

# Stockton Camera Club

**The Shutter Tripper**

**June 2019**

**May Digital/Print Images**



**Back Lit Rose**

Print of the Month - Wayne Carlson



**Sandhill Moon**

Digital Image of the Month - Trey Steinhart

# March 10's



**Pintail Duck**  
Dean Taylor



**The Harvest**  
Em McLaren



**The Shape of Water**  
Christine Blue



**Skiing is Always  
better with Two**  
Trey Steinhart



**Backlit Egret**  
Joanne Sogsti



**Tuscan Sunset**  
Sharon McLemore



**Cambodian Dancer**  
Em McLaren



**Forest Abstract**  
Sharon McLemore



**Grand Tetons in the Sunrise**  
Heide Stover



**Blue Dahlia in the Clouds**  
Christine Blue



**There's always a child in the Kings Court AKA Pillows in the Yuba River**  
Trey Steinhart



**Senanque Abbey, France**  
Sharon McLemore



**Backlit Wave**  
Dean Taylor



**Dancing Cranes**  
Joanne Sogsti



**Booted Up**  
Elizabeth Parrish



**100 Tracks on Donner Peak**  
Trey Steinhart



**\$31,990** of \$100,000 goal



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**Picture Tim Ulmer Healthy**

Picture this, our dear friend and community servant Tim Ulmer is facing a health challenge that impacts not only Tim but our entire community. Many of us know Tim as a selfless servant offering his talent of photography to our fundraising and family events throughout San Joaquin County.

Tim has been diagnosed with Hairy Cell Leukemia, a life-threatening cancer.

Tim's treatment will begin in early March with five straight days of chemotherapy resulting in compromising his immune system. For the next 3 months Tim will be in treatment that leaves him weak, unable to keep his business open, and unable to fulfill his philanthropic photography work.

Tim Ulmer has spent countless hours documenting our fundraising events-often free of charge. Tim needs us to step up now as he faces an immediate need to cover the mounting costs related to the cancer treatment, lost wages, special dietary items, meals, and other living expenses.

Photographs have a way of feeling, touching and loving. It remembers little things and captures the humanity of the moment. It is our moment to capture true humanity through our giving. Together we can and will meet our \$100,000 goal!

Picture a healthy, vibrant Tim Ulmer.



## SCC Officers 2017

### President

Heide Stover

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## President's Message

May 2019

By Heide Stover

### President's Message

We didn't have very many members show up to the last meeting. The judge had good critics and I hope we all learned something from him.

This rain has been pretty crazy and I am wondering how many of you went out and got some rain shots. I did not have a chance as I am super busy right now. But I did see some shots I wish I could have stopped and played with.

We have a number of new members! Brenda and Chris De Roos joined late last year and jumped right in to help. Chris is our hospitality chair and made arrangements with his church for us to use a room there for Doug's program in April. Roger Elkins and Joan Erreca joined this year and Charlene Warren-Martin rejoined. In May Darrell O'Sullivan, Ricky Ortiz, and Adrian Ferreyra joined us. Adrian is a teenager so he is bringing youth to our group and his mom Rosie will be joining us at the meetings.

I look forward to seeing everyone at our June meeting. Remember it is prints only.

Happy Shooting

## A Big Thank You to Our Sponsors!



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# 2019 Calendar of Events

Every 3rd Thursday (Except April, June & Aug) 6:30 PM	West Lane Bowling Alley Stockton	Membership Meeting Contact Heide Stover <a href="mailto:h1stover@aol.com">h1stover@aol.com</a>
Thursday June 20	West Lane Bowling Alley Stockton	June General Meeting Prints only with no special subject
Thursday July 18	West Lane Bowling Alley Stockton	July General Meeting Special Subject - Gates/Fences
Aug TBA	TBA	Annual Pot Luck
Thursday September 19	West Lane Bowling Alley Stockton	September General Meeting Special Subject - Photo Journalism
Thursday October 17	West Lane Bowling Alley Stockton	October General Meeting Special Subject - Monochromatic Color Scheme
Thursday November 21	West Lane Bowling Alley Stockton	November General Meeting Special Subject - Prints Only
Thursday December 19	West Lane Bowling Alley Stockton	December General Meeting Special Subject - Tools

# 2020 Calendar of Events

January 16	TBA	Annual Banquet
Thursday February 20	West Lane Bowling Alley Stockton	February General Meeting Special Subject - Motion/Movement
Thursday March 19	West Lane Bowling Alley Stockton	March General Meeting Special Subject - Sequence of 3
April	TBA	April Workshop/Photo Opportunity
Thursday May 21	West Lane Bowling Alley Stockton	May General Meeting Special Subject - Urban/Cityscapes
Thursday June 18	West Lane Bowling Alley Stockton	June General Meeting Special Subject - Prints Only
July 19	West Lane Bowling Alley Stockton	July General Meeting Special Subject - Reflections

## Meeting Notes May 2019

Heide opened the meeting. New members were Adrian(a teen) and his mother Rosie and Rocky Ortiz. Welcome!

1. Janelle is working on a webpage to add to Skylum. We are now partners with them and any club member can now get \$10.00 off on their products with the code. See Heide for the code.

2. It was decided that it would be ok to use the bowling alley screen instead of bringing our screen each time. The screen is a little lower but is ok.

3. There was some problem with tags for the prints.

The judge for the night was Jim Rose. He had worked for Canon for 30 years and had just recently been laid off. Doug met him when attending workshops he took through Cannon.

### PRINT COMPETITION WINNER OF THE MONTH

“Backlit Rose” by Wayne Carlson

### DIGITAL COMPETITION WINNER OF THE MONTH

“Sandhill Moon” by Trey Steinhart

Congratulations to the winners!

Next month there is NO SPECIAL SUBJECT and will be PRINTS ONLY. So do not enter digital images for June.

If there are any corrections or additions to the notes, please let me know.

Thanks, em



**Stockton Camera Club**  
**May 2019 Competition Standings**  
**Congratulations to all the winners!!!**

**Digital Image of the Month – Pretty in Pink by Sharon McLemore**  
**Print of the Month – Frosted Wolf by Dean Taylor**

Please check out the website, <http://www.stockton-cameraclub.com/home.html>

<b>Class A Standings</b>	<b>TOTAL</b>	<b>OPEN</b>	<b>SS</b>	<b>FEB</b>	<b>MAR</b>	<b>MAY</b>	<b>JUN</b>	<b>JULY</b>	<b>SEPT</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>
Charlene Martin	38	27	9	0	38	0	0	0	0	0	0	0
Brenda DeRoos	32	24	8	0	0	32	0	0	0	0	0	0
Ron Wetherell	30	30	0	20	10	0	0	0	0	0	0	0
Joan Erreca	23	23	0	0	0	23	0	0	0	0	0	0
Susanne Nichols	0	0	0	0	0	0	0	0	0	0	0	0
Lanny Brown	0	0	0	0	0	0	0	0	0	0	0	0
Ed Richter	0	0	0	0	0	0	0	0	0	0	0	0
<b>Class AA Standing</b>	<b>TOTAL</b>	<b>OPEN</b>	<b>SS</b>	<b>FEB</b>	<b>MAR</b>	<b>MAY</b>	<b>JUN</b>	<b>JULY</b>	<b>SEPT</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>
Trey Steinhart	112	82	30	38	39	35	0	0	0	0	0	0
Doug Ridgway	108	82	26	38	36	34	0	0	0	0	0	0
Sheldon McCormick	107	73	27	37	36	34	0	0	0	0	0	0
Elizabeth Parrish	95	27	18	38	30	27	0	0	0	0	0	0
Christine Blue	75	55	20	0	38	37	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
<b>Class AAA Standing</b>	<b>TOTAL</b>	<b>OPEN</b>	<b>SS</b>	<b>FEB</b>	<b>MAR</b>	<b>MAY</b>	<b>JUN</b>	<b>JULY</b>	<b>SEPT</b>	<b>OCT</b>	<b>Nov</b>	<b>DEC</b>
Dean Taylor	114	84	30	36	40	38	0	0	0	0	0	0
Sharon McLemore	114	85	29	38	37	39	0	0	0	0	0	0
Heide Stover	113	85	28	39	37	37	0	0	0	0	0	0
Joanne Sogsti	112	83	29	40	34	38	0	0	0	0	0	0
Wayne Carlson	110	82	28	39	35	36	0	0	0	0	0	0
Em McLaren	106	79	27	36	33	37	0	0	0	0	0	0

