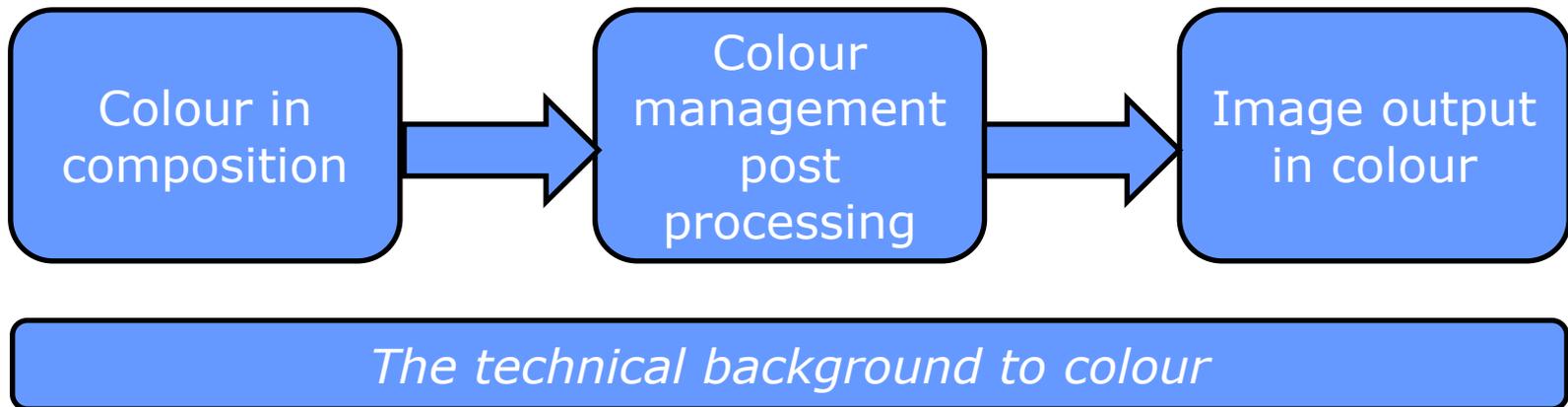


# Obtaining optimum colours in your image

Bob Breach

# TOPICS COVERED TONIGHT



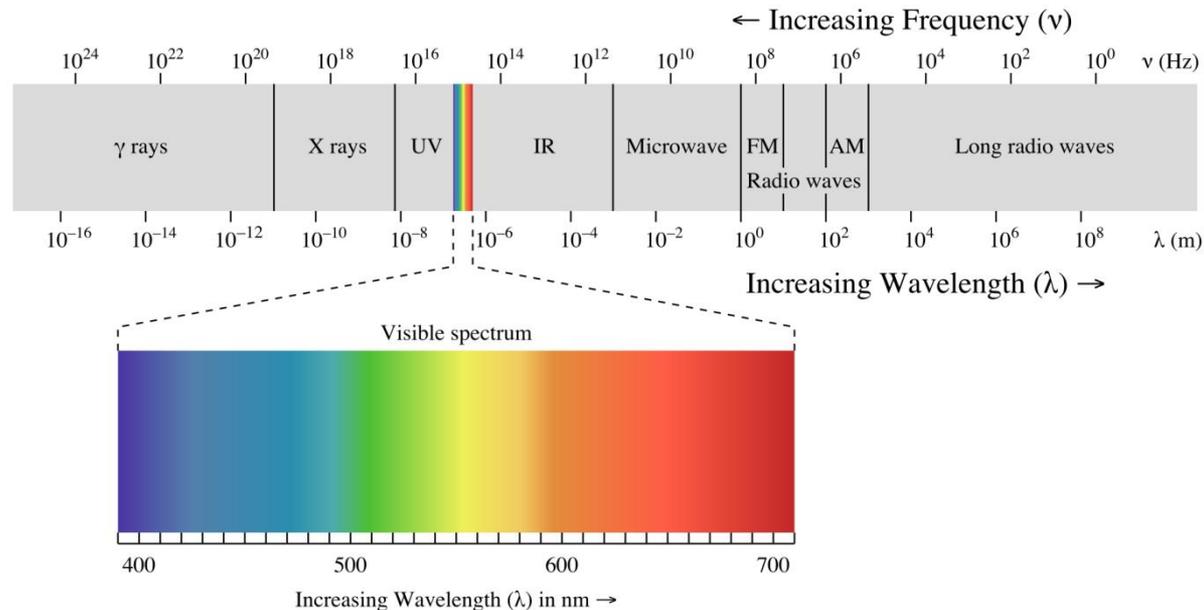
*A lot of the benefits of colour management are lost if you do not have correct calibration of your monitor*



