

## **Guide to Art Photography in Museums** / revised, October 6, 2014

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This essay is found on the MISC INFO page of my web site,

[www.socialhistoryofart.com](http://www.socialhistoryofart.com)

### *About the Author*

I have been photographing regularly in art museums since 1978. For 1,500 sample art photos, see the page “My Art Photos” on my website.

<http://www.socialhistoryofart.com/apps/photos/>

The first version of this guide was written for film cameras and published in CAA Newsletter in 1985. For information on cameras and lenses, see my “Guide to Digital Cameras” under the “Misc Info” page on my web site.

<http://www.socialhistoryofart.com/miscinfo.htm>)

### **SUMMARY**

High-quality, hand-held photos of artworks in museums and churches require three things: 1) good equipment (a full-frame camera and a quality, fast lens or two), 2) photographic experience, and 3) basic skill in Photoshop.

### **A Full-Frame Camera is Necessary as it Allows Shooting in Dim Light at ISO 16,000+**

The most important camera feature for museum photography is a large sensor. This allows shooting at high ISOs without “noise” (grainy images) or blurriness due to handshake. Many museum galleries feature dark objects in dimly lit galleries. Light-sensitive objects such as tapestries, watercolors, pastels, drawings, and illuminated manuscripts are always shown in very dim light. If you shoot sculpture, you will need depth of focus and an even higher ISO. For these reasons, a full-frame camera is essential. If full-frame cameras are too expensive or heavy, you can get good results in well-lit galleries with a mid-range DSLR and a high-quality, fast lens (with a low f stop between f/1.4 and f/2.8).

Most point and shoot cameras have tiny sensors which can only shoot up to ISO 800 without image-degrading noise. Even high-end compact cameras with a 1" sensor like the Sony RX100 series cannot go higher than ISO 1,600 without noisy shots. Smaller, crop-factor DSLRs and mirrorless cameras with bigger sensors will generally yield good results in well-lit galleries and allow ISO up 3,200 or even 6,400. A full-frame camera allows shooting up to ISO 16,000 or higher. Unfortunately, all such cameras are expensive. Much are also large and heavy. One great small, mirrorless, full-frame camera is the Sony Alpha 7s.

#### *Small, Crop-Factor DSLRS and Mirrorless Cameras / up to ISO 3,200 / \$700-\$1,300 (body only)*

Try a mid-price, crop-factor DSLR such as the Canon Rebel T4i, T5i, Canon 7D Mark II, Nikon D5300, or Nikon D300. For much smaller and lighter cameras, try a top mirrorless camera such as the Olympus E-M 1 (\$1,350); or Fuji X-T1 (\$1,300). Other good models include Olympus PEN E-P5 (\$1,000) and Olympus E-M5 (\$1,300) and the full-frame Sony Alpha 7 series.

#### *Smaller Full Frame DSLRS*

Good smaller, full-frame DSLRs include the Nikon D600 (\$2,100) and Canon 6D (\$2,100). See below for full-frame mirrorless cameras.

#### *Full-Frame DSLRS and Mirrorless Cameras*

Full-frame DSLRs allow you to avoid the widest aperture settings (f2.8 on many lenses) which usually reduces image sharpness. For example, if your lens goes down to f/2.8, a full-frame camera will still let you shoot at f/3.2 or f/3.5.

Good full-frame DSLRs include the Nikon D800 and Canon 5D Mark III which shoot at ISO 20,000+ with no noise. Compared to Canon, the Nikon D800 is cheaper, has somewhat better lower-noise levels allowing shots at ISO 30,000, has better dynamic range, and better white balance. If you turn down its 36 megapixel setting to something equivalent to the 23 MP setting of Canon's 5D Mark III, you will do even better.

Full-frame, mirrorless camera have the same, great low-light shooting of a big DSLR without the size or weight. The best of the current crop in 2014 is the Sony Alpha 7S. The main drawback to mirrorless cameras is the lack of an extensive choice in lenses but that is changing quickly in 2014-2015.

