

GETTING STARTED IN ASTROPHOTOGRAPHY

Beginning with the basics helps build a strong foundation for your imaging endeavours

Text and photography by Tony Puerzer

THERE'S A JOKE that says get your kids interested in astrophotography because, if you do, they won't have any money left to spend on drugs or alcohol.

While astrophotography can be an expensive hobby, it doesn't have to be. The key is to avoid the trap of thinking that you need to connect a camera to a telescope right away to take astrophotos. You don't. In fact, your chances of getting a great photo and avoiding a lot of frustration are greatly improved if you don't go anywhere near a high-power telescope with your camera—at least at first. So what's the best way to get started in astrophotography?

DOWN TO BASICS

If you think of astrophotography as a nocturnal version of traditional landscape photography, you'll be on the right path. Plus, the many skills you'll learn by doing basic tripod-and-camera shooting will come in handy should you decide to try taking photos through a telescope later on.

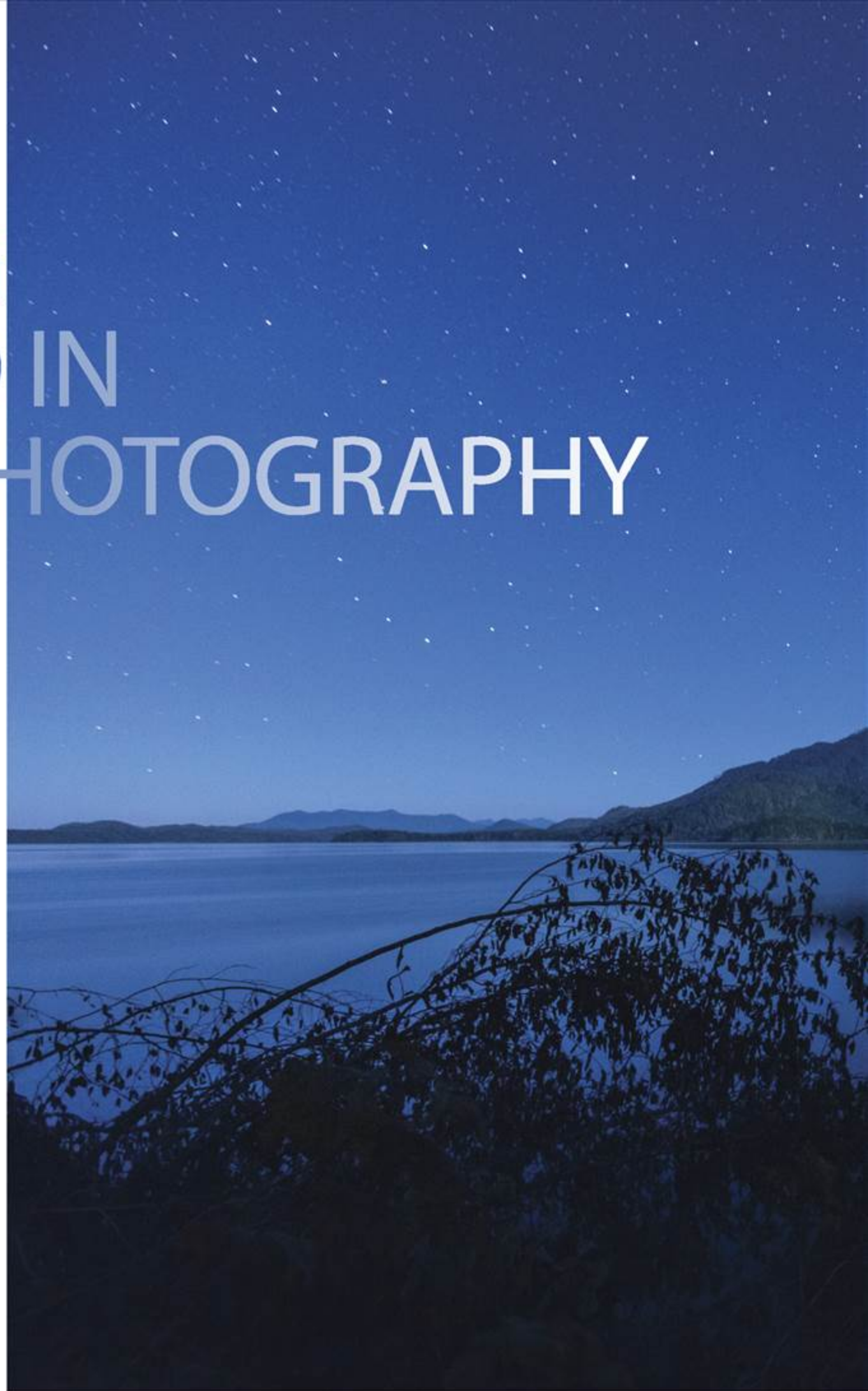
What do you need to get started? At an absolute minimum, you'll need a digital SLR camera (or similar interchangeable-lens camera) with a lens, a sturdy tripod and a remote shutter release or self-timer.

