

## Announcing a course with Charles Poynton

# Colour technology for video designers, artists, and editors

During the last decade, major changes have occurred in professional video production. Computer technology has been embraced; HD has replaced SD; and the CRT display has been superseded. All of these changes have introduced challenges in establishing and maintaining the intended image colours. Computer graphics subsystems (both hardware and software) use different colour coding parameters than video; HD colour space is somewhat different than SD colour space; and emergent displays don't share the same colour physics as CRTs. In the consumer arena, fixed-pixel displays – mainly LCD, but also plasma panels – have become the norm. Production methodology needs to be adapted to the new technology and standards, keeping in mind SD compatibility. In the near future, we can expect IP-based distribution to become increasingly important; attention needs to be paid to colour parameters in video intended for IP transport. It is important for content creators to understand the differences in image presentation between these technologies, both in the studio and in the consumers' premises.

**In this 1-day course,** Charles Poynton will review digital video, HD, and computer graphics image and colour science. He will explain how creative intent is supposed to be preserved, how that goal is often compromised, and how video production artists, editors, and technologists can make the most of the situation. Knowledge of colour science and colour image coding is useful in colour correction; Charles will explain the lift-gamma-gain and 6-way models. He will describe how viewing conditions affect colour appearance, and how faithful image display can be achieved. See the outline overleaf.

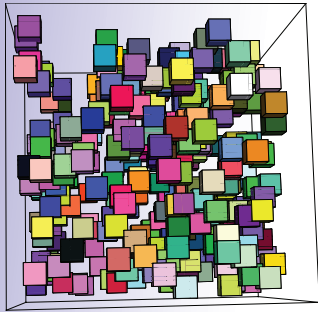
**Who Should Attend:** The attendee should be very familiar with the technical aspects of creation and manipulation of digital imagery and motion sequences. The course is appropriate for people in positions such as these:

- Video graphics designers, artists, composers, colorists, and editors
- Technology managers

Charles Poynton specializes in the physics, mathematics, and engineering of digital colour imaging systems, including HD and digital cinema (D-cinema). He is the author of *Digital Video and HD Algorithms and Interfaces*, recently published in its second edition, and he is a Fellow of the Society of Motion Picture and Television Engineers (SMPTE). Twenty years ago, he chose the number 1080 (as in 1920×1080) for HD and digital cinema standards, thereby establishing "square pixels" for HD. In 1998, he was responsible for introduction of the Adobe RGB (1998) colour space.

### Registration:

EUR 250. To register, contact Katrin Richthofer at HFF Munich, [sft@hff-muc.de](mailto:sft@hff-muc.de), +49 89 68957 9438.



Upcoming in-person workshops, full-day:

**Munich: HFF Munich**

Fri. Mar. 6, 2015

09:30–16:30

**Berlin: DFFB Berlin**

Mon. Mar. 9, 2015

09:30–16:30

Consult [poynton.com/w](http://poynton.com/w) to see announcements of upcoming webinars.

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# COLOUR TECHNOLOGY FOR VIDEO DESIGNERS, ARTISTS, AND EDITORS

## OUTLINE

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| <b>Introduction</b>                     | The big picture: establishing and maintaining creative intent. Lightness and colour terminology. The pixel array; sampling and quantization; contrast, brightness, CONTRAST, and BRIGHTNESS (why the controls are misnamed); Image structure & resolution; sharpness and SHARPNESS; Raster Images in computing; Filtering and sampling; resampling & interpolation   |
| <b>Luminance, luma, and gamma</b>       | Luminance, lightness; gamma in video and computing; appearance phenomena (Hunt, Stevens, and Bartleson/Breneman effects); viewing conditions; visual acuity for lightness and colour; implications for visual design   |
| <b>Introduction to colour science</b>   | Introduction to colour science; Colour spaces: <i>XYZ</i> , <i>LMS</i> , <i>RGB</i> , <i>xyY</i> , <i>HSL</i> , <i>HSB</i> , <i>HSI</i> , <i>CIELAB</i> , <i>CIELUV</i> , and the rest; who so many? Additive and subtractive systems; <i>CMY[K]</i> ; colour temperature; white balance   |
| <b>Still image colour coding</b>        | Vector art (eps, svg); colour standards (sRGB, AdobeRGB, boutique colourspaces, LAB); File formats (bmp, tiff, png, gif, jpeg, psd); historical Mac gamma; colour management systems; ICC profiles; profile embedding  |
| <b>Video colour coding</b>              | BT.601 and BT.709 colour; Constant luminance; Luma and colour differences (loosely, "YUV"); $^{601}Y'_{CB}C_R$ , and $^{709}Y'_{CB}C_R$ ; Chroma subsampling (4:4:4, 4:2:2, 4:1:1, and 4:2:0); Footroom/headroom, studio/full (PC/studio) swing ("full-range"); highlight handling; video processing; historical concerns of composite NTSC; CHROMA and HUE adjustment; "NTSC-safe," "hot" colours, and "broadcast legality"; Gamut alarms, clipping and limiters. |
| <b>Colour correction</b>                | Colour correction: setup/pedestal/lift, lift-gamma-gain, shadows/midtones/highlights, 6-way and 16-way correction  |
| <b>The PC/IT to Studio/CE interface</b> | BT.601 and BT.709 colourspaces; luma coefficients; 219 > 255 level conversion; Quicktime; codecs (e.g., ProRes, DNxHD); four-character codes; metadata   |
| <b>Studio displays</b>                  | Studio reference displays and standards; colour calibration; use of industrial, computer (PC), and consumer displays (e.g., LCD, plasma) in production   |
| <b>Emerging technology</b>              | Wide gamut colour (xvYCC/x.v.Colour); high dynamic range; high-end consumer equipment; home theatre as example of high-quality consumer presentation   |