Olympus M. Zuiko ED 40-150mm f/2.8 Pro (\$1,500) late fall, 2014 / no reviews yet

Olympus M. Zuiko Digital ED 12-40mm F2.8 Pro zoom (\$1,000) / late 2014

Fuji XF 50-140 f/2.8 R LM OIS WR / \$1,600 / fall 2014 / (no reviews yet)

Zeiss Sonnar T\* FE 55mm f/1.8 ZA (\$1,000) / expert reviews describe this as one of the best autofocus lens ever made / The much lower f/stop on this lens makes it my top choice for museum photography.

### *Disadvantages to Full-frame Cameras*

They are large, heavy, and expensive. They also require more expensive lenses as the cheaper lenses used on crop—factor DSLRs tend to have fuzzy edges. This is not a problem on crop-factor cameras because that part of the photo is cropped off. It only becomes an issue with full-frame cameras which show a wider field and need better lenses to produce sharpness across the image. For a good video explaining crop-factor vs. full-frame DSLRs, see the following link.

<http://www.youtube.com/watch?v=M4eiS5YNVA0>

Before rejecting a \$2,000 camera body as an extravagance, consider the much greater expense of a two week art trip. A good camera and lens should last a lifetime.

### **Lenses - Different Tasks Require Different Lenses**

The lens is just as important as the camera body so research any lens carefully. Beware of the “kit” lenses bundled with many DSLRs, especially any DSLR which is not full-frame. These are often mediocre lenses, especially with Canon cameras such as the Rebel T3 series. The Nikon kit lens is quite good.

### *Single, All-Around Zoom Lens (must go down to f/2.8 or it can't handle dim museum galleries)*

If you are focused on painting, you can get by with a single, all-around zoom lens with decent wide angle and some telephoto. For crop-factor cameras, the best, inexpensive 28-200mm lens for Nikon or Canon today is made by a third party: Sigma 18-200mm f/3.5-6.3 DC OS HSM lens (\$400).

Avoid the light, small zoom lenses since these don't allow shooting in dim light. Check the lowest aperture number on the lens. Look for a zoom which goes down to f/2.8. Such a lens allows shooting in half as much light as an f/3.2 lens and one fourth as much light as an f/3.5 lens. The downside is that f/2.8 zooms for DSLRS are large, heavy, and expensive.

### *50mm Low-Light Lens – a Must for Museums*

For extremely low light situations and for sculpture, you need a “fast” 50mm lens – “fast” means the lowest aperture is f/1.2 or f/1.4. The best such lens for Canon or Nikon DSLRS came out in 2014 - the Sigma 50mm f/1.4 DG HSM Art lens (\$950). I've used it in two museums and the results are remarkable. With no zoom, this lens can't handle everything. But it could become your primary art photography lens for DSLRS. For mirrorless cameras, try the Zeiss Sonnar T\* FE

55mm f/1.8 ZA (\$1,000. 5 stars) and the Olympus M. Zuiko ED 40-150mm f/2.8 Pro (\$1,500; Late fall, 2014 / no reviews yet).

For architecture and gardens, you need a wide angle lens. Rather than a prime lens (no zoom), I suggest getting a wide angle lens with some zoom. Top Picks include the following.

Sigma 18-35mm f/1.8 DC HSM Art / July 2013 / \$800 / lens of the year award in 2013 – comes with Canon or Nikon mount

Canon EF-S 10-22 mm wide angle / f/3.5-4.5 / \$815 (for smaller, crop-factor DSLRs)

Canon EF 17-40mm f/4L USM / \$740 (for full-frame cameras)

For details of architecture, elevated sculpture, and the tops of large paintings, you need a telephoto lens of 70-300 mm. In my experience, 200 mm is insufficient.

For shots of small ivories, ceramics, medallions, and coins exhibited a few inches away in display cases, you need a macro lens (and a black cloth to mask off reflections).