Most DSLRs come with a "kit" lens that

has a zoom range typically around 18mm to 55mm. If you've acquired a second lens for your camera, chances are it's a telephoto of 75mm to 300mm focal length. Since these are the most common lenses for consumer cameras, we'll deal with them first.

The brightest nighttime target is the Moon, but even with a telephoto lens, it will be disappointingly small—especially if you shoot it against a dark night sky.

For tripod-based shots, the trick is to photograph the Moon just after sunset or just before sunrise, when the sky still has some colour and the lunar disc is near the horizon. This allows you to fill the bottom of your frame with an interesting landscape while capturing the beautiful indigo-blue of twilight above it. Instead of an uninspiring photo of a tiny disc floating in a black void, you're giving the Moon a compelling con-





MOONLIT LAKE AND BIG DIPPER One of the keys to successful night-sky photography is to approach your composition as you would for traditional landscape photography. That means considering all the elements in the image and seeking out appealing lighting. A good example is this well-composed picture of the Big Dipper hanging over a moonlit lake. A Canon 6D DSLR was used at ISO 1600 for a 30-second exposure with a zoom lens set to 16mm and f/4.0. Moments earlier, the sky had been quite dark, but the rising Moon quickly changed the scene.

text. Also, the twilight sky will fill most of the frame, which gives your camera's meter a good chance to judge the correct exposure even if you're shooting in fully automatic mode.

This same approach can be used to take stunning photographs of lunar and planetary conjunctions. Again, since these objects fill only a small part of the frame, the trick to capturing a rewarding scene is to



GETTING IN GEAR Beyond a DSLR camera and lens, basic astrophotography requires a sturdy tripod and a remote shutter release. Remote shutter releases from camera manufacturers are quite expensive, but third-party versions (such as the one illustrated here) function well for a fraction of the cost. You can also use your camera's self-timer function to create "jiggle-free" photos.



SUPERMOON COUPLE A Canon 70D DSLR was used at ISO 640 for a 1/400-second exposure with a 300mm telephoto lens at f/6.3 to record this couple on the beach observing the full Moon rising. Shooting at twilight, while the sky still has some colour, and positioning the camera to include the couple in the foreground add interest to the scene.

shoot during twilight and to include some interesting foreground objects or landscape features.

In addition to a tripod to steady the shot, you'll need a way to trip the shutter without jiggling your camera too much. You can accomplish this by using either the camera's self-timer feature (check the owner's manual) or a remote shutter release. Either way, the idea is to make sure that once the exposure starts, there's no chance that vibrations will blur your image. A remote shutter release also has the advantage that it can be set to lock the shutter open for longer exposures.

SHOOT FOR THE STARS

What about photographing stars? Here, a complication is introduced by the planet you're standing on. The Earth's rotation causes all astronomical objects to appear to move across the sky from east to west. It may be hard to notice this motion with your unaided eye, but it will quickly transform the stars in your photos into streaks. Those streaks are often called star trails—and many people find them beautiful.

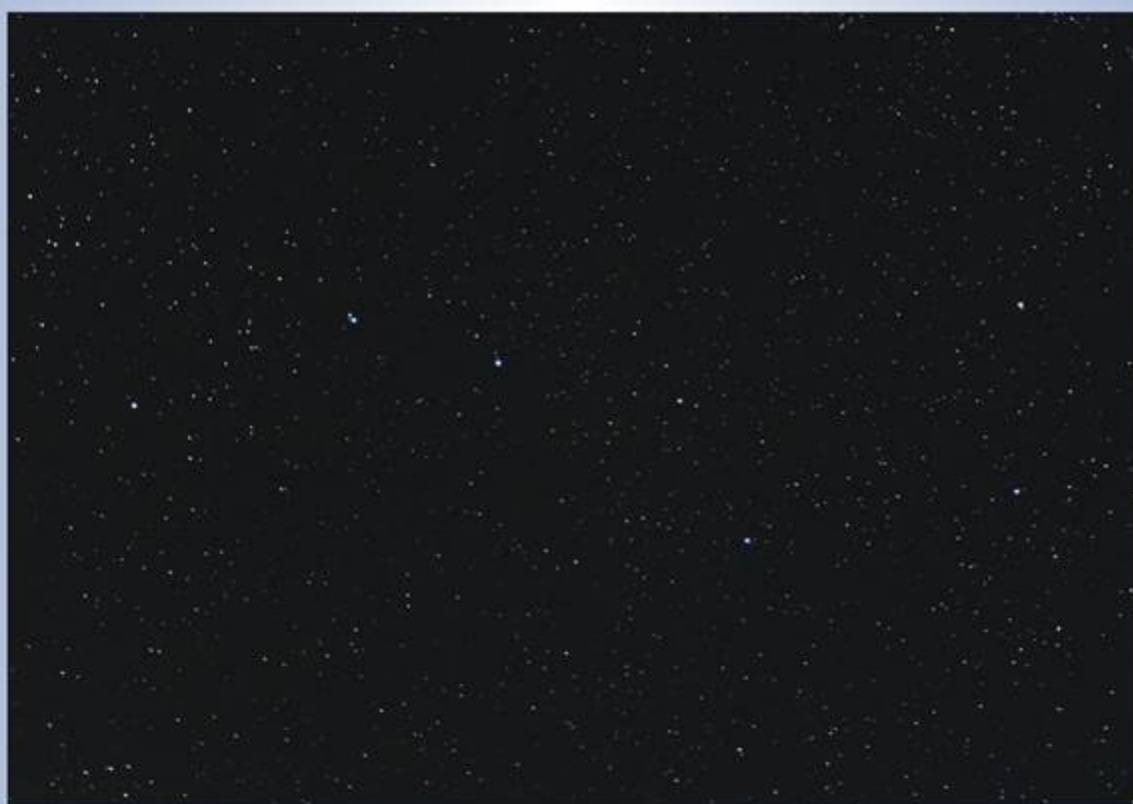
Try some star-trail shots by setting your camera to Bulb (B) mode and using your