## May 2019, All Prints and Digital Images

First Name	Last Name	Title	Score Open	Score SS	D or P	Class	Open Total	SS Total	Total	Date
Christine	Blue	Early Morning Take-off	8		D	AA				05/16/2019
Christine	Blue	Masaai Shepherd Boy	9		D	AA				05/16/2019
Christine	Blue	Dahlia in the Clouds	10		D	AA				05/16/2019
Christine	Blue	The Shape of Water		10	D	AA				05/16/2019
<b>Christine</b>	<b>Blue</b>	<b>Competition Totals</b>					<b>27</b>	<b>10</b>	<b>37</b>	
Wayne	Carlson	Kauffman Center for the Performing Arts	9		P	AAA				05/16/2019
Wayne	Carlson	A Study in Shades of White	9		P	AAA				05/16/2019
Wayne	Carlson	The Tide Goes Out	8		P	AAA				05/16/2019
Wayne	Carlson	Backlit Rose (POM)		10	P	AAA				05/16/2019
<b>Wayne</b>	<b>Carlson</b>	<b>Competition Totals</b>					<b>26</b>	<b>10</b>	<b>36</b>	
Joan	Erreca	Nature's Window	8		D	A				05/16/2019
Joan	Erreca	Camellia	8		D	A				05/16/2019
Joan	Erreca	Snack Time	7		D	A				05/16/2019
<b>Joan</b>	<b>Erreca</b>	<b>Competition Totals</b>					<b>23</b>	<b>0</b>	<b>23</b>	
Sheldon	McCormick	Hillside Bloom	8		D	AA				05/16/2019
Sheldon	McCormick	Underground Garden	9		D	AA				05/16/2019
Sheldon	McCormick	Bridge at Shin Zin Garden	8		D	AA				05/16/2019
Sheldon	McCormick	Tree & Truck		9	D	AA				05/16/2019
<b>Sheldon</b>	<b>McCormick</b>	<b>Competition Totals</b>					<b>25</b>	<b>9</b>	<b>34</b>	
Em	McLaren	Peacock Posing	8		D	AAA				05/16/2019
Em	McLaren	Cambodian Dancer	10		D	AAA				05/16/2019
Em	McLaren	The Harvest	10		D	AAA				05/16/2019
Em	McLaren	Yosemite Dogwood		9	D	AAA				05/16/2019
<b>Em</b>	<b>McLaren</b>	<b>Competition Totals</b>					<b>28</b>	<b>9</b>	<b>37</b>	
Sharon	McLemore	Forest Abstract	10		D	AAA				05/16/2019
Sharon	McLemore	Senanque Abbey, France	10		D	AAA				05/16/2019
Sharon	McLemore	Castle Stairway, Blois France	9		D	AAA				05/16/2019
Sharon	McLemore	Tuscan Hills Bathed in Light		S	D	AAA				05/16/2019
<b>Sharon</b>	<b>McLemore</b>	<b>Competition Totals</b>					<b>29</b>	<b>0</b>	<b>29</b>	
Elizabeth	Parrish	Spin Off	8		D	AA				05/16/2019
Elizabeth	Parrish	Holding On	9		D	AA				05/16/2019
Elizabeth	Parrish	Booted Up	10		D	AA				05/16/2019
Elizabeth	Parrish					AA				05/16/2019
<b>Elizabeth</b>	<b>Parrish</b>	<b>Competition Totals</b>					<b>27</b>	<b>0</b>	<b>27</b>	
Doug	Ridgway	Cranes in a Row	8		P	AA				05/16/2019
Doug	Ridgway	Crane Preening Feathers	9		P	AA				05/16/2019
Doug	Ridgway	Crane in Flight	9		P	AA				05/16/2019
Doug	Ridgway	Snow Goose Preening Backlit Feathers		8	P	AA				05/16/2019
<b>Doug</b>	<b>Ridgway</b>	<b>Competition Totals</b>					<b>26</b>	<b>8</b>	<b>34</b>	
Joanne	Sogsti J	Rusting Relic	9		P	AAA				05/16/2019
Joanne	Sogsti J	Anna's Hummingbird	9		P	AAA				05/16/2019
Joanne	Sogsti J	Dancing Cranes	10		D	AAA				05/16/2019
Joanne	Sogsti J	Backlit Egret		10	D	AAA				05/16/2019
<b>Joanne</b>	<b>Sogsti J</b>	<b>Competition Totals</b>					<b>28</b>	<b>10</b>	<b>38</b>	
Trey	Steinhart	Sailboat Masts and Elodea	8		D	AA				05/16/2019
Trey	Steinhart	Quiet Reflections on Kayak Paddle and Harbor	8		D	AA				05/16/2019
Trey	Steinhart	Winter Grape Pruning	9		D	AA				05/16/2019
Trey	Steinhart	Sandhill Moon (POM)		10	D	AA				05/16/2019
<b>Trey</b>	<b>Steinhart</b>	<b>Competition Totals</b>					<b>25</b>	<b>10</b>	<b>35</b>	
Heide	Stover	Pied-Billed Grebe Swimming	9		D	AAA				05/16/2019
Heide	Stover	Grand Tetons in the Sunrise	10		D	AAA				05/16/2019
Heide	Stover	Pintails White Geese and Red Winged Black birds in Flight	9			AAA				05/16/2019
Heide	Stover	Truth is Beauty Statue		9	D	AAA				05/16/2019
<b>Heide</b>	<b>Stover</b>	<b>Competition Totals</b>					<b>28</b>	<b>9</b>	<b>37</b>	
Dean	Taylor	Pintail	10		D	AAA				05/16/2019
Dean	Taylor	Rust and Old Paint	9		D	AAA				05/16/2019
Dean	Taylor	Krishna Temple	9		D	AAA				05/16/2019
Dean	Taylor	Backlit Wave		10	D	AAA				05/16/2019
<b>Dean</b>	<b>Taylor</b>	<b>Competition Totals</b>					<b>28</b>	<b>10</b>	<b>38</b>	