### *Prime Lens or Zoom Lens*

Professional photographers often use prime lenses for their sharper image quality and lower apertures (f/1.4, f/1.2) allowing shooting in low light. A prime lens has a fixed focal length and thus no zoom. This is great advice for those shooting art in a studio. But for normal museum photography, a prime lens doesn't work most of the time unless you have a full-frame camera. And even then, it has real drawbacks. Since a 50mm lens on a crop-factor DSLR works more like an 85mm lens (due to the cropped view), you must stand back 15-30 feet from mid to large size paintings. And that makes it impossible to shoot in a crowded museum without waiting 3-10 minutes for the people in front to move out of the shot. A zoom lens allows you to stand among the closer viewers and take your shot without waiting. In really crowded museums like the Louvre or Vatican, a 50mm lens is useless unless you have a full-frame camera. Even then, it could only be used as a secondary lens.

### *Other drawbacks to prime lenses in art museums*

Many large paintings have reflected light on the upper sections unless you stand back and use a zoom lens. Perspective distortions also decreased if you can stand back. A fast, 50mm prime lens won't allow you to stand back and zoom in. Nor can you use a 50mm lens to shoot details of paintings hung high. A fast 50mm prime lens is an excellent second lens especially if you have a full-frame camera which allows a wider view and thus lets you stand closer. But for most museum shooting, I recommend a fast, moderate zoom lens such as a 24-70mm f2/8 (the one I use), a 24-105mm, or a 18-200 (like the 2014 Sigma lens). The wide end allows you to get close for detail shots at head level while the telephoto end allows you to back off to reduce reflections and capture details at the tops of larger paintings.

The Canon EF 70-200 mm, f/2.8 L IS II lens is a great lens but too big and heavy to lug around for weeks of art travel. I use the inexpensive Canon EF 70-300 mm f/4.5-5.6 IS USM but plan to upgrade soon to the sharper Canon EF 70-300mm f/4-5.6 L IS.

Here are links to good review sites for Nikon and Canon lenses.

[http://www.cameralabs.com/lenses/lens\\_buyers\\_guide/Nikon\\_Nikkor\\_lenses/Which\\_general-purpose\\_lens/Which\\_Nikkor\\_Nikon\\_general-purpose\\_lens.shtml](http://www.cameralabs.com/lenses/lens_buyers_guide/Nikon_Nikkor_lenses/Which_general-purpose_lens/Which_Nikkor_Nikon_general-purpose_lens.shtml)

<http://www.the-digital-picture.com/Reviews/>

### **Other equipment**

Carry a small lipstick-shaped lens brush and a lens cleaner kit and make sure your lenses are clean before shooting. Protect every lens from the start with a protective UV filter.

Tripods are generally outlawed in art museums. So leave them home unless you are shooting architecture, gardens, or art in churches. Even then, a tripod is rarely needed if you invest in a good full-frame camera.

A black cloth is essential for masking out light reflected in art, especially art with dark surfaces, or in plexiglass cases. For this reason, you should always wear black or dark clothing when shooting art. At the very least, a black sport coat can mask off plexi reflections. Big camera stores like B&H sell black backdrop cloth or visit your local Jo-Ann Fabric and get some lightweight black cloth as wide as you can stretch your arms and ca. 5 feet tall. The bigger the cloth, the more reflection you can block off. If you need two hands to steady the camera, ask a tall museum visitor to hold the cloth behind you. Even if the whole painting is too big for your black cloth to mask, you can use the cloth to get great close-ups. A black cloth also works wonders behind small sculptures if you can find someone to hold it for you.

### **RAW VS JPEG**

JPEG compresses and processes every photo inside your camera, sacrificing some detail while providing an image which is ready to view and email (after it gets sized down in Photoshop). Most DSLRS allow shooting in RAW mode which preserves more visual information but requires processing the image afterwards in Photoshop or some other program before it can be viewed, projected, or printed. Processing in RAW is not difficult if you have already learned basics Photoshop for jpegs. Indeed, processing RAW images is easier and more user-friendly as the main things you will improve are lighting and color. Since post-processing is needed for all art images, you must learn basic Photoshop. So why not spend another hour learning basic RAW processing.