remote release to lock the shutter open for several minutes. It's fascinating to see the different results you get by shooting near Polaris (the North Star) versus pointing your camera to the south.

Star trails are fun, but what if you prefer pictures that show the sky as you see it, without streaking stars? Avoiding star trails involves a race against time. With an 18mm lens, you can shoot for about 30 seconds before the stars start to trail noticeably. If you zoom to 55mm, the

time decreases to just 10 seconds. A telephoto zoom lens set to 300mm will show star trails in just two seconds. Of course, a great deal depends on how big you display your pictures. If you only post them on-line as small images, you can tolerate more trailing than if you blow them up big or crop heavily.


Setting your lens to its widest angle allows you to take the longest exposure possible while still producing pinpoint stars. And the longer the exposure, the



STARS TRAILING AND STARS FROZEN These two images show the familiar grouping known as the Big Dipper. Both shots were captured with a Canon 70D DSLR camera equipped with a zoom lens set to 35mm and f/2.8. So why does one image display star trails while the other doesn't? The difference is exposure time. The trailed stars are the result of leaving the shutter open for 8 minutes (with the camera in B, or Bulb, mode), while the exposure above was only 20 seconds—brief enough to effectively freeze motion and (almost) eliminate trailing. To compensate for the shorter exposure, the camera's ISO setting was boosted from 100 to 1600.



VENUS REFLECTED The colourful symmetry of a twilight sky and the planet Venus reflected in a tide pool at Pacific Rim National Park Reserve, in British Columbia, make this photo a keeper. A Canon 6D DSLR was used at ISO 200 for this 13-second exposure with a zoom lens set to 47mm at f/9.0.



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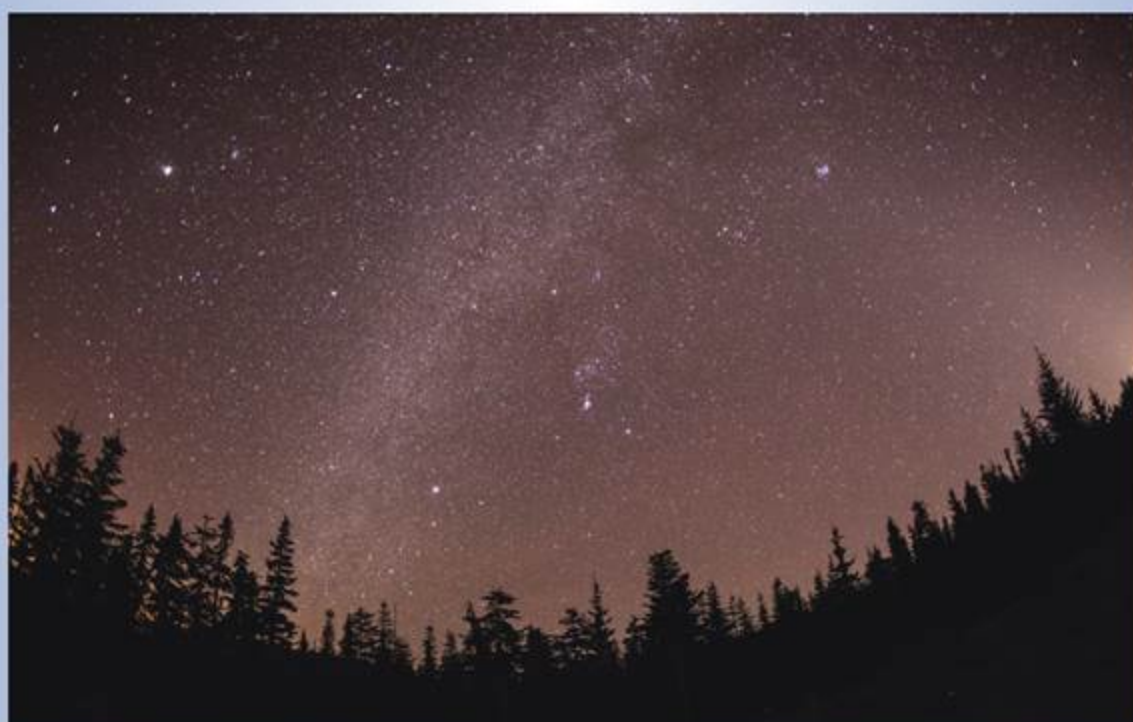
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A QUESTION OF WHITE BALANCE The same RAW image file was processed in Adobe Lightroom software using both a tungsten (top) and a daylight (above) white-balance setting. By shooting RAW files, you can alter the look of your images during post-processing. A Canon 5D Mark II DSLR was used at ISO 3200 for a 30-second exposure with a 15mm fish-eye lens at f/2.8.