# 2019 Competition Policy

## A. GENERAL RULES

1. Only paid-up members may enter club competition.
2. Regular print and digital image competition period: Once each month except January. A competition year is February through December. Current regular meetings are February, March, May, July, September, October and December. The number of meetings may change from time to time at the discretion of the Board of Directors and approval of the general membership as facilities permit. The Annual Awards Dinner will be held in January.
3. A total of four (4) images (all prints, all digital or a combination of both) may be entered each competition month. A total of three (3) images may be entered in the Open Division and a total of one (1) in the Special Subject Division. The number of entries may change from time to time at the discretion of the Board of Directors and the approval of the general membership.
4. Each image will be scored from 6 to 10 points. All prints or digital images receiving 9 or 10 points will be classed as an honor image. The title of each print or digital image entered will be read before being evaluated. The name of the maker will be read for 9-point honor winners. Maker's names will be announced for the 10 point images after the Print & Digital Image-of-the-Month winners are chosen.
5. A print or digital image that does not receive an honor score, may be re-entered one more time in the same division.
6. A print or digital image may be entered in all divisions for which it qualifies; i.e., an honor image in Open may also be entered in the Special Subject Division at another competition. A print or digital image that receives an honor score may not be re-entered in the same division.
7. Any print or digital image that appears to be ineligible for competition or not qualified for a specific division could expect to be challenged. The Competition Vice-President shall decide whether or not the image is acceptable.
8. The exhibitor must have exposed each negative, slide or digital image entered. All images submitted for judging must be the work of the photographer/maker including the taking of the images and any digital enhancements and/or manipulation of the image. This does not apply to the processing of film or printing by a commercial processor.
9. The same image should not be entered both as a print and a projected digital image in the same competition.
10. In the event of absence or barring unforeseen circumstances, a member may submit make-up prints or digital images for one competition night per competition year; and whenever possible must submit all make-up prints or digital images at the meeting immediately following the month a member failed or was unable to submit the prints or digital images. Make-ups in the Special Subject Division must be the same subject as the month missed. Also, in case of absence a member may assign the responsibility of submitting his or her prints and/or digital images for competition to another member.
11. A club member who serves as judge cannot enter his or her own prints or digital images in the same competition. The judge's make-up prints or digital images can then be entered in another competition during that competition year. This is in addition to the once-a-year make-up provision already

allowed.

12. Prints or digital images may be projected/viewed briefly before the judging of each division if the judge indicates he/she would like a preview.

## B. PRINT ENTRY RULES

1. Each print entered must have a completed label attached to the back of the print including; name of maker, title, date entered and Division (Open or Special Subject). The writing or printing on the form must be legible. Labels must be attached on the back of the print in the upper left-hand corner for correct viewing of the print.
2. All prints must be matted or mounted with a total size (including mat board) of no larger than 18" X 24" and no smaller than 8" X 10". Exception: One side of a Panorama Print may be no larger than 36". Prints that are smaller than 5" X 7" will not be accepted. The maker's name must not appear on the viewing surface of the image. Framed prints shall not be entered.
3. Prints accompanied by entry forms should be submitted no later than 15 minutes prior to the start of the regular monthly meeting.
4. Prints receiving a score of 10 points, in each class, will be regrouped and judged for selection for the Print-of-the-Month honors. Print-of-the-Month honors will be given in Class A, AA & AAA.

## C. DIGITAL IMAGE ENTRY RULES

1. Digital images must be submitted in a format and by the deadline specified by the Competition Vice-President. Digital images may be submitted by email, mailed (CD) or delivered (CD) to the Competition Vice-President. Definition of Digital Image: An image taken with a digital camera, a negative, slide or print scanned into the computer and processed digitally.
2. Images must be in a format compatible with the projector. The key thing to keep in mind when formatting photos for submission is that the projector we use in the competition has a (maximum) resolution of 1400 x 1050 pixels. This means that any photo that exceeds this size in either dimension, could end-up being cropped by the projector. In other words: the image width cannot be more than 1400 pixels and the image height cannot be more than 1050 pixels. If your image is horizontal, only change the width to 1400, if your image is vertical, only change the height to 1050. Do not change both. Down-sizing the image from the "native" resolution coming out of your camera also significantly reduces the file size. This helps when emailing the files and takes-up less space on our hard-drives.
3. The maker's name, title of image, date entered and division (Open or Special Subject) must be included as the title of the image. When you have finished re-sizing your image save your image with a new title. For example do a Save as: Smith Sunrise Splendor 05-15 O.jpeg. (O-Open or SS-Special Subject). Specify whether you're Beginner, Advanced or Very Advanced.
4. Digital Images receiving a score of 10 points, in each class, will be regrouped and judged for selection for the Digital Image-of-the-Month honors. Digital Image-of-the-Month honors will be given in Class A, AA & AAA.



## Getting Started in Macro (It's Easier Than You Think!)

By: [Matthew Cicanese](#)

April 13, 2018

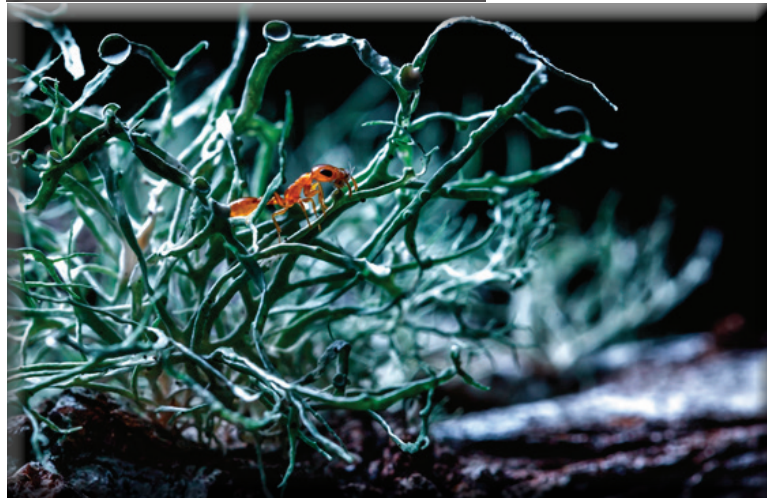
No macro lens? No problem! Although it may seem like the world of macro photography is out of reach and a world apart from our own, shooting macro is more accessible than you might think. From rigging your current gear, to creating DIY setups that tackle challenges like lighting, I'm here to be your guide for all things macro! My name is Matthew Cicanese (sick-uh-knees). I'm a National Geographic Explorer, documentary artist, and Canon USA Photographer who leads EOS Destination Workshops specializing in macro photography. I shoot macro subjects all over the world, from my own backyard to the rainforests of Sri Lanka! I've been a macro photographer for over ten years now, and have evolved along the way to overcome different challenges in macro and produce award-winning photographs. My goal with this article is to teach you how to accomplish more using less – less money, less frustration, and a drop of ingenuity.

Let's get started!

### Assess and Adapt Your Existing Gear

When starting off in macro, a lot of people (myself included) think that they have to have an elaborate DSLR setup or “dedicated” macro lens to be able to take any macro photographs. This is not the case. With the right tools and mindset, macro photography is a genre that is accessible with just a few simple, inexpensive steps in the right direction. The easiest way to get involved with macro using less, is to adapt with the gear you already have using some simple attachments.

The first recommended attachment is a set of close-up lenses (also called close-up filters or macro filters). The least expensive option are generic, close-up filter “sets,” available at camera stores and online. They're often sold as a set of three, sometimes labeled “+1,” “+2,” and “+3.” They screw into the front of your lens like a conventional



filter, and can be combined for greater a great way to get your feet wet with macro shooting. The catch? Optical performance is often only fair-to-middling.