The other disadvantage to RAW is that each image will be substantially larger on your memory card and computer. You may need higher capacity cards and a larger hard drive at home.

The advantage to shooting RAW is that you can make much more dramatic improvements to flawed photos than you can in Photoshop. RAW processing is far better in three areas: 1) fixing color, 2) recovering areas which are overexposed and blown out (all but impossible to fix with jpegs), and 3) restoring detail to overly dark, murky shadows. When shooting in jpeg mode, some art works will always appear greenish or brown no matter what you do in Photoshop. With RAW images, all color problems can be corrected. The second video listed below shows a portrait taken in RAW with a garish orange lamp. In jpeg, this photo would have been ruined. In RAW, the photographer was able to restore skin tones.

The ability of RAW processing to recover overexposed, blown-out areas while brightening shadows involves what photographers call dynamic range. This is the full spectrum of lights and darks which the eye sees but no camera can capture using jpegs. Although full-frame cameras already have better dynamic range, they can only handle so much strong contrast. This is a particular problem when shooting high contrast paintings or areas of paintings by Caravaggio or Cole or stained glass windows by Tiffany where some sections are brilliantly lit. By shooting in RAW and processing the images later, you can achieve near perfect results. See the dramatic improvements possible when shooting in RAW – in the two videos shown below.

[http://www.youtube.com/watch?feature=endscreen&v=mHMHYM\\_J7SY&NR=1](http://www.youtube.com/watch?feature=endscreen&v=mHMHYM_J7SY&NR=1)

<http://www.youtube.com/watch?feature=fvwp&NR=1&v=E4X8BhlsxVk>

Another option to shooting in RAW or JPEG is to save every photo in both formats if your DSLR allows. Then fix the jpegs which turned out well. For those which turn out badly, process them from the RAW files.

## **FLASH**

Virtually no museums allow flash photography. Even if they did, flash doesn't work for paintings because it bounces back and ruins the shot. If you have a wireless flash (allowed by some DSLRs), you could hold the flash to the side and get around that problem. But the museum guards will soon descend. Flash is more helpful for sculpture, especially if you can angle the flash at the ceiling or at a side wall to get an indirect light. This greatly heightens the three-dimensionality of the sculpture. Flash pointing straight ahead tends to flattens everything. Learning how to turn down your flash is also very helpful. A camera without flash adjust is not worth buying. Most cameras over \$600 have this feature.

## **PHOTO TIPS**

Weekdays are better as weekend crowds will force you to wait until a clear view opens up.

If possible, visit museums on sunny days as this greatly increases the light available for shooting and allows faster shutter speeds (to eliminate blur) and greater depth of focus (for sculpture).

Study your manual thoroughly and learn to change ISO (light sensitivity), White Balance (color temperature), Exposure Compensation (brightens or darkens a shot), Flash intensity (adjustable on all DSLRS and many good point and shoot cameras), aperture (depth of focus), shutter speed (at least 1/100 of a sec to eliminate hand shake or faster if using telephoto), and timer. Type your own 1-2 page guide of the most useful menu options and slip a copy into your camera bag and email it to your smartphone. You can also download a pdf file for the whole manual from the manufacturer's web site and send that to your phone.

Recharge all batteries before going out to shoot. Always carry an extra charged battery and, if needed, the charger for use while you are having lunch.

Check all camera settings before shooting or you may still be on a setting which will wreck all of your shots (like tungsten WB when you are now outdoors). If something is inexplicably wrong with your shots, it's probably a simple matter of changing a setting.

Never shoot on AUTO. If you must use something like AUTO, use P instead as this is fully automatic with one big exception. It leaves manual control over all the important features you need to adjust to get good results such as ISO, White Balance, Exposure Compensation, and Flash Adjust.