more light the sensor will record. Wide-angle lenses also offer the perfect field of view for many interesting astronomical targets, such as constellations, meteor trails, auroral displays or wide swaths of the Milky Way. To capture the absolute maximum amount of night sky, you might even consider buying or borrowing a fish-eye lens. The results can be dramatic.

MORE CONSIDERATIONS

Beyond shutter speed, there are two other factors that influence the overall exposure of your photos: aperture and ISO. To let in as much light as possible, you need to use the widest aperture on your lens, which corresponds to the lowest numerical f-stop. On most low-cost zoom lenses, this will be around f/3.5, but higher-

priced lenses allow you to use f/2.8 or lower.

You'll also want to use the highest ISO your camera allows without introducing an unacceptable amount of digital "noise" in the final image. On most consumer DSLR cameras, this will be around ISO 1600.

Regardless of what you decide to photograph, the most critical step is to focus your lens perfectly. This means switching your lens to manual focus and using "live view" (if your camera has it—again, check your owner's manual) to zoom in and focus on the Moon, a very bright star or a planet. The auto-focus systems on most cameras simply can't cope with dim-light starlight, so switch to manual and take the time to focus the lens carefully to get the smallest, sharpest star image possible. A properly



SUMMER MILKY WAY FISH-EYE Different lenses give different effects. For this dramatic twilight picture of the Milky Way over a beach at Pacific Rim National Park Reserve, a 15mm fish-eye lens at f/2.8 was used on a Canon 6D DSLR camera set to ISO 1600 for a 25-second exposure. Tilting a camera armed with a fish-eye lens renders a severely curved horizon and a domelike bowl of stars.

focused image is always more appealing, of course, but there's more than simple aesthetics involved. The tinier the stars, the more concentrated the light from each one, allowing you to record more and fainter stars. Even a small focus error will lower the contrast of your images and obscure the faintest stars.

Finally, you'll need to set your camera's white-balance setting. Most modern DSLR cameras have an automatic setting that works pretty well for daytime scenes; however, nighttime star photos are a bit of an odd case. Setting your camera's white balance to "daylight" usually results in an unappealing brownish cast to your pictures, especially if you're shooting near an urban area with significant light pollution. Try using the "tungsten" setting instead, which

will give the sky in your photos a more natural, cool blue colour. Better yet, shoot with your camera in RAW mode so that you can adjust the colour balance after the fact.

A PARTING SHOT

Putting it all together, here's a recipe for success for your first fixed-tripod star photos:

- ★ wide-angle lens
- ★ remote shutter release
- ★ 20-second exposure
- ★ f/3.5 aperture (or wider)
- ★ ISO 1600 (or higher)
- ★ tungsten white-balance setting
- ★ manual focus

While all the technical stuff is interesting, the real fun comes when you add your individual artistic creativity to the image-

making process. Again, if you think of astrophotography as an extension of daylight landscape photography, there is really no limit to what your compositions can include—perhaps the summer Milky Way reflected in a lake by a cabin in the woods or Orion rising over a glacier bathed in the light of the setting Moon. The beauty of digital photography is that you can experiment until you get the effect you want, since there's no penalty for taking photos that don't work out.

The compositional possibilities are endless, limited only by your imagination. The next clear night, give it a try. You might be surprised at what you can accomplish with just the basic techniques covered here. ♦

Tony Puerzer is a full-time professional photographer and a part-time amateur astronomer living in Nanaimo, British Columbia. He's had a lifelong love of astronomy and is passionate about introducing people to the wonderful world of astrophotography.