Canon offers two close-up lens options, with the Close-up 250D and 500D lenses. These are double-element optics which similarly screw into your lens like a filter, but can be expected to deliver sharper performance than single-element close-up attachments. The 250D is optimized for lenses from 50 thru 135mm, and the 500D works best with lenses from 70mm thru 300mm. They're available in a range of sizes to attach to many (but not all) Canon EF and EF-S lenses.

Another great attachment to try with macro is a set of extension tubes. These small, metal lengths of tubing that sit between your camera and lens act like bellows on an old camera, to increase the distance between your lens and your camera's sensor. Using extension tubes like the Extension Tube EF 12 II or the EF 25 II can enable a wide variety of lenses to be used in a macro-sense, by allowing you to get closer to your subject — but it comes at a cost. Extension tubes reduce the amount of light entering your camera, but if you use your in-camera metering, no compensation is usually necessary. Auto exposure modes like Aperture-priority (Av on Canon cameras) can be a quick and effective way to work with close-up accessories in the field.

### Macro Myths Dispelled

In your path to becoming more proficient in macro photography, you're bound to come across opinions that are made out to be rock solid rules to achieving macro shots. “Always shoot macro with a tripod. Never use an ISO higher than 100. Always use a flash for the best light.” But the universal truth, which can apply to any genre of photography, is that there is no precise recipe for successful photographs.

A great way to learn more about macro and ways of shooting is through social media forums. Groups like these are (usually)

friendly, moderated environments where you can post your shots and see the work of others. It's a wonderful way to make new friends in the macro community, get feedback on your work, and even meet up with others to shoot macro together! Be warned though, these types of groups and forums are breeding grounds for myths like the ones mentioned above, and you should always take advice you get from those places with a grain of salt.

### **It's All About the Light (natural light, Speedlites, & long exposures)**

At its core, the very nature of photography comes down to light itself. Light is what illuminates your subjects, and shapes how they appear in your photographs. Like a person, light has different personality traits that will affect the overall look and feel of your macro photos. Let's dive into three light sources to learn about their pros and cons, and when to best utilize each type.

#### **Natural Light**

Natural light can be a great source of light for macro photography in the right conditions. It offers hours of non-stop use without the need for batteries (as opposed to Speedlites) and can create effects that other light sources can't. Depending on what time of the day you shoot, the characteristics and qualities of natural light change. If you utilize this to your advantage, natural light can provide you with a variety of styles for your macro photography throughout the day. When the sun is below the horizon (before sunrise and after sunset) the "blue hour" brings cool-colored tones and has a nice evenness to it. During the golden hours of the morning and evening (when the sun is just above the horizon), the qualities of the light are very warm. This is also a great time to see the dynamics of the environment for your macro (i.e. — sun rays coming through the trees and dew on the plants).



By photographing this cotton-grass in natural light on an overcast day, I was able to get a really even spread and good quality of light that didn't produce any harsh shadows. I was also able to open up my aperture (to f/2.8) to produce some nice, soft, bokeh that helped isolate the subject.

The downside to using natural light is the unpredictable patterns it can have. One moment it may be bright and sunny, while the next your light could disappear due to passing clouds. Vice versa, if you're shooting with soft, diffused sunlight through the clouds, and the clouds break — you're left with a harsh light source with strong shadows and too much light. Natural light also makes it harder to take creative shots by shaping your light, because there aren't that many ways to shape natural light. You can diffuse it if it's too harsh, but if it's too dark out there's not really a solution. Being dependent on a light source you can't control has more limitations than other light sources (such as Speedlites or flashlights).

Natural light is best utilized during the golden hours and blue hours where the light is the most dynamic. This provides a range of color tones and characteristics (such as sun rays). The other time when natural light is very useful is on overcast days, where evenly distributed cloud cover creates a softbox for the sun. This diffused light is great for providing even, consistent light — as long as the rain stays away.

#### **Pros**

- No batteries required! You can use natural light all day long and never have to reach for your battery bag.
- Variety. Using natural light for your macro will provide you with a wide spectrum of different light moods throughout the day.
- Golden Hour: Sunrise and sunset bring warm, golden light (called the "golden hour") that is great for flowers, insects, and water drops in nature.
- Blue Hour: The hour before sunrise and following sunset (called the "blue hour") give a very different mood for macro photographs – with deep hues of blue that cool off your scenes and give them drama in many cases.

#### **Cons**

- Unpredictability. Because it's uncontrollable, natural light can be really unpredictable. If it's your only source of light, this can present problems when shooting macro. If it's golden hour and it suddenly gets cloudy, you've lost your shot. If it's midday but cloudy with a soft light quality, then clouds disappear, now the harsh midday sun is going to cast bad shadows on your subject.

#### **Best uses**

- For golden hour and blue hour shooting where the natural light on macro subjects is the most dynamic
- For large macro scenes during cloudy days, where the light is softened by the cloud cover

## Artificial Light (Speedlites)

Perhaps the largest challenge in creating natural-looking macro photographs (besides getting tack-sharp focus) is lighting your subject. As the environment changes from subject to subject, Speedlites offer the most reliable and consistent forms of light. Speedlites like Canon's 600EX II-RT allow you to dial in exactly how much light you want to fall onto your subject. When you pair this amount of control with Manual mode on your camera, it gives you the most options to get your pictures exactly how you want them to look. With Canon's wireless transmitter unit ST-E3-RT, you're able to use your Speedlites off-camera, and control up to 15 flashes in up to 5 separately-controlled groups.

The downside to using Speedlites is that you have to have a power source for them. If you're on a heavy shoot and taking lots of frames with the Speedlites at full power, you'll need to bring extra batteries. Another challenge to shooting with Speedlites is that you have to soften the light that comes from them. This can be done in a variety of ways — from bouncing the light off of a white surface, to using a reflective umbrella.



By using a Speedlite unit, small flash diffuser, and small aperture, I was able to get a subject like this blue lichen in complete focus under the canopy of a dark forest.  
f/13; 1/200th sec.; 100mm; ISO 125.

### Pros

- Very controllable (amount of light)
- Predictable (directionality & characteristics of that light)
- Consistent (As long as you have power, you have light. No waiting for the golden hour to come, etc.)

### Cons

- Batteries required (rechargeable AA-size NiMH batteries are a great investment!)
- Additional accessories needed (i.e. – light modifiers or radio triggers for off-camera flash)
- More setup required before you can get the shot

### Best uses

- For a wide range of shooting without limitations to time-of-day, quality of light, or where the light lands on the subject.



A 5-second exposure (f/16, ISO 100) of some tulips in a pitch dark room. The light landed exactly where I needed it to by painting it onto my subject using a small, continuous light source.

## Long Exposures (light painting)

One of the least-used methods for getting light on macro subjects is by long exposures. When shooting long exposure macro photographs, the light is literally painted by moving the light source, such as a flashlight onto the different parts of your subject over a period of time (i.e. – 3, 5, or 10 seconds). The nice part about long exposure light painting for macro is that it allows the most amount of control over where your light falls onto your subject. By locking your camera into a sturdy tripod and working in a controlled environment (i.e. indoors), you can control every element of the photograph.

The challenge to shooting long exposure macro photographs is that it requires a lot of setup, a larger time commitment, and much more trial and error to get the shot. However, this type of shooting can allow you to create photographs that illuminate certain aspects of your subject and have complete control over the scene.

