

NIGHT PHOTOGRAPHY

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WHY NIGHT OR LOW-LIGHT PHOTOGRAPHY

- Photography allows you to capture or create.
 - Night or low-light photography opens the creative part wide open.
 - What makes a good night photo? The interaction between the light and the environment.
 - The human eye has two types of receptors:
 - Rods (120 million)
 - Cones (7 million)
 - Rods are not sensitive to color but are responsible for our scotopic, or night, vision.
 - Cameras are sensitive to color regardless of light intensity.
 - The camera will record details/color the human eye simply can't see in low light.
 - Low light means the number of photons per second is low.
 - Exposure times must then be increased to boost the signal-to-noise ratio and thus reduce the visible noise.
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GEAR CONSIDERATIONS

- Camera
 - Manual control is necessary
 - Nikon good at high ISO and dynamic range
 - Canon good live-view performance
 - Sony good at high ISO & pretty good live-view
 - But short battery life
 - 1in sensor point-and-shoots need a bulb feature and usually top out at around 2-3min
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GEAR CONSIDERATIONS

- Lens
 - Wide-angle, particularly for astrophotography
 - Popular lens: 18-21mm
 - Any lens without an aspherical lens element will exhibit coma aberration at image edges when wide open (yes, that includes the OEM lenses too)
 - Rokinon manufactures inexpensive, manual-focus, fast prime lenses with an aspherical lens element

GEAR CONSIDERATIONS

- Tripod
 - More \$; Better performance...of course
 - Stability
 - Portability
 - Height
 - Ball head
 - Plus L-bracket
 - Level is a plus
 - Disable Image Stabilization (Canon) or Vibration Reduction (Nikon) when on tripod
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GEAR CONSIDERATIONS

- Cable release
 - Removes possible movement from pressing shutter button
 - Alternatively, can simply use timer delay

GEAR CONSIDERATIONS

- Intervalometer
 - Useful for star stacking and time lapse photography
 - Programmable
 - Exposures longer than 30sec

GEAR CONSIDERATIONS

- Red LED headlamp/light
 - Can see gear while maintaining night vision
 - Compass
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PLANNING & PREP

- APPS for smartphone
 - PhotoPills
 - TPE (The Photographer Ephemeris)
 - Night Sky
 - Dark Sky
 - Stellarium
 - Moonrise
 - MoonPhase
 - Test your camera for various ISO level performance
 - Lower the brightness of LCD screen
 - A bright LCD can fool you into thinking you have more exposure than you really do
 - Saves battery power
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ASTROPHOTOGRAPHY

- Stars...Meteor Showers...Milky Way...
- Must find a location with minimal light pollution (no moonlight either)
 - www.cleardarksky.com
- A great astrophoto will have an amazing foreground or leading lines
- Wide-angle lens
- Turn Autofocus off...won't work in dark
- White Balance: Daylight
- ISO: 1600 is optimal in most cameras
 - Long exposure noise reduction is a nice camera feature but can tie up your camera while it is shooting the equal long exposure dark frame
 - Could do LENR on last exposure of shoot and it will do it in camera while packing up/driving home
 - The higher the ambient temperature the more LENR becomes a consideration
- To test a long exposure quickly, use some easy math with ISO = 6400 test shot(s)
 - 1sec @ ISO 6400 = 1min @ ISO 100
 - 3sec @ ISO 6400 = 3min @ ISO 100
 - 10sec @ ISO 6400 = 10min @ ISO 100

ASTROPHOTOGRAPHY

- Stars
 - Manually focus by zooming in on brightest star using Liveview
 - Freezing stars, there is the 400 Rule for determining shutter speed
 - Shutter speed (less than) $< 400 / (\text{focal length} \times \text{crop factor})$
 - Star trails (due to the rotation of the earth): one long exposure or series of shorter, combined exposures
 - Employ star stacking of series of long exposure images (image stacking in Photoshop will work)
 - Good star trails with about 4-30 cumulative minutes
 - Pointing north gives you more time to work...pointing south stars move more quickly
 - Longer focal length lenses will yield brighter star trails than shorter lenses at equivalent apertures
- Milky Way – optimal shooting May-June
 - Avoid star trails by using the 400 Rule
- Meteor Showers
 - Continuous 30sec exposures
 - If using a tracking mount, stars can be kept round while capturing the meteor trails

AURORA BOREALIS

- The human eye does not often make out all the color in the aurora
 - Camera captures all the color
 - Use fastest (optimally f/2 or better), widest angle lens
 - Daylight white balance
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LIGHT PAINTING

- 'Painting' subject with beam of light
- Long exposure (1sec to many minutes)
- ISO: low
- Shutter speed: Trial and error...every setup is unique
- Aperture: f8
- Turn autofocus OFF
- Establish desired ambient exposure first – typically underexposed
- Light illuminating subject can originate from any position (can be helpful to have assistant)(best if not from behind camera)
 - Can also illuminate from multiple positions in a single exposure to create depth or creative effect
 - Don't kill all the shadows...create some
- An LED light will cast a 'cool' light on subject versus an incandescent's 'warm' light

LIGHT WRITING

- 'Writing' in image with light source in scene
 - Flashlight
 - Sparklers
 - Glow stick
 - Remember if writing text or numbers, it must be with respect to the camera eye!
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URBAN SCENES

- City-scapes are terrific subjects for night photography
 - To get the maximum number of lights on in office buildings, shoot for Tue-Wed nights at twilight
 - Clouds can be a good thing to reflect light
 - Small apertures to get 'starburst' effect on points of light
 - Neon lights
 - Fireworks
 - Car trails
 - Can use a neutral density filter to increase exposure time
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TIPS

- Focusing
 - Use Liveview with a bright star or painted subject in image to focus
 - Or Autofocus at infinity during daylight & mark with tape
 - Use Sharp Star 2
 - A plastic filter that fits into a std filter holder
 - Exposure
 - Expose with right-shifted histogram to lessen noise
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TIPS

- Cold weather shooting
 - Be mindful of battery levels
 - Carry sufficient spares
 - Put in pocket to keep warm...cold temps reduce battery output
 - Dress warmly (layers)...even 50deg will chill
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TIPS

- Pack snacks
 - Shoot with friends
 - Safety
 - Sources of inspiration and perspective
 - Helpful for tricky light painting situations
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