*The technical  
background to  
colour*

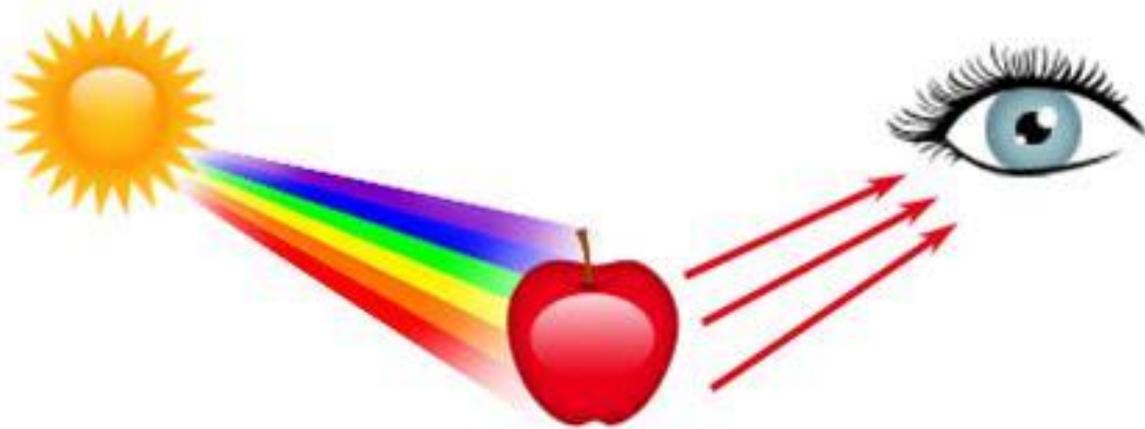
# WHAT IS COLOUR ?

- Light is a form of electromagnetic radiation
- Glass and other materials can split (refract) white light into the different component wavelengths (the spectrum)
- Photographic lenses use combinations of glasses of different refractive indices to enable different colours to focus in one plane (apochromatic)



# HOW DO WE SEE COLOUR?

- We all see and perceive colour differently
  - For example 12- 20% of white males and a much smaller proportion of females suffer from colour blindness, usually mild red/green.
- The colour we see depends on -
  1. Light source
  2. The absorption and reflection of light from an object
  3. The observer – human eye, digital camera
- The light source may have a continuous spectrum (e.g. sunlight) or a restricted spectrum (e.g. coloured sodium street light)
- Under normal light we “see” an object as “red” because it adsorbs other wavelengths and reflects only the red part of the spectrum



# COLOUR TEMPERATURE

- Continuous light can vary in the predominant wavelength or colour and this is defined in terms of “colour temperature”
- Measured in degrees Kelvin (K)
  - Tungsten lamp – 2800 K
  - Sunset – 3000 K
  - Electronic flash/average noon daylight – 5500 K
  - Noon sunlight/international white light – 6500 K
  - Overcast sky – 7000 K
  - Clear blue sky – 10000 K
- In photography this is termed the coolness or warmth of an image



# COLOUR CODING

- To help designers/web managers, colours are now coded to ensure colour consistency
- Very complex but in essence there are two main systems
- RGB
  - An RGB color value is specified with: `rgb( RED , GREEN , BLUE )` where each parameter defines the intensity of the colour as a number between 0 and 255.
  - For example, `rgb(0,0,255)` is blue, because the blue parameter is set to its highest value (255) and the others are set to 0.
- *Hexadecimal*
  - *A hexadecimal color is specified with: #RRGGBB.*
  - *RR (red), GG (green) and BB (blue) are hexadecimal number between 00 and FF specifying the intensity of the colour.*
  - *For example, #0000FF is displayed as blue, because the blue component is set to its highest value (FF) and the others are set to 00.*

# COLOUR CODE EXAMPLE



**Maya blue**

#7CB9E8 Save

rgb(124,185,232) Open

rgb(0.49,0.73,0.91)

CMYK( 0.4655, 0.2026, 0, 0.0902)

Hue: 206, Saturation: 47, Value: 91

The benefit is that if you know the colour code you can accurately reproduce that exact colour