## Pros

- Extremely controllable in regards to where the light lands on your subject (you paint it on)

## Cons

- Requires tripod
- Requires darkness
- Longer time commitment
- Requires more controlled conditions (i.e. – no wind)

## Best uses

- For controlled environments where you want to create drama and emphasize key part of your subject using hand-painted light.

## Sharpening Your Mind Before Wielding Your Camera

To me, macro photography is a very meditative process. It gives me a chance to see and explore the world around me at a much slower pace — and as a result, experience details that would otherwise go forgotten. When it comes to shooting macro, I spend at least half of the time in deep observation without my camera to eye. This mindfulness is something I practice each time I shoot, and a skill that I always pass on to my students. By observing the world through your eyes first, it eliminates the desire to constantly press the shutter, and gives the mind a chance to see and digest the scene you're experiencing. When you're studying the scenes, you want to photograph in deep thought and not simply trying to get "the money shot," you'll naturally achieve stronger macro photographs.

The most important thing to remember when it comes to shooting macro is not to get discouraged. It takes a lot of practice to learn how to shape your light around your subject, utilize Manual mode to achieve the desired results, and compose macro photographs in a way that tells a story. The macro world can be very daunting at times, even for seasoned professionals like myself. When a heartbeat or minor camera setting can be the difference between getting and missing the shot, it's easy to get discouraged. What's important for the process of improving in your macro photography, is not to give up when things get challenging.

## Summary

To summarize:

### Assess & adapt your existing gear

- Get a lay of the land for what gear you have, and how you can adapt it to help you achieve macro shots (like adding close-up filters or using extension tubes).

### Dispelling Macro Myths

- Don't let opinions or myths get in the way of your shooting. If you shoot a certain way and it works for you, then keep doing that!

### Using the right light

- Learn what your favorite light source is for macro photographs, and how to creatively use that light source. Learn when to use each type of light depending on the scene, and how those light types tell the story in certain ways.

### Sharpening your mind

- Macro photography is a meditative practice. Learn to observe the world around you without necessarily having the camera to eye. This will sharpen your observation skills, and in turn, help you produce better macro photographs.

### Don't get discouraged

- Macro photography is a very challenging genre to be proficient in, so it's important to remember that half of the fun is just being out in nature experiencing the scenes before you even take the picture!

Want to learn more about macro photography? Check out this [Canon Live Learning Destination Workshop](#) taught by Matthew himself!

Can't make it in person? Canon Online Learning has you covered with this online class: [Intro to Macro and Close-Up Photography](#).

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Bristlecone Night, Milky Way from the White Mountains, California  
See the Milky Way

## How to Photograph the Milky Way

By [Gary Hart](#)

Look heavenward on a moonless (Northern Hemisphere) summer night far from city light. The first thing to strike you is the sheer volume of stars, but as your eyes adjust, your gaze is drawn to a luminous band spanning the sky. Ranging from magnificently brilliant to faintly visible, this is the Milky Way, home to our sun and nearly a half trillion other stars of varying age, size, and temperature.

### Size and shape

Though every star you've ever seen is part of our Milky Way galaxy, stargazers use the Milky Way label more specifically to identify this river of starlight, gas, and dust spanning the night sky. As you feast your eyes, appreciate that some of the Milky Way's starlight has traveled 25,000 years to reach your eyes, and light from a star on one edge of the Milky Way would take 100,000 years to reach the other side.

The rest of the sky appears to be filled with far more discrete stars than the region containing the Milky Way, but don't let this deceive you. Imagine that you're out in the countryside where the lights of a distant city blend into a homogeneous glow—similarly, the stars in the Milky Way's luminous band are simply too numerous and distant to resolve individually. On the other hand, the individual pinpoints of starlight that we name and mentally assemble into constellations are just closer, much like the lights of nearby farmhouses. And the dark patches in the Milky Way aren't empty space—like the trees and mountains that block our view of the city, they're starlight-blocking interstellar dust and gas, remnants of exploded stars and the stuff of future stars.

Just as it's impossible to know what your house looks like by peering out a window, it's impossible to know what the Milky Way looks like by simply looking up on a dark night. Fortunate for us, really smart people have been able to infer from painstaking observation, measurement, reconstruction, and comparison with other galaxies that our Milky Way is flat (much wider than it is tall) and spiral shaped, like a glowing pinwheel, with two major arms and several minor arms spiraling out from its center. Our solar system is in one of the Milky Way's minor arms, a little past midway between the center and outer edge.



Milky Way look-alike spiral galaxy:

This is what our galaxy would look like from the outside, looking in. (The individual stars visible here are "local" and not part of the spiral galaxy depicted here.) Earth would be between two of the spiral arms, about halfway out from the center.

whether we're looking toward our galaxy's dense center or sparse outer region.

### Blinded by the light

Sadly, artificial light and atmospheric pollution have erased the view of the Milky Way for nearly a third of the world's population, and eighty percent of Americans. Worse still, even though some part of the Milky Way is overhead on every clear night, many people have never seen it.

Advances in digital technology have spurred a night photography renaissance that has enabled the Milky Way challenged to enjoy images of its splendor from the comfort of their recliner, but there's nothing quite like viewing it in person. With just a little knowledge and effort, you too can enjoy the Milky Way firsthand; add the right equipment and a little more knowledge, and you'll be able to photograph it as well.

### Horizon to Horizon

Understanding that our Solar System is inside the Milky Way's disk makes it easier to understand why we can see some portion of the Milky Way on any night (assuming the sky is dark enough). In fact, from our perspective, the plane of the Milky Way forms a complete ring around Earth (but of course we can only see half the sky at any given time), with its brightness varying depending on





The Milky Way's brilliant center, its "galactic core," radiates above Kilauea on Hawaii's Big Island

### Where the action is

Though the plane of the Milky Way stretches all the way across our sky, when photographers talk about photographing the Milky Way, they usually mean the galactic core—the Milky Way's center and most densely packed, brightest region. Unfortunately, our night sky doesn't always face the galactic core, and there are many months when this bright region is not visible at all.

To understand the Milky Way's visibility in our night sky, it helps to remember that Earth both rotates on its axis (a day), and revolves around the sun (a year). When the side of the planet we're on rotates away from the sun each day, the night sky we see is determined by our position on our annual trip around the sun—when Earth is between the sun and the galactic core, we're in position to see the most brilliant part of the Milky Way; in the months when the sun is between earth and the galactic core, the bright part of the Milky Way can't be seen.

Put in terrestrial terms, imagine you're at the neighborhood playground, riding a merry-go-round beneath a towering oak tree. You face outward, with your back to the merry-go-round's center post. As the merry-go-round spins, your view changes—about half of the time you'd rotate to face the oak's trunk, and about half the time your back is to the tree. Our solar system is like that merry-go-round: the center post is the sun, the Milky Way is the tree, and in the year it takes our celestial merry-go-round to make a complete circle, we'll face the Milky Way about half the time.

