Capturing the Summer Milky Way

A dark sky is the secret to dramatic photos of our home galaxy.



The mild months of summer are a great time to photograph the Milky Way. That's when our galaxy's bright core, in Sagittarius, is perfectly positioned for dramatic compositions. If you're a city dweller, you owe it to yourself to plan a getaway to a remote dark-sky location where you can take in the full majesty of the Milky Way. But photographing it can be both rewarding and challenging. Here are a few tips to save you time and frustration while ensuring that you come away with some stunning images.

Where and When

Beyond the crucial absence of light pollution, an ideal destination will also offer a compelling landscape to add interest to your Milky Way images. Lakes, rivers, and mountains are classic subjects to help anchor a composition. National parks and dark-sky preserves are often good bets, as are the locations of numerous summer star parties across the country.

Once you've selected a promising location, flip to this magazine's center spread and review the Lunar Almanac section, which lists dates for the various phases of the Moon. Each month offers a window of several days centered around the time of new Moon, when light from Earth's celestial neighbor doesn't interfere with our photographic goals. Even a thin lunar crescent can

LIGHT BEAM The author used a Canon 6D DSLR camera (set to ISO 1600) on a fixed tripod and a Canon 15-mm fisheye lens at f/2.8 for this 30-second-exposure self-portrait. The photo was captured near the Amphitrite Point Lighthouse on the remote west coast of Vancouver Island, British Columbia.



add enough light to wash out at least some of the sky.

If you're venturing to a location for the first time, plan to arrive well before sunset. This will give you ample opportunity to scout for the perfect photographic spot and set up your gear before it gets dark. Some mobile phone apps (such as SkySafari and PhotoPills) have an augmented-reality feature that lets you overlay a graphical representation of the night sky onto a live video image of the daytime landscape. This feature is helpful when composing your photographs because the apps allow you to see how the Milky Way will be positioned with respect to the foreground at any time of night.

What equipment should you bring for a successful outing? At a minimum, you'll need a camera, a wide-angle lens, a sturdy tripod, and a remote shutter release (or a built-in intervalometer, if your camera has that feature).

Getting Set

You can save yourself a lot of frustration by making all your camera settings during daylight hours so you're not fumbling with buttons and dials in the dark. You can even pre-focus your lens during the daytime by aiming at a distant object and then manually tweak the focus after dark using Live View (if your camera has that feature).

To prepare for a night of Milky Way photography, set your camera to Manual mode and crank up the ISO to the highest value that produces pleasing results without too much digital noise. This is one area that requires experimentation because the optimum setting will be specific to your camera's sensor. Newer, full-frame cameras tend to produce less noise and therefore allow higher ISO settings.

As a starting point, try ISO 3200 and see if you like the results. If the picture is too noisy, throttle the ISO down to 1600 and try again. Conversely, if the image looks fine at 3200, bump up the ISO and see what you get. You just might be surprised at how good it looks.

When it comes to your lens, start with the widest aperture offered (the lowest numerical f/stop value). It's critical to deliver as much light as possible



▲ **PIXEL PLACEMENT** Check your camera's instruction manual to see how to activate the histogram display. For Milky Way photography, your exposures should be just long enough that the histogram "hump" fully separates from the left side of the graph but doesn't extend beyond the halfway point.

▲ WIDER THAN WIDE Sometimes even a fisheye lens isn't wide enough to capture everything you'd like. This horizon-to-horizon panorama consists of three individual frames stitched together. The author captured each 30-second exposure with a Canon 15-mm fisheye lens wide-open at f/2.8 and a Canon EOS 6D camera set to ISO 3200.

to the camera's sensor if you want highquality photos. Here again, a couple of test shots will reveal if you need to stop your lens down to produce reasonably round star images at the edges of the frame. Most lenses work best at least one stop down from fully open.

