

Snitzer Photography Celestial Photography

Photos, like the one shown below, combine two disciplines executed during a single exposure:



1. Photographing stars as fixed objects
2. Lighting an interesting foreground element using the moon or light painting techniques.

Step #1: Where/When to go

- Stars are obscured by the surface illumination of urban and suburban areas. Places like Southern Utah (Arches National Park, Bryce Canyon), South Texas (Big Bend National Park), Nevada (great op to shoot ghost towns...) or portions of Northern Michigan all offer clean, dark night skies.
- The locations also offer interesting foreground subject matter to make your photos more memorable.
- Is the moon your friend? Generally not. You're typically trying to shoot into a jet black sky. Even a modest crescent moon overhead can ruin an otherwise great night sky.
- The Photographers Ephemeris is a great tool to find the days each month, at a specific location which will provide either a new moon, or a time when the moon isn't visible during the evening hours.
 - Most people can actually see the Milky Way Galaxy (a great source target for your photo) once their eyes acclimate to the night sky. If you can't, PhotoPills is another application that help locate the Milky Way for you. <http://photoephemeris.com/>
<http://www.photopills.com/>
- Moon occasionally your friend? A 5-15% crescent moon, low in the horizon is a good source to illuminate foreground objects providing your shooting away from the moon. Great for very large objects (mountains...). Will usually lower the required ISO by 500-1000.
- Time of year? Many different opinions. My take: You'll be out for 3-4 hours (it's fun/addictive). Go late winter/early Spring or late fall. It gets dark earlier. You might actually get some sleep. It's cold but not freeeeeeezzing. Factor in location. Arches is great in February, Bryce another great spot will be ice cold.
- Advanced Topic!!! Shooting the Galactic Core...BAM.
 - The Milkyway is a gigantic saucer with a giant core, caulked full of stars. That very photogenic core becomes visible in our hemisphere only during the months between March and November.
 - In Spring it's forms an arch across the SE horizon (it becomes visible after 1am...eckkkk), during summer it appears at a 45 deg angle (after 3am) and in fall it's vertical to the horizon (4-5am).
 - PhotoPills is a power phone ap that allows you to plan exactly when the Galactic Core will be visible and where it will appear in the sky. Ergo so you can plan your shots. Don't worry...just take no-dose & pretend you're a vampire!

Step #2: Getting the stars "right"

- The night sky is constantly in motion, rotating around the North Star. In order to get a sharp rendition of the Milky Way, & avoid star trails, your exposure time is generally limited to between 20 & 35 seconds.
- The 1st exposure rule: Divide the lens focal length into 500. Ex. 14mm lens divided into 600 yields a maximum exposure time of 35 seconds. Longer lenses require shorter exposures.
- Dialing in other exposure dets. Auto exposure won't work on a dark evening. You'll need to rely on your histogram (see below for target exposure...brightest area about 25-33% across the lower axis).

- To get there start in Manual Mode with a 30 second exposure you'll generally need an aperture of F2.8 and an ISO between 2,500 and 4,000. You'll need to generate several test shots to dial your exposure in.
- I generally set my color temp to 4000K.
- It's hard to frame your photo, even using the viewfinder, given it's dark. Each test shot, allows you to check your histogram and your framing to micro adjust the camera angle.
- Turn off your long exposure noise reduction until your ready to take the final shot (saves time). Frankly it doesn't do much for shots under 30 sec. Ok to forget it.
- Don't forget to use your mirror lock up option to reduce vibration.
- How long after sunset? It generally takes about 2 hours after sunset for the sky to dark sufficiently to get optimal images.
- Focus. Forget about autofocusing or even manual focusing. Too dark! Set your lens to manual focus, turn the ring to "infinity" and your done. Remember that most lenses have an infinity focus mark next to the infinity logo...make sure you get that right! Not all lenses have that mark...see below.

Step #3: Selecting Camera/Lens

- You'll obviously be shooting at very high ISO settings where "noise" is a big issue. Full frame cameras offer a real advantage.
 - If you don't own a full frame camera, the Canon 6D (now avail for \$1,399) may be an option worth considering (for this & other aps). Offers practically identical image quality as the 5DMkIII (\$2,500) & just a hair below the 5DMk IV(\$3,499*), lower weight for hiking, albeit inferior focus ability. For nature photography and portraiture, where fast focus isn't critical, it can be a good fit. The 6D offers better tonal range and ability to utilize wide lenses as compliment your crop sensor camera. *13.5 stops dynamic range vs 12.
 - Nikon currently offers my fav full frame choice for night shooting. The Nikon D750 (\$1,900) has great low light performance like the 6d and 2 additional stops of dynamic range (14 stops). That means underexposed night shots have far less noise!!! Ironically the Nikon D810 because of it's greater pixel density doesn't perform nearly as well in low light. See comparison of noise between Nikon 810 and Canon 6d.
- Fast wide lenses are the ticket to capture the celestial heavens and the Milky Way.
 - 14mm is a sweet spot. The small focal length also has a short hyperfocal distance. At F2.8 everything from 20ft to infinity will be in focus. Ergo, your foreground object will be tack sharp...as will be the stars.
 - Lens choices: Canon 14mm F 2.8 \$2,250, Nikon 14mm F2.8 \$1,600, Rokinon 14mm F2.8 \$349.
 - Rokinon also offers a great 12mm F2.8 fisheye lens for those who want to grab 180 degree view! This might be a good second lens to compliment the 14mm above (124 deg view).
 - Which lens? The fully manual Rokinon matches the others for edge to edge sharpness and has the lowest coma (the tendency of a lens to turn stars from round pin point objects into egg shaped blobs). Save the money. Set the Rokinon to F2.8, Infinity focus and fire away.
- Remote trigger
 - You'll need a remote wireless shutter release (to light paint your subject away from the camera).