### Finding the Milky Way

Just like every other celestial object outside our solar system, the Milky Way's position in our sky changes with the season and time of night you view it, but it remains constant

relative to the other stars and constellations. This means you can find the Milky Way by simply locating any of the constellations in the galactic plane. Here's an alphabetical list of the constellations\* through which the Milky Way passes (with brief notes by a few of the more notable constellations):

Aquila	Ara	Auriga—faintest	Canis Major—faint	Carina
Cassiopeia—faint; its easily recognized "w" (or "m") shape makes Cassiopeia a good landmark for locating the Milky Way in the northern sky				
Cepheus	Circinus	Crux	Cygnus—bright	Gemini
Lacerta	Lupus	Monoceros	Musca	Norma
Ophiuchus	Orion—faint; another easy to recognize constellation that's good for finding the galactic plane			
Perseus—faint	Puppis	Pyxis	Sagitta	Sagittarius—brightest, galactic core
Scorpius—bright	Scutum	Serpens	Taurus—faint	Triangulum
Vela	Vulpecula			

\* Constellations are comprised of stars that only appear connected by virtue of our Earth-bound perspective—a constellation is a direction in the sky, not a location in space.

If you can find any of these constellations, you're looking in the direction of some part of the Milky Way (if you can't see it, your sky isn't dark enough). But most of us want to see the center of the Milky Way, where it's brightest, most expansive, and most photogenic. The two most important things to understand about finding the Milky Way's brilliant center are:

- From our perspective here on Earth, the galactic core is in Sagittarius (and a couple of other constellations near Sagittarius)—when Sagittarius is visible, so is the brightest part of the Milky Way (assuming you can find a dark enough sky)
- Earth's night side most directly faces Sagittarius in the Northern Hemisphere's summer months (plus part of spring and autumn)

Armed with this knowledge, locating the Milky Way's core is as simple as opening one of my (too many) star apps to find out where Sagittarius is. Problem solved. Of course, it helps to know that the months when the galactic core rises highest and is visible longest are June, July, and August, and to not even consider looking before mid-March, or after mid-October. If you can't wait until summer and don't mind missing a little sleep, starting in April, Northern Hemisphere residents with a dark enough sky can catch Sagittarius and the galactic core rising in the southeast shortly before sunrise. After its annual premier in April, the Milky Way's core rises slightly earlier each night and is eventually well above the horizon by nightfall.

People who enjoy sleep prefer doing their Milky Way hunting in late summer and early autumn, when the galactic core has been above the horizon for most of the daylight hours, but remains high in the southwest sky as soon as the post-sunset sky darkens enough for the stars to appear. The farther into summer and autumn you get, the closer to setting beneath the western horizon the Milky Way will be at sunset, and the less time you'll have before it disappears.

## Into the darkness

The Milky Way is dim enough to be easily washed out by light pollution and moonlight, so the darker your sky, the more visible the Milky Way will be. To ensure sufficient darkness, I target moonless hours, from an hour or so after sunset to an hour before sunrise. New moon nights are easiest because the new moon rises and sets (more or less) with the sun and there's no moon all night. But on any night, if you pick a time before the moon rises, or after it sets, you should be fine. Be aware that the closer the moon is to full, the greater the potential for its glow to leak into the scene from below the horizon.

Getting away from city lights can be surprisingly difficult (and frustrating). Taking a drive out into the countryside near home is better than nothing, and while it may seem dark enough to your eyes, a night exposure in an area that you expect to be dark enough reveals just how insidious light pollution is as soon as you realize all of your images are washed out by an unnatural glow on the horizon. Since the galactic core is in the southern sky in the Northern Hemisphere, you can mitigate urban glow in your Milky Way images by heading south of any nearby population area, putting the glow behind you as you face the Milky Way.

Better than a night drive out to the country, plan a trip to a location with a truly dark sky. For this, those in the less densely populated western US have an advantage. The best resource for finding world-class dark skies anywhere on Earth is the [International Dark-Sky Association](#). More than just a resource, the IDA actively advocates for dark skies, so if the quality of our night skies matters to you, spend some time on their site, get involved, and share their website with others.



River of Light  
Grand Canyon, Arizona

## Photograph the Milky Way

Viewing the Milky Way requires nothing more than a clear, dark sky. (Assuming clean, clear skies) the Milky Way's luminosity is fixed, so our ability to see it is largely a function of the darkness of the surrounding sky—the darker the sky, the better the Milky Way stands out. But because our eyes can only take in a fixed amount of light, there's a ceiling on our ability to view the Milky Way with the unaided eye.

A camera, on the other hand, can accumulate light for a virtually unlimited duration. This, combined with technological advances that continue increasing the light sensitivity of digital sensors, means that when it comes to photographing the Milky Way, well..., the sky's the limit. As glorious as it is to view the Milky Way with the unaided eye, a camera will show you detail and color your eyes can't see.

Knowing when and where to view the Milky Way is a great start, but photographing the Milky Way requires a combination of equipment, skill, and experience that doesn't just happen overnight (so to speak). But Milky Way photography doesn't need to break the bank, and it's not rocket science.

## Equipment

Bottom line, photographing the Milky Way is all about maximizing your ability to collect light: long exposures, fast lenses, high ISO.

## Camera

In general, the larger your camera's sensor and photosites (the "pixels" that capture the light), the more efficiently it collects light. Because other technology is involved, there's not an absolute correlation between sensor and pixel size and light gathering capability, but a small, densely packed sensor almost certainly rules out your smartphone and point-and-shoot cameras for anything more than a fuzzy snap of the Milky Way. At the very least you'll want a mirrorless or DSLR camera with an APS-C (1.5/1.6 crop) size sensor. Better still is a full frame mirrorless or DSLR camera. (A 4/3 Olympus or Panasonic sensor might work, but as great as these cameras are for some things, high ISO photography isn't their strength.

Another general rule is that the newer the technology, the better it will perform in low light. Even with their smaller, more densely packed sensors, many of today's top APS-C bodies outperform in low light full frame bodies that have been out for a few years, so full frame or APS-C, if your camera is relatively new, it will probably do the job.

If you're shopping for a new camera and think night photography might be in your future, compare your potential cameras' high ISO capabilities—not their maximum ISO. Read reviews by credible sources like DP Review, Imaging Resource, or DxOMark (among many others) to see how your camera candidates fare in objective tests.

An often-overlooked consideration is the camera's ability to focus in extreme low light. Autofocusing on the stars or landscape will be difficult to impossible, and you'll not be able to see well enough through a DSLR's viewfinder to manually focus. Some bodies with a fast lens might autofocus on a bright star or planet, but it's not something I'd count on (though I expect within a few years before this capability will become more common).

Having photographed for years with Sony and Canon, and working extensively with most other mirrorless and DSLR bodies in my workshops, I have lots of experience with cameras from many manufacturers. In my book, focus peaking makes mirrorless the clear winner for night focusing. Sony's current mirrorless bodies (a7RII/RIII, a7S/SII) are by far the easiest I've ever used for focusing in the dark—what took a minute or more with my Canon, I can do in seconds using focus peaking with my Sony bodies (especially the S bodies). I use the Sony a7SII, but when I don't want to travel with a body, I only use for night photography, the Sony a7RIII does the job too. Of the major DSLR brands, I've found Canon's superior LCD screen (as of 2019) makes it much easier to focus in extreme low light than Nikon. (More on focus later.)

## Lens

Put simply, to photograph the Milky Way you want fast, wide glass—the faster the better. Fast to capture as much light as possible; wide to take in lots of sky. A faster lens also makes focus and composition easier because the larger aperture gathers more light. How fast? F/2.8 or faster—preferably faster. How wide? At least 28mm, and wider is better still. I do enough night photography that I have a dedicated, night-only lens—my original night lens was a Canon-mount Zeiss 28mm f/2; my current night lens is the Sony 24mm f/1.4.