If you're shooting with your camera mounted on a fixed tripod, the maximum exposure time will be limited by the focal length of your lens. Over time, Earth's rotation causes stars to trail across your images – an effect that's more pronounced with increasing lens focal lengths. A 50-mm lens (on a full-frame camera) will show trails in just 10 seconds. The same camera with a 16-mm lens will allow 30-second exposures without serious trailing. Ultra-wide-angle lenses accommodate the longest exposures and also have the advantage of including more of the scene you're trying to capture. (For more on this topic, turn to page 54 of the February issue.)

You can side-step these exposure limitations if you mount your camera on a motorized equatorial mount or a battery-powered portable star tracker.



▲ **SKY LIGHT** Even at a dark-sky location, moonlight can affect an image. A waxing lunar crescent is about to set, but its light is bright enough to partially wash out this 30-second exposure made with a tracking mount and a Canon EOS RP camera working at ISO 1600.

Camera trackers permit longer exposure times without the risk of star trails and let you take advantage of slower lenses and those with longer focal lengths. You can also utilize lower ISO settings to improve image quality. The main limitation is that foreground objects, such as trees or mountains, will start to blur as your camera tracks the stars. This is why many trackers offer a special, halfspeed ($0.5\times$) setting that lets you split the difference between pinpoint stars and a sharp landscape.

When evaluating your shots, don't rely solely on your camera's rear screen. Although "chimping" (as the activity is humorously known) gives you an overall sense of the image quality and composition, the camera's bright display can trick your dark-adapted eyes into believing an underexposed image looks fine. Instead, trust the histogram. This graphic shows the brightness range of the recorded pixels. (Check your camera's instruction manual to find out how to enable this valuable feature).

The histogram of a well-exposed image will have a hump fully separated from the left side of the screen while not extending much past the halfway point of the graph. You should also avoid over-exposing your images because this will wash out the vivid colors in the stars you're trying to capture.

Finally, shoot in RAW (not JPEG) mode. This will let you adjust the image's white balance after the fact and recover more highlight and shadow detail during post-processing.

Compelling Compositions

While it's tempting to point your camera straight up to capture as much of the Milky Way's expanse as possible, you'll get more appealing images if you include the horizon. The silhouette of a distant mountain range, or some nearby trees framing your subject, will make your photos more compelling. On calm evenings, nearby lakes and rivers can act like mirrors to reflect the sky, thereby adding impact to your composition.

Try shooting images in both horizontal and vertical orientations. A horizontal image emphasizes features in the landscape and works well when the Milky Way is rising or setting. A vertical orientation is a better choice when you have a tall tree in the shot, or when the Milky Way is arching high overhead.

Once you've got the framing and exposure settings sorted out, consider

taking a sequence of shots, one right after the other. You'll want to minimize the delay between each individual exposure, so set your camera to high-speed continuous mode and turn off features such as image review or long-exposure noise reduction — these significantly increase the shot-to-shot time.

An image sequence opens up several important post-processing options. After you've downloaded the individual frames onto your computer, you can stack them together with software such as Adobe Photoshop, Affinity Photo, DeepSkyStacker, or Sequator. By averaging the pixel values across a large number of sequential shots, random digital background noise is smoothed out, producing a cleaner photo that allows for more extensive post-processing. Stacking is particularly helpful for removing airplane and satellite trails. (Turn to page 54 of the April 2022 issue for more about image stacking.)

Alternatively, you can combine a sequence into a stunning time-lapse movie. The *Photos* app in Windows allows you to add a set of images to a timeline and then export them as a video. On a Mac, you can do the same thing using iMovie or QuickTime. Timelapse sequences shot from a fixed tripod will show the apparent motion of the stars drifting across the sky from east to west. Conversely, those captured on a sky-tracking platform or equatorial mount will reveal the somewhat surreal sight of the Earth's western horizon tilting up to cover the stars, which remain fixed in the frame.

Finally, I always recommend bringing along binoculars or a small, wide-field telescope so you can enjoy views of the sky while your camera busily clicks away in the background. After all, if you've made the effort to travel to a dark-sky location, you have the perfect opportunity to soak in the amazing sight of our home galaxy in real time.

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