

Colour Management Notes

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Colour

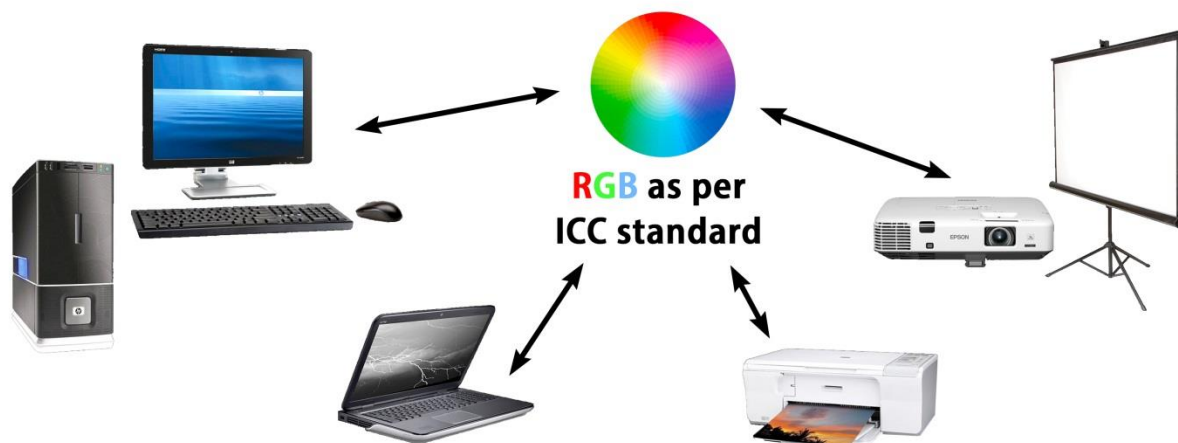
- A perception of the human optical system when stimulated by specific wavelengths of light energy.
- Described by photographers in terms of HSL (Hue-Saturation-Luminance).
- Colour is not 'absolute', and its perception varies with individual optics, ambient light and other viewing conditions, and depends on how our devices capture, display and reproduce colour information.

Devices & Software

- **Input:** cameras, scanners
- **Viewing:** monitors, laptops, projectors, televisions
- **Output:** printers (with various combinations of inks and papers)
- **Software:** operating systems (Windows, Mac), Web Browsers (Windows Explorer, Google Chrome, Safari, Firefox), photo editing and related programs (Adobe Photoshop/Lightroom, Apple Photos, Picasa, ProShow, Nikon Capture NX...)
- **The Challenge:** because colour is not absolute, each device and software represents colours somewhat differently depending on physical & technical features, so our images may look different on different devices.

Colour Management

- A system that relates device-specific colours to a common CIE/ICC standard to make colour representation consistent and predictable across devices.
- **CIE:** French Commission on Illumination 1931 standard colour definitions based on mathematical model of how colours are perceived by humans under specific viewing conditions.
- **ICC:** International Colour Consortium, formed in 1993, now includes 61 leading printing/photograph-industry vendors (Adobe, Apple, Microsoft, Agfa, Kodak, Fuji, Canon, Hewlett-Packard, Lexmark...)
- **Device Profiling:** measuring light & colour emitted/created by our devices using a colorimeter (DataPro Spyder, X-Rite ColorMunki) to create a Colour Profile for each device = a data file that describes its colour behaviour and how it relates to the ICC standard.
- **Device Calibration:** software that uses a device's colour profile to adjust device behaviour so that its input/output conforms to the ICC standard.



Cautionary Notes

- To achieve consistent, predictable colour, **all** devices in the system must be calibrated.
- Devices tend to 'drift' over time and need regular re-calibration.
- Even using calibrated devices, colours may look different because of screen type (matte, glossy, projection), ambient light and other viewing conditions, different colour quality and gamuts of monitors vs printers.
- Some colours are not reproducible by certain devices (rich blue on RGB monitor is not possible with CMYK inks when printed), so can only be represented by a close colour match via a Rendering Intent.

DataColour Spyder (<http://spyder.datacolor.com>)

- **Express:** simple monitor calibrator
- **Pro:** advanced monitor/laptop calibrator
- **Elite:** monitor-laptop-projector calibrator
- **SpyderPRINT:** printer-paper-ink sensor/profiler

Further Reading

- *Color Confidence* by Tim Grey, Wiley Publishing 2008 is the 'bible' of colour management, with excellent general information although the specifics are now slightly out of date.
- Cambridge in Color at www.cambridgeincolour.com and type "color management" into their search bar for a series of helpful articles.
- DataColor at <http://spyder.datacolor.com/how-to-guides> for several articles about colour management and printing.