## Tripod

It goes without saying that at exposure times up to 30 seconds, you'll need a sturdy tripod and head for Milky Way photography. You don't need to spend a fortune, but the more you spend, the happier you'll be in the long run (trust me). Carbon fiber provides the best combination of strength, vibration reduction, and light weight, but a sturdy (albeit heavy) aluminum tripod will do the job.

An extended centerpost is not terribly stable, and a non-extended centerpost limits your ability to spread the tripod's legs and get low, so I avoid tripods with a centerpost. But if you have a sturdy tripod with a centerpost, don't run out and purchase a new one—just don't extend the centerpost when photographing at night.

[Read my tips for purchasing a tripod here.](#)

## Other stuff

To eliminate the possibility of camera vibration I recommend a remote release; without a remote you'll risk annoying all within earshot with your camera's 2-second timer beep. You'll want a flashlight or headlamp for the walk to and from the car, and your cell phone for light while shooting. And it's never a bad idea to toss an extra battery in your pocket. And speaking of lights, never, never, NEVER use a red light for night photography (more on this later).

## Getting the shot

### Keep it simple

There are just so many things that can go wrong on a moonless night when there's not enough light to see camera controls, the contents of your bag, and the tripod leg you're about to trip over. After doing this for many years, both on my own and helping others in workshops, I've decided that simplicity is essential.

Simplicity starts with paring down to the absolute minimum camera gear: a sturdy tripod, one body, one lens, and a remote release (plus an extra battery in my pocket). Everything else stays at home, in the car, or if I'm staying out after a sunset shoot, in my bag.

Upon arrival at my night photography destination, I extract my tripod, camera, lens (don't forget to remove the polarizer), and remote release. I connect the remote and mount my lens—if it's a zoom I set the focal length at the lens's widest—then set my exposure and focus (more on exposure and focus below). If I'm walking to my photo site, I carry the pre-exposed and focused camera on the tripod (I know this makes some people uncomfortable, but if you don't trust your tripod head enough to hold onto your camera while you're walking, it's time for a new head), trying to keep the tripod as upright and stable as possible as I walk.

Flashlights/headlamps are essential for the walk/hike out to to and from my shooting location, but while I'm there and in shoot mode, it's no flashlights, no exceptions. This is particularly important when I'm with a group. Not only does a flashlight inhibit your night vision, its light leaks into the frame of everyone who's there. And while red lights may be better for your night vision and are great for telescope view, red light is especially insidious about leaking into everyone's frame, so if you plan to take pictures, no red light! If you follow my no flashlight rule once the photography begins, you'll be amazed at how well your eyes adjust. I can operate my camera's controls in the dark—it's not hard with a little practice, and well worth the effort to learn. If I ever do need to see my camera to adjust something, or if I need to see to move around, my cell phone screen (not the phone's flashlight, just its illuminated screen) gives me all the light I need.

## Composition

A good Milky Way image is distinguished from an ordinary Milky Way image by its foreground. Simply finding a location that's dark enough to see the Milky Way is difficult enough; finding a dark location that also has a foreground worthy of pairing with the Milky Way usually takes a little planning.

Since the Milky Way's center is in the southern sky (for Northern Hemisphere observers), I look for remote (away from light pollution) subjects that I can photograph while facing south (or southeast or southwest, depending on the month and time of

night). Keep in mind that unless you have a ridiculous light gathering camera (like the Sony a7S or a7S II) and an extremely fast lens (f/2 or faster), your foreground will probably be more dark shape than detail. Water's inherent reflectivity makes it a good foreground subject as well, especially if the water includes rocks or whitewater.

When I encounter a scene I deem photo worthy, not only do I try to determine its best light and moon rise/set possibilities, I also consider its potential as a Milky Way subject. Can I align it with the southern sky? Are there strong subjects that stand out against the sky? Is there water I can include in my frame?

I've found views of the Grand Canyon from the North Rim, the Kilauea Caldera, and the bristlecone pines in California's White Mountains that work spectacularly. And it's hard to beat the dark skies and breathtaking foreground possibilities at the bottom of the Grand Canyon. On the other hand, while Yosemite Valley has lots to love, you don't see a lot of Milky Way images from Yosemite Valley because not only is there a lot of light pollution, and Yosemite's towering, east/west trending granite walls give its south views an extremely high horizon that blocks much of the galactic core from the valley floor.

The last few years I've started photographing the Milky Way above the spectacular winter scenery of New Zealand's South Island, where the skies are dark and the Milky Way is higher in the sky than it is in most of North America.

To maximize the amount of Milky Way in my frame, I generally (but not always) start with a vertical orientation that's at least 2/3 sky. On the other hand, I do make sure to give myself more options with a few horizontal compositions as well. Given the near total darkness required of a Milky Way shoot, it's often too dark to see well enough to compose that scene. If I can't see well enough to compose I guess at a composition, take a short test exposure at an extreme (unusable) ISO to enable a relatively fast shutter speed (a few seconds), adjust the composition based on the image in the LCD, and repeat until I'm satisfied.

### Focus

Needless to say, when it's dark enough to view the Milky Way, there's not enough light to autofocus (unless you have a rare camera/lens combo that can autofocus on a bright star and planet), or even to manually focus with confidence. And of all the things that can ruin a Milky Way image (not to mention an entire night), poor focus is number one. Not only is achieving focus difficult, it's very easy to think you're focused only to discover later that you just missed.

Because the Milky Way's focus point is infinity, and you almost certainly won't have enough light to stop down for more depth of field, your closest foreground subjects should be far enough away to be sharp when you're wide open and focused at infinity. Before going out to shoot, find a hyperfocal app and plug in the values for your camera and lens at its widest aperture. Even though it's technically possible to be sharp from half the hyperfocal distance to infinity, the kind of precise focus focusing on the hyperfocal point requires is difficult to impossible in the dark, so my rule of thumb is to make sure my closest subject is no closer than the hyperfocal distance.

For example, I know with my Sony 24mm f/1.4 wide open on my full frame Sony a7SII, the hyperfocal distance is about 50 feet. If I have a subject that's closer (such as a bristlecone pine), I'll pre-focus (before dark) on the hyperfocal distance, or shine a bright light on an object at the hyperfocal distance and focus there, but generally I make sure everything is at least 50 feet away. Read more about hyperfocal focus in my [Depth of Field](#) article.

By far the number one cause of night focus misses is the idea that you can just dial any lens to infinity; followed closely by the idea that focused at one focal length means focused at all focal lengths. Because when it comes to sharpness, almost isn't good enough, if you have a zoom lens, don't even think of trying to dial the focus ring to the end for infinity. And even for most prime lenses, the infinity point is a little short of all the way to the end, and can vary slightly with the temperature and f-stop. Of course if you know your lens well enough to be certain of its infinity point by feel (and are a risk taker), go for it. And that zoom lens that claims to be parfocal? While it's possible that your zoom will hold focus throughout its entire focal range, regardless of what the manufacturer claims, I wouldn't bet an entire shoot on it without testing first.

All this means that the only way to ensure night photography sharpness is to focus carefully on something before shooting, refocus every time your focal length changes, and check focus frequently by displaying and magnifying an image on your LCD. To simplify (there's that word again), when using a zoom lens, I usually set the lens at its widest focal length, focus, verify sharpness, and (once I know I'm focused) never change the focal length again.