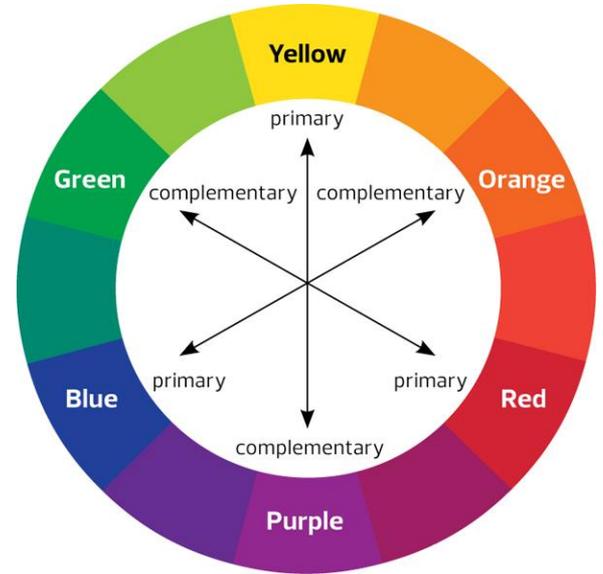
# Colour in composition

# COLOUR GIVES MOOD TO AN IMAGE

- Think about what mood you want to convey with your image
  - Bold and dramatic
  - Soft and subdued
  - Harmonious or vibrant
- Some of this can be best created at the time of image capture
  - Train yourself to see the “right colour balance” when looking for shots
  - Use colour as a compositional tool
- But can also change to some extent in post production

# COLOUR BALANCE

- Understand the colour wheel
- Complementary colours provide strong contrast
  - Do not have to be the same dominance in the picture
  - If equal amounts then can create tension
  - Often better if you make one of the colours less prominent than the other



- Adjacent colours are harmonious
  - Use to provide soft and restful pictures
  - Can keep the eye of the viewer looking within the picture



# COLOUR SCHEME DESIGNER

The screenshot displays the Color Scheme Designer (CSD) interface. At the top, it says "Color Scheme Designer is now Paletton! Check out [Paletton.com](http://Paletton.com)". The main header includes "Color Scheme Designer" and the "paletton" logo. Below the header, there are navigation buttons: "Undo", "Redo", "Random", "Colorblind", "Color space", "Export", and "Help". A copyright notice reads "2002-2010 © Petr Stanicek • v3.51 • [Blog & News](#)".

The interface features a color wheel on the left with "Hue: 0°" and "opposite" labels. The wheel is divided into "warm" and "cold" regions. Below the wheel, the RGB values are shown: "R: 100 %", "G: 0 %", "B: 0 %", and "RGB: FF0000".

On the right, there is a color palette with four swatches: a bright red, a medium red, a light red, and a dark red. Below the palette, the "Scheme ID" is "0011Tw0w0w0w0". A button on the far right says "CREATE FREE STUNNING WEBSITES GO >>".

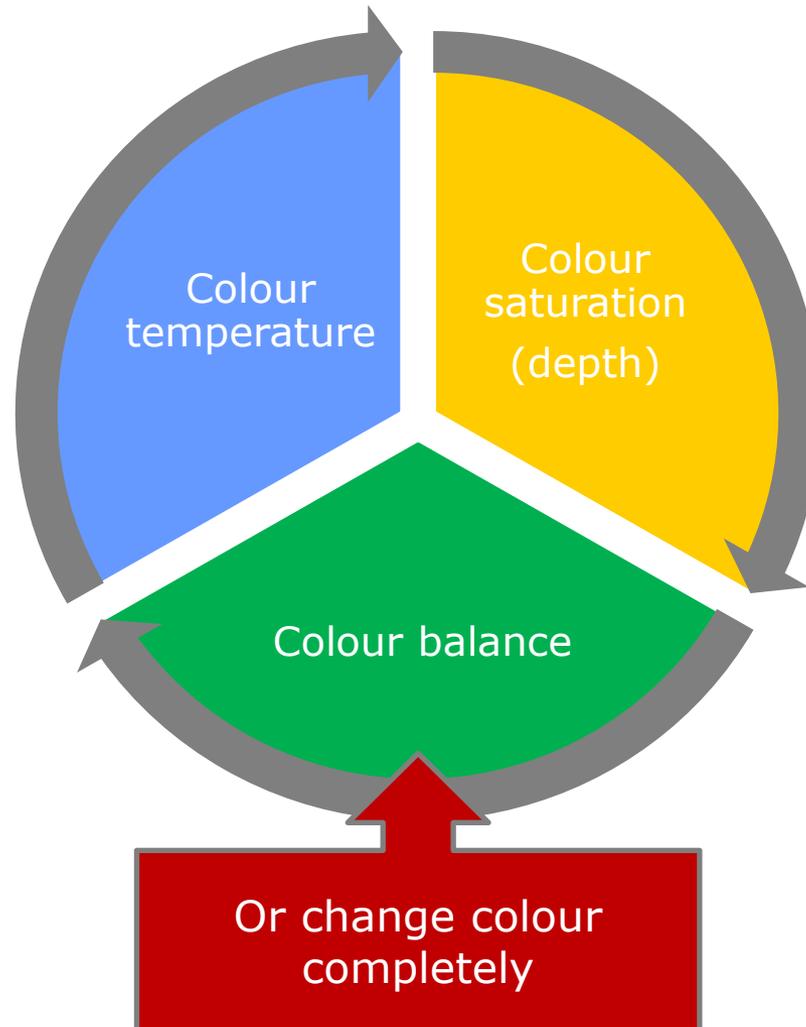
<https://colorschemedesigner.com/csd-3.5/>



