INTRODUCTION

Have you ever thought of making your own star photos? It’s not as hard as you think. No need for expensive telescopes, scientific cameras, and awkward mounts. Making scenic images of the stars mainly requires a good DSLR and a few simple techniques.

Night photography is a mighty big topic though, so in this article, I only cover the techniques you need to capture star points. As the name implies, star points are fixed dots, whereas, star trails capture the earth’s rotation. A follow-up article will be posted later to address star trails.

THE ENEMY

Capturing star points is not difficult, but you’ll have to battle a powerful arch enemy: digital noise. Whenever you photograph in extreme low-light conditions, you need to increase your camera’s sensitivity to light, as controlled by the ISO setting. And every time you raise ISO speed, you increase the likelihood of fuzziness showing up in your images. In a nutshell then, night photography involves achieving an acceptable balance between good exposure and manageable noise.

ABOUT GEAR

If you already shoot landscapes at sunrise and sunset, then you most likely have all the gear you need to capture star points. Here’s the list:

1. **DSLR** with a crop-sensor or better. The camera should support RAW files and allow full manual control over both exposure and focus.
2. **Wide-angle lens.** A fast lens is best as it will allow you to set a lower ISO speed, thereby reducing the amount of noise that shows up in your night photos.

3. **Sturdy tripod** with a quality head that will not slip during long exposures.

4. **Remote cable release** to prevent camera shake.

WHEN AND WHERE

Needless to say, you need a clear sky to capture star points. Baby clouds can add character to the sky, but daddy clouds will surely ruin the shot. So, pick an evening with a promising forecast and hope for the best. Before locking in the day though, check the moon phase -- a full moon will diminish the mass and intensity of stars. You can still photograph the stars on a moonlit evening, but don’t expect to hit the motherload.

I prefer to shoot the stars at night, but it is certainly possible to photograph them in the ridiculous hours preceding dawn. The problem with shooting early in the morning is that there’s no natural light to guide you in setting up the composition and focus. So, I highly recommend evening, unless bravery happens to be your proud hallmark.

There’s one more thing to consider when planning to photograph at night: temperature. Did I mention that digital noise is the bane of night photography? Yes, well it turns out that a hot sensor is an unhappy sensor. When a sensor overheats, it rebels by tossing salt-and-pepper noise into your hard-earned photos. So keep your sensor happy by shooting the stars on cool nights. Better to dress warmly than to create lousy photos.

So, where should you go to shoot the stars? ANSWER: As far away as possible from metropolitan areas -- preferably fifty miles from the nearest big city. If you can’t get that far from the city, at least be sure to point your camera the other way. Long exposures tend to pick up subtle light that the naked eye ignores. If
you notice that your photos glow at the horizon, it’s quite likely that your camera is picking up light pollution.

- **The mountains** are a wonderful place to shoot the stars. Mountaintops and ridges hide the horizon from line-of-sight, effectively negating any residual light pollution.
- **The seacoast** is one of my favorite places to photograph at night. Coastlines, beaches, and lighthouses offer up lots of foreground potential. And, as long as you point your camera out to sea, your images should be free of light pollution.
- **Ponds and lakes** are also well suited for star photography. On a calm night, you can capture both the stars in the sky and their mirror reflection in the water.

**CAMERA SETTINGS**

For several reasons, photographing the stars requires different camera settings than usual. First, the triad of ISO, Aperture, and Shutter Speed must reach a balance between exposure and digital noise. And second, neither automatic focus nor automatic exposure work well in the dark of night, so the manual modes are used.

1. **Set image quality to RAW.** Star photography involves a fair amount of trial and error. And RAW mode gives you more leeway to tweak crucial settings like exposure and white balance after the fact, without degrading pixels.
2. **Turn ON long exposure noise reduction.** This is a nifty DSLR feature that uses a technology called “dark frame subtraction” to reduce noise in longer exposures. It’s done by taking a second photo with the shutter closed, so expect to double the time.
3. **Turn OFF vibration reduction.** If your camera or lens supports image stabilization, turn it off for the night. You’ll be shooting from a tripod, which obviates the need.
4. **Set focus mode to manual.** Automatic focus looks for contrast in deciding where to aim. Since there’s not much contrast at night, the camera may “hunt” forever. So, be sure to set manual focus mode on both the camera and lens.

5. **Set exposure mode to manual.** Darkness tends to fool your camera meter, so turn on manual exposure mode. You’ll be in charge of both aperture and shutter speed. Think of it as driving a sports car with a manual transmission -- at night.

6. **Set your widest aperture.** Set the aperture to the smallest F-Stop number available on your lens (often f/2.8 or f/3.5). Sharp stars are best captured using a wide open aperture. This leverages the ambient light and lets you retain a lower ISO.

