

# PERSONAL COLOUR MANAGEMENT FOR DISPLAY DEVICES AND CONSUMER PRODUCTS

## Abstract

The way we perceive colours varies significantly from person to person due to individual differences in the spectral sensitivities of short-, middle-, and long-wavelength cone photoreceptors. These variations can result in noticeable colour mismatches, known as metamerism failures, when viewing displays or consumer products. Addressing these discrepancies offers clear advantages for industry. Some products can be designed to minimise colour mismatches across diverse observers, while others, such as personal displays, can be tailored to optimise colours for individual users.

## Convenor

LUO, Ming Ronnier, University of Leeds (*confirmed*)

This workshop is organized by CIE Division 1.

## Speakers

STOCKMAN, Andrew, University College London (*confirmed*); RIDER, Andrew, University College London (*confirmed*); SONG, Alan, University of Zhejiang (*confirmed*); WEI, Minchen, Hong Kong Polytechnic (*confirmed*).

## Workshop description

Individual differences in the spectral sensitivities of the short-, middle- and long-wavelength cones means that we all see colours differently. These differences can be large enough to cause noticeable colour mismatches on displays and with consumer products. Quantifying and correcting these differences has obvious advantages for industry. Some products may be optimised to reduce the colour mismatches (metamerism failures) seen across different observers, while other products (such as phones or personal displays) may be optimised to enhance the colours seen by the individual end user.

This workshop will delve into key topics, including cone spectral sensitivities, colour matching functions, and individual differences. It will also present insights from research into measuring individual colour vision in 100 observers using the LEDMax multi-spectral trichromator, as well as explore colour discrepancies resulting from differences between people and between displays. The challenges of observer metamerism with laser projectors and OLEDs will also be addressed, alongside discussions on whether it is possible to develop a personal colour measurement system for displays.

The workshop will include a hands-on demonstration of LEDMax and its application, along with software for calculating cone spectral sensitivities for individual observers, providing participants with practical tools and insights into this field.

The workshop will also include an open panel discussion where participants can offer their own insights, participate in the discussion, and ask questions to the presenters.

## References

1, Shi K, Luo M.R, Rider A.T, Song S, Huang T, Stockman A, Individual color matches and cone spectral sensitivities in 100 observers of varying age, *Opt. Express* 32, 48051-48071 (2024)