## Colour management post processing

**Note : Modifying colour is much easier and better on raw files  
and indeed some features are only really possible using raw**

# THE MAIN ELEMENTS OF COLOUR MANAGEMENT



# MANAGING COLOUR TEMPERATURE

## White balance

- The time of day (with natural light) or type of artificial lighting (indoors) can impact on the overall warmth or tone of an image
- On a digital camera you can:
  - Set an appropriate colour (white) balance appropriate to the conditions (shade/daylight etc.)
  - Leave camera on fixed (e.g. 5200 K setting)
  - Leave camera on auto white balance
- Auto white balance usually easiest unless for example you want to take dramatic sunsets or very accurate colour
- Where necessary in post processing for raw files you can:
  - Use the temperature slider to adjust colour temperature
  - Or use white balance colour picker to get neutral tones



# ACCURATE WHITE BALANCE



- For really accurate colour (white) balance e.g. for product shots or at weddings you may need to use a “grey card”
- This is a neutral coloured card which you include in a trial shot
- In post processing you can then bulk edit the white balance for all other images taken under the same conditions



Grey card in  
use

# AN EXAMPLE



- Depending on the raw software you use you should have a “white balance” eye drop picker
- Use this to pick on a suitable neutral tone in the image and check the result.
- May have to choose different points in the image to get right
- Can also use to change the “time of day” or to improve sunsets!

What time of day was this taken?