7. **Calculate shutter speed.** The focal length of your lens (the wider the better) determines the maximum shutter speed. Remember that star points must appear fixed in the sky, so there can be no visible motion. If the stars begin to take on an oblong shape, then the exposure is too long. To calculate shutter speed, *divide 600 by the focal length*. For example, if your focal length is set to 24mm, divide 600 by 24 to get a value of 25 seconds. This number represents the maximum shutter speed you should use to avoid motion in the stars. Since most cameras support a maximum shutter speed of 30 seconds, you’ll need to keep it under that threshold unless you own an *intervalometer* (fancy remote control with a built-in timer).

8. **Set focus on infinity.** Avoid the pitfall of turning the focus ring to its extreme position. Instead, line up the focus mark smack in the middle of the little sideways 8 on your focus ring. You have to get this right, otherwise your stars will be blurry. If your camera supports *Live View*, use the feature to carefully focus on the stars.
ISO SPEED

ISO will always be the noisiest and most disruptive guest at your star party, so it behooves you to keep it on a tight leash. Increasing ISO can rapidly degrade your night photos to the point where fuzzy noise overwhelms the stars.

The size and quality of the sensor in your camera determines how much noise haunts your low-light photos. The smaller the sensor, the more noise will be visible. This is why compact digital cameras are a poor choice for night photography. A full-frame sensor usually fares better than a crop-sensor, but this too varies by camera.

Since no maximum ISO speed applies equally to all cameras, you’ll need to test the ISO performance of your DSLR to determine “how high you can go”. The result will tell you the highest acceptable ISO speed to use with your camera model.

Start with as low an ISO setting as ambient light permits, and ratchet it up as the night progresses. Every time you increase ISO speed, use your LCD to verify the noise ratio by zooming in on the sky. You’ll know that your DSLR has exceeded the practical ISO limit when background noise overpowers the stars without hope of recovery.

Most entry-level and mid-range DSLR cameras exhibit noise at speeds above ISO 800. Don’t despair if you find that your camera is unable to rise about the ISO 800 mark. You may not be able to photograph the Milky Way in the middle of a moonless night, but you can turn the tide in your favor by using the moon to your advantage.

Consider the moon to be a gigantic softbox that casts light over the whole landscape. On a moonlit night, speeds in the range of ISO 400-800 are generally sufficient to catch a respectable volume of stars. Just be sure to point your camera in the opposite direction from the moon to limit the light pollution that gets into your shots.
TAKING THE SHOT - FINALLY

Okay, so we’ve covered the gear, camera settings, location, timing, and the blasted curse of ISO speed. Now, let’s get on with the business of shooting some star points. Here are some additional pointers to consider once you’re finally on location.

1. **Arrive early.** Get there before sunset and use the time to pin down a tripod location, set up your camera, and take test shots to verify focus and composition.

2. **Bring a headlamp.** This is a no-brainer, but one worth repeating. You’ll need the headlamp to rummage through your camera bag and find your way back to the car.

3. **Use a fresh battery.** Be sure to load a fresh battery in your camera before it gets too dark. Batteries usually drain at a faster rate under cooler temperatures.

4. **Set controls by feel.** You should be able to change your ISO and shutter speed blindfolded. Practice setting the controls by feel to be more efficient in the dark.

5. **Use a lens hood.** It may seem silly to use a lens hood at night, but long exposures have a nasty habit of picking up stray light that can frustrate and disappoint.

6. **Use the histogram.** Beginners often make the mistake of using the LCD to verify exposure after taking a shot. Bad idea. Your eyes will nicely adapt to low light, so the image on your LCD may look marvelously bright...until you get home and bring it up on your large display. Instead, rely on the histogram to check your exposure. As always, expose to the right of the histogram to catch as much light as possible.

THE MORNING AFTER

So, it’s now the morning after and you’re eager to process your RAW images of the stars from the night before. The thing that may surprise you about night shots is that they need little post-processing. Here’s what I do to my star photos:
1. **Reduce noise.** Zoom in on the photo at 100%, and carefully apply noise reduction using your favorite tool (such as Luminance Noise Reduction in Lightroom). Approach this task with an “easy does it” attitude as you can start to lose stars along with noise. Try to avoid any major alterations to our constellations and galaxies, if you can.

2. **Tweak the white balance.** On a dark night, the sky will lose much its blue luster and take on a dull gray or sepia tone. You can easily restore the sky to a more natural color by adjusting the white balance. Try the Tungsten setting and then pull back the blues until the sky returns to a natural hue.

3. **Increase contrast.** As with most RAW files, your night shots will lack contrast. Increase the contrast setting to make the stars pop. If you process your photos in Lightroom or Photoshop, try pushing up Clarity to +25-50 as well.

**ARE WE DONE?**

Are we done yet? Well, not really. As I mentioned earlier, there’s a lot to night photography and I’ve only covered the basics in this first article. Stay tuned for follow-up articles on related subjects like capturing star trails and lighting foregrounds.

If you want to spiff up your knowledge and skills, I recommend that you pick up one of the many excellent books by photographers [Lance Keimig](#), [Harold Davis](#), [Alan Hess](#), and [Jim Harmer](#) (great little book only available as a Kindle eBook).

Now go out there and catch yourself some stars!

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