Turn off your camera off between shots to quadruple the battery time. For the same reason, use the viewfinder, not the power-hungry LCD.

### *Exposure Compensation*

Use Exposure Compensation (-+) to add or subtract light from a shot. Since it's easier to brighten darks later than it is to darken lights, subtract light to avoid over exposed highlights and washed out areas. Canon DSLRs often take better shots with the Exposure Compensation set down one or two notches. Exposure Compensation is one basic setting to learn immediately as you'll be changing it every three or four shots.

Every camera with manual controls has options for setting the internal light meter. For most art works, avoid spot metering whereby the camera selects a tiny central point in your shot and uses that to determine how much light is present. "Center-Weighted" or "Evaluative" settings for light metering are more reliable and take a broad sample. On the other hand, these settings will misread a dark painting in a large, gleaming gold frame as the bright gold throws the meter off.

In that case just add more light using Exposure Compensation until you have the optimal lighting.

### *White Balance*

White Balance is another setting to change frequently as you move from tungsten to daylight to fluorescent to mixed lighting, at times in the same galleries. (Small objects behind plexiglass are often lit with fluorescent.) Learn the WB icons so you can quickly change to the best setting. Many full-frame DSLRS allow color to be dialed up or down manually while you check using Live View.

Check every shot, as a matter of course, to ensure overall lighting (adjusted with Exposure Compensation) and white balance. The best way to get perfect color is to shoot in RAW and adjust later in Photoshop.

### *Keep the ISO as Low as Possible*

Always use the lowest ISO possible as this improves the shot by reducing or eliminating noise. In bright daylight, you can shoot at ISO 100-400 and still have fast shutter speeds and wide depth of focus if needed. The most commonly changed setting on your camera should be the ISO. So practice until you know the button by feel. ISO is light sensitivity. The less light on your subject, the higher you must set the ISO. Stay within the limit of your camera as going higher will produce grainy shots. Noise is also a product of megapixel setting. Since 10-12 MP is all you really need to get good results, try setting the picture quality (i.e., megapixels) one notch down if you can't get noise-free results or if it's too dark to shoot. (Remember to change it back to the highest MP setting afterwards.)

### *Misc. Tips*

With paintings, I shoot on the AV mode (aperture priority). With a full frame camera, I often have enough leeway to set the aperture at one or two f stops above the lowest setting to get sharper results. (The lowest aperture settings on most lens yields somewhat fuzzier images.) This suggestion is usually impossible with a crop-factor DSLR because the low light forces you to shoot at the lowest aperture. When shooting sculpture, remember to select a higher aperture number to provide depth of focus. The closer you are to a 3-D object, the greater depth of field you will need to handle even a small object only 2-3 inches deep. Shooting four inch figurines from eight inches away might require an aperture as high as f/8 or higher.

Check each shot afterwards for focus by zooming in. With a crop-factor DSLR, I had to take 3-4 shots of everything to make sure one was in focus. Fortunately, I could review all of my images while fully zoomed in, allowing me to confirm the focus quickly. My current, full frame DSLR has a review button which immediately zooms in on the last photo.

If the image is blurred, raise the ISO and the shutter speed will go up, eliminating most blur problems which are caused by handshake. If only part of a photo of a painting is in focus, your camera was not parallel to the painted surface. This is especially important when shooting small works or extreme close-ups. If available lighting permits a higher f stop number, raise the aperture and give yourself a little extra depth of focus when shooting close-ups.

All cameras have occasional trouble focusing on shiny or smooth surfaces (such as marble) so be prepared to revert to manual focus now and then. Or move your focus point to a crack in the sculpture or some area of contrast to help the camera autofocus properly. When using a tripod, use manual focus and Live View (with the LCD zoomed way in to check focus).