While the best way to ensure focus is to set your focal length and focus before it gets dark, sometimes pre-focusing isn't possible, or for some reason you need to refocus after darkness falls. If I arrive at my destination in the dark, I autofocus on my headlights, a bright flashlight, or a laser 50 feet or more away. And again, never assume you're sharp by looking at the image that pops up on the LCD when the exposure completes—always magnify your image and check it after you focus.

For more on focusing in the dark, including how to use stars to focus, read my [Starlight Photo Tips](#) article.

### Exposure

Exposing a Milky Way image is wonderfully simple once you realize that you don't have to meter—because you can't (not enough light). Your goal is simply to capture as many photons as you can without damaging the image with noise, star motion, and lens flaws.

Basically, with today's technology you can't give a Milky Way image too much light—you'll run into image quality problems before you overexpose a Milky Way image. In other words, capturing the amount of light required to overexpose a Milky Way image is only possible if you've chosen an ISO and/or shutter speed that significantly compromises the quality of the image with excessive noise and/or star motion.

In a perfect world, I'd take every image at ISO 100 and f/8—the best ISO and f-stop for my camera and lens. But that's not possible when photographing in near total darkness—a usable Milky Way image requires exposure compromises. What kind of compromises? The key to getting a properly exposed Milky Way image is knowing how far you push your camera's exposure settings before the light gained isn't worth the diminished quality. Each exposure variable causes a different problem when pushed too far:

**ISO:** Raising ISO to increase light sensitivity comes with a corresponding increase in noise that muddies detail. The noise at any particular ISO varies greatly with the camera, so it's essential to know your camera's low-light capability(!). Some of the noise can be cleaned up with noise reduction software (I use Topaz DeNoise 6)—the amount that cleans up will depend on the noise reduction software you use, your skill using that software, and where the noise is (is it marring empty voids or spoiling essential detail?).

**Shutter speed:** The longer the shutter stays open, the more motion blur spreads the stars' distinct pinpoints into streaks. I'm not a big fan of formulas that dictate star photography shutter speeds because I find them arbitrary and inflexible, and they fail to account for the fact that the amount of apparent stellar motion varies with the direction you're composing (you'll get less motion the closer to the north or south poles you're aimed). My general shutter-speed rule of thumb is 30-seconds or less, preferably less—I won't exceed 30 seconds, and do everything I can to get enough light with a faster shutter speed.

**F-stop:** At their widest apertures, lenses tend to lose sharpness (especially on the edges) and display optical flaws like comatic aberration (also called coma) that distorts points of light (like stars) into comet shaped blurs. For many lenses, stopping down even one stop from wide open significantly improves image quality.

**Again:** My approach to metering for the Milky Way is to give my scene as much light as I can without pushing the exposure compromises to a point I can't live with. Where exactly is that point? Not only does that question require a subjective answer that varies with each camera body, lens, and scene, as technology improves, I'm less forgiving of exposure compromises than I once was. For example, when I started photographing the Milky Way with my Canon 1DS Mark III, the Milky Way scenes I could shoot were limited because my fastest wide lens was f/4 and I got too much noise when I pushed my ISO beyond 1600. This forced me compromise by shooting wide open with a 30-second shutter speed to achieve even marginal results. In fact, given these limitations, despite trying to photograph the Milky Way from many locations, when I started the only Milky Way foreground that worked well enough was Kilauea Caldera, because it was its own light source (an erupting volcano).

Today (mid-2019) I photograph the Milky Way with a Sony a7S II and a Sony 24mm f/1.4 lens. I get much cleaner images from my Sony at ISO 6400 than got a ISO 1600 on my Canon 1DSIII, and the night light gathering capability of an f/1.4 lens revelatory. At ISO 6400 (or higher) I can stop down slightly to eliminate lens aberrations (though I don't seem to need to with the Sony lens), drop my shutter speed to 20 or 15 seconds to reduce star motion 33-50 percent, and still get usable foreground detail by starlight.

I can't emphasize enough how important it is to know your camera's and lens's capabilities in low light, and how for you're comfortable pushing the ISO and f-stop. For each of the night photography equipment combos I've used, I've established a general exposure upper threshold, rule-of-thumb compromise points for each exposure setting that I won't exceed until I've reached the compromise threshold of the other exposure settings. For example, with my Sony a7SII/24mm f/1.4 combo, I usually start at ISO 6400, f/1.4, and 20 seconds. Those settings will usually get me enough light for Milky Way color and pretty good foreground detail. But if I want more light (for example, if I'm shooting into the black pit of the Grand Canyon from the canyon rim), my first exposure compromise might be to increase to ISO 12800; if I decide I need even more light, my next compromise is to bump my shutter speed to 30 seconds. Or if I want a wider field of view than 24mm, I'll put on my Sony 16-35 f/2.8 G lens and increase to ISO 12800 and 30 seconds.

These thresholds are guidelines rather than hard-and-fast rules, and they apply to my preferences only—your results may vary. And though I'm pretty secure with this workflow, for each Milky Way composition I try a variety of exposure combinations before moving to another composition. Not only does this give me a range of options to choose between when I'm at home and reviewing my images on a big monitor, it also gives me more insight into my camera/lens capabilities, allowing me to refine my exposure compromise threshold points.

One other option that I've started applying automatically is long exposure noise reduction, which delivers a noticeable reduction in noise for exposures that are several seconds and longer.

\* In normal situations the Sony a7SII can handle ISO 12,800 without even breathing hard, but the long exposure time required of night photography generates a lot of heat on the sensor with a corresponding increase in noise.

### It's time to click that shutter

You're in position with the right gear, composed, focused, and exposure values set. Before you actually click the shutter, let me remind you of a couple of things you can do to ensure the best results: First, lower that center post. A tripod center post's inherent instability is magnified during long exposures, not just by wind, but even by nearby footsteps, the press of the shutter button, and slap of the mirror (and sometimes it seems, by ghosts). And speaking of shutter clicks, you should be using a remote cable or two-second timer to eliminate the vibration imparted when your finger presses the shutter button.

When that first Milky Way image pops up on the LCD, it's pretty exciting. So exciting in fact that sometimes you risk being lulled into a "Wow, this isn't as hard as I expected" complacency. Even though you think everything's perfect, don't forget to review your image sharpness every few frames by displaying and magnifying an image on your LCD. In theory nothing should change unless you changed it, but in practice I've noticed an occasional inclination for focus to shift mysteriously between shots. Whether it's slight temperature changes or an inadvertent nudge of the focus ring as you fumble with controls in the dark, you can file periodically checking your sharpness falls under "an ounce of prevention...." Believe me, this will save a lot of angst later.

And finally, don't forget to play with different exposure settings for each composition. Not only does this give you more options, it also gives you more insight into your camera/lens combo's low light capabilities.

### The bottom line

Though having top-of-the-line, low-light equipment helps a lot, it's not essential. If you have a full frame mirrorless or DSLR camera that's less than five years old, and a lens that's f/2.8 or faster, you probably have all the equipment you need to get great the Milky Way images. Even with a cropped sensor, or an f/4 lens, you have a good chance of getting usable Milky Way images in the right circumstances. If you've never photographed the Milky Way before, don't expect perfection the first time out. What you can expect is improvement each time you go out as you learn the limitations of your equipment and identify your own exposure compromise thresholds. And success or failure, at the very least you'll have spent a magnificent night under the stars.

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