

Digital Photography 101

Presented to the SMCCC

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Agenda – The Toolbox

- Intro
- The toolbox
 - The building blocks: The Big 3
 - ISO, Shutter Speed, f-stop
 - Wide vs Telephoto
 - FX vs DX vs 4/3rds vs iPod...
 - Auto Exposure modes
 - Point, Center Weighted, 3D Matrix, Advanced...
 - Auto Focus modes
 - Single, Continuous, Live view, Advanced

Agenda – (WC)²

- What can we control
 - Composition
 - Exposure
 - DoF
 - Motion
 - **THE LIGHT**

Intro

- Shoot what you love
- It's not just about the light....
- What's your subject?

- Digital is rapidly changing the way we shoot pictures.

Initial Thoughts

- Digital Photography is just starting to open unlimited potential for anyone wanting to better express themselves through photographs.
 - The ability to share pictures in real time around the world with friends/family or report breaking news....
 - The image quality from our iPhones is starting to rival what a \$1000 film camera a generation ago could produce.
 - Digital IQ is now better than 2 ¼ x 2 ¼ film.
 - The cost of a bit is much less than film. (I shot 1853 images in one day last January and I've shot over 10,500 since January 1)
 - Post processing, video, HDR,

And the most important break through of them all:

The Tools

- Definition “STOP”
 - Humans tend to have logarithmic senses, to see / hear something as notably brighter / louder it needs to be twice as bright / loud:
 - For photography - light is measured in “STOPS”, for sound in decibels.
- Definition “Dynamic Range”
 - The number of stops from the brightest point in a scene to the darkest point in the scene.

The Tools

- Definition “DoF”
 - That range of a picture in final presentation that appears to be in acceptable focus at a normal viewing distance. It’s controlled by:
 - F-stop, focal length of the lens, distance to the subject, sensor size
- Definition “Bokeh”
 - The characteristics of the out of focus areas in the image

The Tools - ISO

- ISO
 - How sensitive is the camera sensor,
 - It is measured linearly, e.g. to increase one stop it is doubled ISO 100 – ISO 200
 - As ISO increases the amount of noise goes up, and the range of sensitivity to goes down.
 - The new Nikon D500 has an advertised range of ISO 50 – ISO 1,640,000 - My original D70 was only good to about ISO 400.

The Tools – Shutter Speed

- The other control we have to effect exposure is shutter speed. Shutter speed is linear so to reduce the light by one stop the shutter speed needs to be reduced by a half. (eg 1/100s to 1/200ths)
- Shutter speed can be used to either stop motion or to allow for desired blurring to occur.
 - There are a lot of recipes out there for the right shutter speed, **all dependent on the distance to the subject and how fast it's moving.**
- Shutter speed is also important to consider when hand holding a shot.
 - Historical gouge for hand holding a camera is 1/focal length (ie for a 50mm lens, 1/50th of a second) **see note above.**
 - Good shooting technique can make a huge difference (OBTW so can tripods)
 - VR/IS systems are designed to improve this, some claiming up to 4 stops, age tends to be a counter factor ;o)

The Tools - f/Stop

- “f-stop” is a function of the lens’ aperture diameter, and the focal length of the lens.
- To increase the light one stop the aperture has to be opened 1.4 x the current value e.g. f/5.6 to f/4.0
- As the aperture is decreased the Depth of Field increases
- As the aperture is decreased diffraction increases and degrades image quality.

The Tools - Focal Length

- With a single camera the only way to change focal length is to change the lens
 - Wide angle is considered less than 35mm (on a full frame 35mm camera)
 - Normal is considered 35-85mm
 - Telephoto is anything over 85mm
- Changing from full frame to cropped frame changes the “Effective” focal length
 - Nikon by 1.5, Canon by 1.6
- An iPhone has an “effective” focal length of 28mm

The Tools – Exposure Meters

- Exposure meters (light meters) are designed to measure the light conditions and display / report the settings required to properly expose an average gray.
- There are usually several different modes in current cameras.
 - Point ●
 - Center Weighted (●)
 - Matrix, Live View, phase detect...

The Tools – Exposure Meters cont.

- Additional Tools for accurate metering
 - Blinkies - highlights any portion of the image that is overexposed in two channels
 - Histogram – Total combined and by channel, very good for detecting red channel issues.
- E/V button - changes the value the meter reports / uses.
 - Don't forget to change it back.

Operating Modes - Exposure

- “P” Program, automatically adjusts aperture and shutter speed according to a preplanned schedule
- “S” Shutter, adjusts the aperture as required to maintain the set shutter speed, good for action shots
- “A” Aperture, adjusts the shutter speed to maintain aperture setting, landscape, tripod..
- “M” Manual,

Operating Modes – Auto-ISO

- “A”: Adjusts the ISO when the shutter speed drops below set value default is usually $1/\text{focal length}$ of the lens.
- “S”: Adjusts the ISO when the f-stop exceeds lens capability e.g. $> f/2.8$
- “M”: Adjusts to ISO to enable set SS an f-stop. Maybe be configurable in the menu options.

Operating Modes - AutoFocus

- Autofocus single, press the shutter down half way and the camera focuses on what's inside the bracket, then stops adjusting.
- Autofocus continuous, press the shutter down half way and the camera continuously attempts to keep what's in the bracket in focus
- There are multiple advanced modes, check your manual.
- Manual, obvious

102 Topics

- RAW vs JPG
 - WB
 - Noise Reduction
 - Contrast / Sharpening
- Flash
 - Fill vs Full
 - Off camera
- Post Processing

What Can We Control

- Composition
 - Still making art, leading lines, S-curves, rule of thirds
 - Get closer
 - Telephoto vs physically walking up closer
 - Watch the Background
 - Bokeh vs f/64 club
- Exposure

Every Picture is a Trade

Hands On Workshop

- Time / Location

What's next

Go out and experiment!,

Go take a thousand pictures in "P" and only focus on composition / light

Zoom in, Get closer,

What does this scene look like if I open it up even more

Then go take a thousand pictures in "A"

What lens combinations give you the best Bokeh

What's the minimum f-stop for "infinite" focus with a wide angle lens

Watch the blinkies and use the EV button.

Shoot some very red things, sunsets, roses....

WE'LL TALK ABOUT RAW NEXT TIME