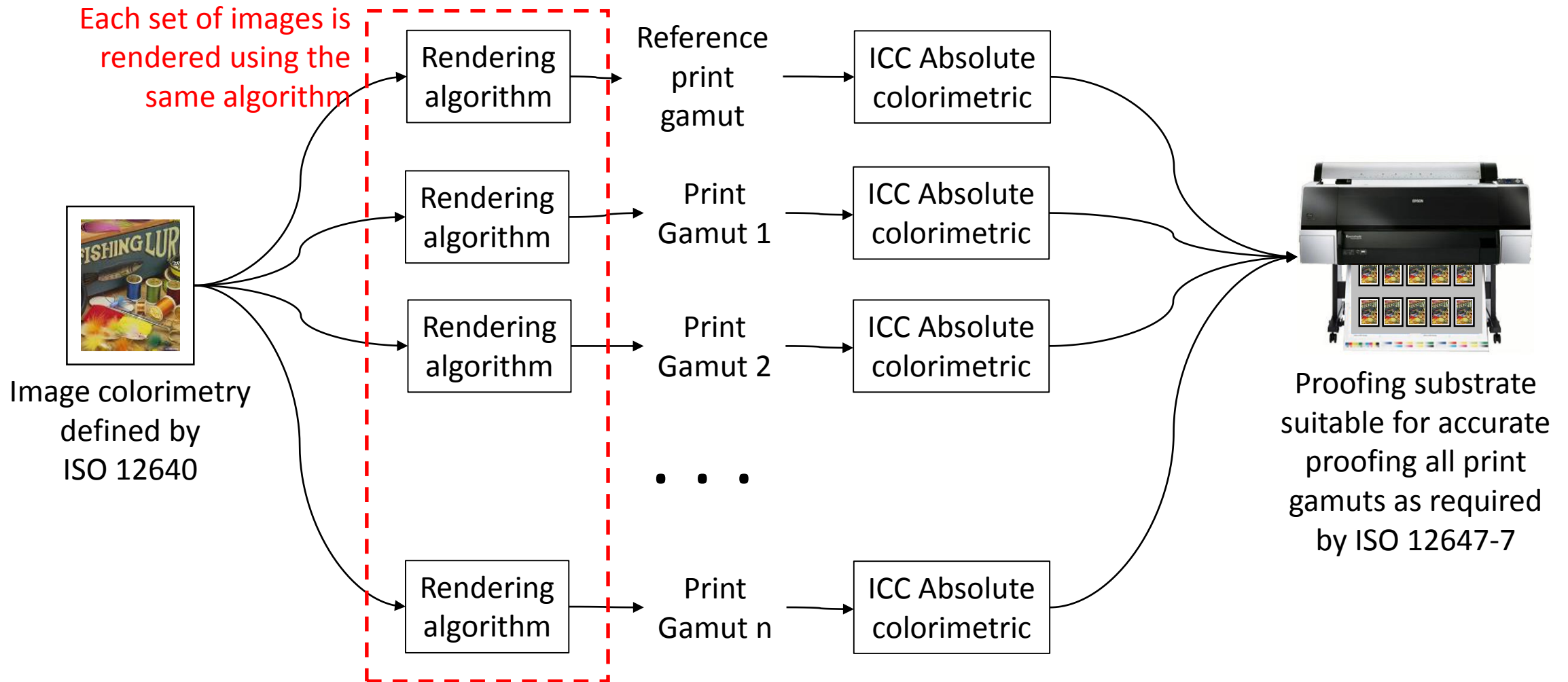
Print measurement and assessment



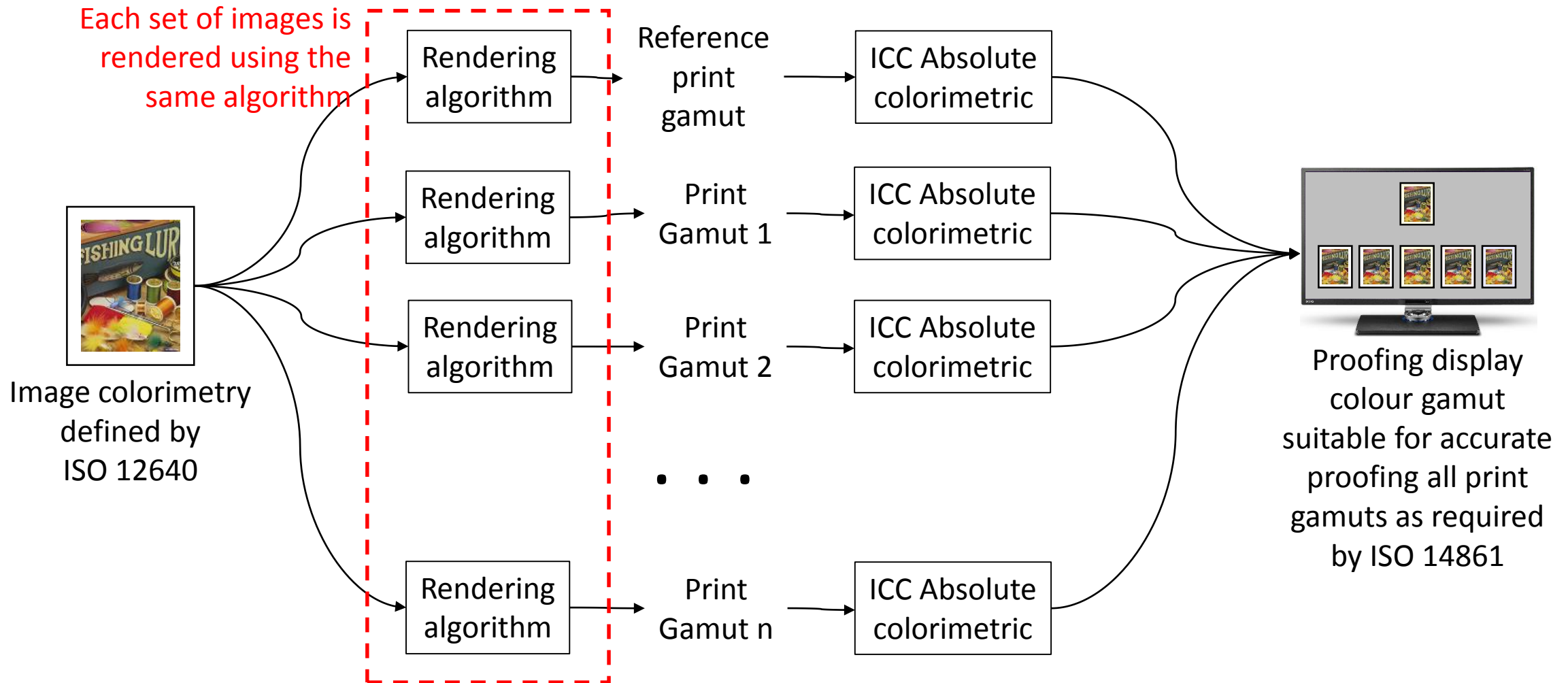
Consistent Colour Appearance Metric



Use of print gamuts (hard copy)



Use of print gamuts (soft copy)



Consistent colour appearance test (a)



Reference

Closeness to reference

B



This set of reproductions has poor consistency of colour appearance but is closer to reference than A

C



This set of reproductions has consistent colour appearance and good closeness to reference

A



This set of reproductions has consistent colour appearance but poor closeness to reference

Fixed viewing environment
ISO 3664:2000 P2

Consistent colour appearance

Planned research projects

New TC proposal

Title: Consistency of colour reproduction within a single reproduction medium

Co-chairs: W Craig Revie (GB), Yasuki Yamauchi (JP)

Terms of Reference (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.

Initial Members

- Claas Bickeboeller (CH)
- Andy Kraushaar (DE)
- Chris Bai (TW)
- Craig Revie (UK)
- David McDowell (US)
- Elena A. Fedorovskaya (US)
- Gregory High (UK)
- Jan Morovic (UK)
- Nikolaus Pfeiffer (DE)
- Phil Green (NO)
- Philipp Tröster (DE)
- Robert Chung (US)
- Ronnier Luo (UK)
- Yasuki Yamauchi (JP)
- Yuan Jiang Ping (CN)

Discussion