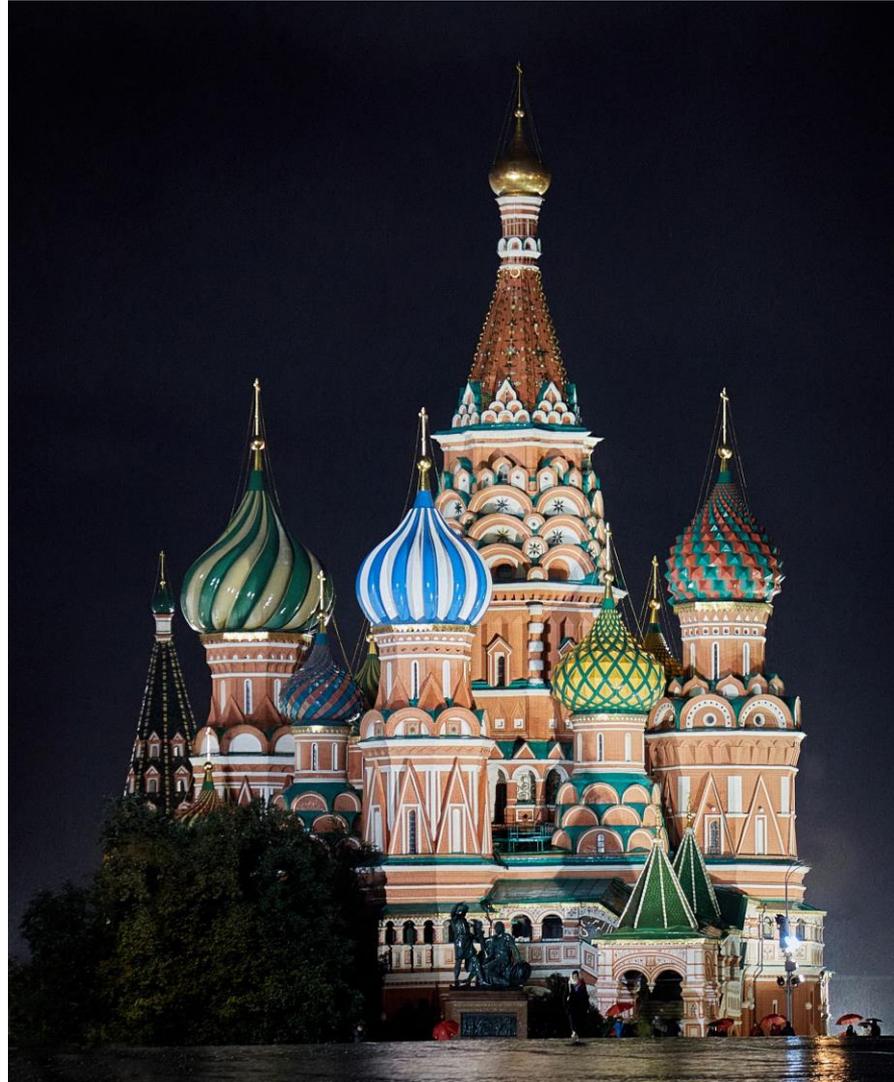


Demonstration

# MANAGING COLOUR BALANCE

- Depending on your software you can significantly alter the colour balance post processing
- This can also help to correct colour casts derived from point of capture
- Use with care or you can get some weird effects (unless this is what you wish!)
- Some software has special tools for this
- In PS use new layer and adjust colour tone through
  - single colour tone
  - colour balance tool
  - hue/saturation layer tool
  - gradient mapping (maps grey tones and then adds colour)
- You can then moderate the extent of the changed colour tone by blending between the two layers or use different blend modes

# AN EXAMPLE





Demonstration

# MANAGING COLOUR DEPTH

- The depth of colour (saturation) can significantly impact on how an image is perceived
- High levels of saturation are bold and punchy
- Low levels of saturation can provide a soft subtle image
- Sometimes just a little colour can be used to emphasise small tonal differences within the image
- Complete desaturation (a monochrome image) works best when there are significant tonal differences within the image
- Use the saturation slider to adjust the depth of colour
- Contrast (+/-) can also emphasise the degree of saturation
- Can also just adjust a part of the image using layer masks

# AN EXAMPLE



Desaturate whole or part of image to give different moods



Demonstration

# CHANGING COLOUR !

- It is also possible to selectively change colours
- Use image/adjustment/replace colour
  - Use colour picker to choose colour to be replaced
  - Use fuzziness slider to alter exact colour range in image
  - Choose replacement colour
  - Can do on separate layer if you wish
- Usually works best when certain key objects within the image have a distinct colour



Blue tomatoes  
anyone ???



Demonstration



Image output  
in colour

# COLOUR IMAGE OUTPUT

Each output format has different requirements

High quality  
jpegs or TIFFS



Large prints for  
competition or  
display

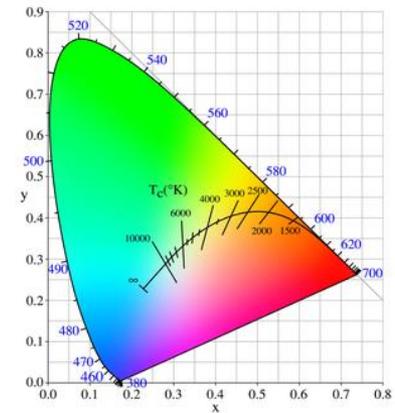
Jpegs at screen  
resolution



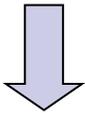
Projected  
image/slide show

# ACCURATE COLOUR PRINTS REQUIRE CORRECT PROFILES

- The underlying basis of colour profiling is very complex, but in practice is easy to manage
- Each piece of kit can reproduce colour slightly differently
- Ideally camera, monitor, printer and each paper type, and projector should be colour calibrated so that they match
- Thus minimum colour matching necessary
  - Monitor
    - Borrow/buy calibration equipment
    - Make sure monitor position and lighting good
  - Printer/paper
    - Can usually get free “standard” profiles
    - Better to use specialist service
- Make sure the profiles are set up properly in your software and changed when you use different paper



# COLOUR ICC PROFILES



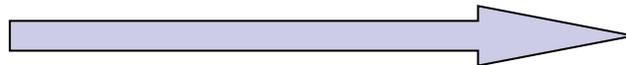
Monitor profile sets  
"standard" colour  
reproduction

*(but will be influenced by  
lighting and monitor position)*

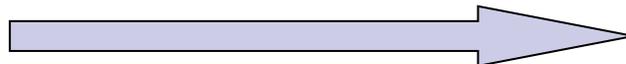
*Print profile 1*



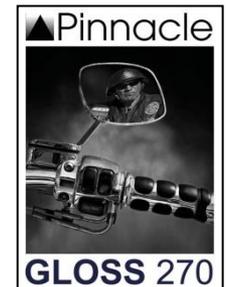
Print profile "matches" monitor  
colour to printer/paper combination



*Print profile 2*



*Projector profile*





Now for some questions,  
discussion

And if you really want to boggle yourself with  
technical details Spyder e-books are available