- Velo FreeWave Wireless Remote Shutter Release \$35.
- Tripod
 - Use whatever is in your photo gear bag.
 - If considering something new: Slik Sprint Pro II. \$90 Lightweight 2 Lbs. workhorse, plenty tough for your lightweight celestial set up..."go to" tripod for long hikes.
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Step #4: Tools to Light Paint your foreground (MacGyver to the rescue)

- See at night. Get the "hat". Digital After Dark's hat has both white and red (to preserve night vision) LED lights in the visor. \$35 Great way to see what your doing, while keeping your hands free.
- <http://www.kadamsphoto.com/catalog/digital-after-dark-night-vision-with-white-leds-p-82.html>
- Light painting flash lights (right tool for the job)
 - Color made easy for smaller nearby objects. Coast TX10 Quad Color LED light \$23
 - <http://www.amazon.com/Coast-Color-LED-Light-Lumens/dp/B000P70RVA>
 - Workhorse for near to medium size objects. Olight M10 Maverick. \$40. Small, 3 options for brightness, one 350 lumens!
 - http://www.amazon.com/Olight-Maverick-Compact-Tactical-Flashlight/dp/B00CDROGVC/ref=sr_1_1?s=hi&ie=UTF8&qid=1428673063&sr=1-1&keywords=olight+m10+maverick
 - Max power for the big jobs! Z96 LED Panel, provides an area of 96 LED lights which can be dialed in to any brightness. Comes with tungsten diffuser...perfect for painting rocks/mountains...etal. \$86
 - http://www.amazon.com/gp/product/B003UCGDSS/ref=oh_aui_detailpage_o02_s0?ie=UTF8&psc=1
 - Color gels to modify Olight. \$7. You'll use black gaffing tap to build a small gel holder to filter your LED light. See photos below.
 - http://www.amazon.com/Neewer-Universal-Photography-Speedlite-Balance/dp/B00QN48X0Q/ref=sr_1_sc_3?s=electronics&ie=UTF8&qid=1436096999&sr=1-3-spell&keywords=photography+gels&pebp=1436097010075&perid=ORE42BT6P5BVY4X9W6AD

Step #5 Time to Light Paint

- The key: Light objects from the side (like portrait photography), not straight on. More interesting shadows.
- Keep your light moving in circular painting brush like strokes. I usually avoid painting the ground area between the camera and the foreground object.
- Less is more! You don't need much light to properly illuminate your subject, unless your doing far off mountains and such. Selecting the right light source and luminosity setting so you can paint for the full exposure time will help provide more even results.
- Remember to turn on your long exposure noise reduction for the final shot (once your settings are fully dialed in).

Step #6 Post Processing

- If using Lightroom or Photoshop, you'll be taking your initial image and increasing the contrast, along with exposure of the night sky (use layers or magic paintbrush to isolate the sky).
- Also try experimenting with your color controls, to boost the saturation levels, luminosity & range of the red, orange, yellow &/or blue channels. These colors will often present themselves at the lower part of the nighttime sky. Again apply these changes to the sky area only.
- For any foreground elements you want to make more visible...try using the "shadows" slider.
- You may also play with the color temp. I often reduce slightly, from 4,000 where I shoot at to a little as 3,400.

Case Studies

Saint Elena Canyon, Big Bend National Park

- Canon 6D, 14mm Rokinin @ F2.8, 30 sec, ISO 4000, color temp 4,000k.
- Coast Tx10 flashlight placed inside tent (red). Light painted with Z96 Panel & tungsten diffuser.
- Post Processing: Increased sky contrast, boost red channel Sat, Lum & Range. Dodged cliff areas to the right. Burned in foreground area between camera and lighted painted area (blacked out).



Arches National Park, Utah

- Canon 6d, 14mm Rokinin @ F2.8, 25 sec, ISO 1600, color temp 5,300
- Lighted by 15% crescent moon 15% above horizon (opposite direction of camera facing).
- Post processing: Dodged mountainous subject areas. Sky contrast, black point, red and purple channels increased.



North Window, Arches National Park, Utah

- Canon 6d, 14mm Rokinon @ F2.8, 25 sec, ISO 2500, color temp 4,800
- Lighted by a red gelled Olight, held under the arch (facing up).
- Post processing: Dodged the arch, Increased contrast, exposure and red channel for the sky.



Turret Arch, Arches National Park, Utah

- Canon 6d, 14mm Rokinon @ F2.8, 25 sec, ISO 2,500, color temp 3,700
- Lighting by red gelled Olight.
- Post processing: Increased exposure, increased red channel for subject.



Tellingua B&B, Texas

- Above camera specs.
- Light painted with Olight on lowest power setting with red gel.
- Post processing: Burned in area between camera and building. Increase exposure, increased sky contrast.



Hilo, Hawaii

- Which picture is more "impactful"?



VII: Other options to light paint?

- Use an Iphone/Android ap to photograph your subject with light trails. Lightbomber one of the best.
- <https://itunes.apple.com/us/app/lightbomber/id481526696?mt=8>