Shoot close to your art object, if possible, as this increases visible detail. When using the wide end of a zoom lens, don't get too close to a sculpture or you may distort the piece. When using a zoom lens, you may not have enough light to shoot, even if your ISO is as high as it can go without getting noisy). In that case, make sure you are zoomed out, as this lets in more light. If your zoom lens goes down below 24mm, be careful about using these low settings which introduce barrel vaulting (curving the sides of your rectangular painting). Most of this can be corrected in Photoshop but you can reduce or eliminate the problem beforehand by staying above 24 mm.

Leave your camera on the maximum megapixel setting as this brings in more detail. You can always downsize the shots later for emailing, PowerPoint projecting, and web posting. If your can't get a shot without increasing the ISO into the realm of noisy photos, switch to the next lowest megapixel setting (8 to 10 MP) as this significantly reduces noise levels.

#### *Use Something to Steady Your Camera*

Always try to improvise a tripod-like object to steady your camera. Placing your camera against the side of a column, door, chair, wall, etc. will eliminate hand shake and allow you to use much lower ISOs (for a clean, smooth shot) while allowing greater depth of focus if needed. Move a table out and put a chair on it to make a tripod. Improvise. If you can place your camera on something stable, set the ISO to 100 and use the 2 second timer. To shoot a ceiling, put your camera on the floor, set the ISO to 100, select a medium aperture number, zoom out for the widest view, and use the 2 sec timer. If shooting at a local church, ask for a step ladder. If you can improvise a tripod, then you can use Live View and manual focus (with peak preview zoomed way in) to get perfect focus each time.

#### *How to Handle Reflections in Paintings*

If a painting has reflected light which cannot be blocked with a black cloth (or your dark coat), you might be able to shoot from a side angle without reflections and correct the perspective later with one Photoshop command. In that case, you must leave a little space on the far side of the art

work as the correcting process enlarges that side as you fix the perspective. Without including some extra space, your painting will be cropped when you straighten it. For reflections at the top of a painting, stand back and zoom in or use a stronger telephoto. And leave extra space above the painting for the later step when you correct the distortion.

### *Shooting Sculpture and Architecture*

Needless to say, you must use a higher aperture when shooting anything three-dimensional or it won't be fully in focus. Since 3D objects require a higher aperture number (i.e. a smaller opening letting in less light), you will need plenty of light or a higher ISO. A tripod or tripod substitute eliminates this problem.

With sculpture, it may or may not be helpful to set the camera on spot focusing. In this mode, the camera focuses on a tiny spot which is normally in the center but can be moved using your camera's buttons. Spot focusing used unknowingly is particularly bad for sculpture because you may end up focusing on the wrong area. To get the result you want, know how to change focusing options and know your current setting.

If your camera locks the focus after you push the shutter down halfway, you can always select your ideal focal point, depress the shutter halfway, and then recompose the shot before taking the picture. Many DSLRs have a setting placing a red dot on the focal spot which is only visible in the PLAYBACK mode so you can review your focus points and understand your mistakes better.

To get a better angle on a sculpture placed high up, put the camera on LIVE-VIEW mode so you can shoot using the LCD and hold the camera high over your head with a faster shutter speed to prevent blur. Or put the camera on a tripod, use the timer, and raise your camera even higher for the ideal shot. This works best with cameras with a tilting LCD so you can aim properly. If your LCD doesn't tip back, get a spotter to stand behind you and tell you when the shot is framed.

Architecture is hard to shoot well and requires a separate, wide angle lens which goes down to 12 or 14mm. To reduce perspective distortion, shoot from a greater distance or find an elevated spot such as a 2<sup>nd</sup> or 3<sup>rd</sup> story window in a nearby building. Many architectural shots are spoiled by a washed out, bright sky so wait for a cloudy day or shoot at dawn or dusk. At dusk, change your White Balance to "shade" or everything will look cold and blue. Or shoot in RAW and recover the original blue sky. Dimmer, indirect light is generally preferable as it brings out the middle tones whereas direct sunlight often reduces everything to harsh contrasts. Most cameras have a grid option visible through the viewfinder which helps compose architectural scenes, landscapes, and paintings.