

You can take stunning digital photographs of your turnings, and may be able to do it using the *compact camera* you already own, provided it has manual controls for lens aperture and shutter speed. All you need to do is create a setup where you can control the background and the lighting—I will show you simple gear you can make yourself—and if you would like consistency among all of your images, photograph your work in the same setup each time. A dedicated area is ideal, if possible, but temporary setups can work just as well, since the only thing that really matters is what the camera captures.

To inspire future works, you can take advantage of the digital format to evaluate design potential, by stretching forms, changing tones, compositing sections, and creating many variations. Use your camera to record works in progress as well as for reference when disassembling machinery and electrical wiring. Have fun with your camera; don't be intimidated by the technology.

Backgrounds

For backgrounds, a roll of neutral gray photo paper is a good choice because it will not influence the color of your turnings. Other choices are white, black, and graduated backgrounds. Your choice should enable your turning to stand out from the background. Organize the setup so the background gently sweeps upward behind the subject. Placing the sweep farther away from the subject enables light to drop off and create a gradation without purchasing a graduated background. Use black backgrounds sparingly; they can make an object appear to float.

Lights

You can get a good photo with almost any light source, provided it is bright enough and that your camera is set for automatic white balance (see Definitions sidebar). I prefer pigtail-shaped, cool-running compact fluorescent photo bulbs. They are daylight-balanced, can ►

Stunning Digital Photos Show Off Your Turnings

Ed Kelle



(Above) Diffuser — Made from ½" square strips of wood, covered with a double layer of white plastic tablecloth, the open back side of the diffuser permits the background to curve up behind the object so that the light intensity falls off. The result is a softly graduated background that fades toward black as it recedes.

(Left) This softbox was constructed from cardboard lined with white paper, with front diffusion from a double layer of white plastic tablecloth. A fluorescent bulb runs cool enough to be safe inside, but an incandescent light would not be fire-safe.

Setup #1



Here is the simplest setup: overhead light comes from a single compact fluorescent photo bulb mounted in a socket with a reflector but no diffuser. The lighting is flat with no sense of depth, and the shadow is strong.

run for a long time at low temperatures, and have a lifespan of a few thousand hours. At \$8 to \$10 each, they are more expensive than the lamps available in home centers, but their quality is worth it. In the setups shown in this story, I'm using a single 43-watt bulb in a small ball-head fixture attached to a light-weight aluminum stand. My hardware is ancient, but you can buy similar gear for \$20 or less. When I need more light, I add a 27-watt bulb as a fill light.

Whatever type of light you choose to use, it is always best turn off any other lighting so it will not cause a color shift somewhere in your image. I also block out windows in my studio to have total control over all the light. This helps create consistency across many images.

The setup

Most turnings show best under diffused light with soft shadows. This can be achieved with a light tent. Some tent kits include background papers that fit inside.

A drawback is that with the limited depth of a tent, there is no light drop-off to create a gradation. I have created my own diffuser from white plastic tablecloth on the sides of an open-end wooden framework (*Page 35, top photo*), which allows unlimited depth for my background. I also soften the light with homemade softboxes that house the bulbs. They can be constructed from foam core and cardboard lined with white paper to reflect the light inside, and then covered with more white plastic tablecloth. They can be various sizes and shapes to control the spread of light. Do not place hot incandescent lights near any diffusion material, and only use cool-running fluorescent bulbs in these softboxes.

A good starting point is to set two lights at 45 degrees to your subject, one close, which will be the main light, one farther away to create dimension. Move your lights around and notice the changing effect. A single overhead light is a good alternative, although you

probably will want to place squares of white cardboard or foam core just out of the camera frame to bounce light back on the subject. In contrast, black board can be used to absorb light from a side of the subject to darken it. Large pieces of board can block light from the background to darken it. Don't be afraid to experiment—the pairs of setup photos accompanying this story illustrate the journey from an okay photo to a good one, by making small changes one step at a time.

The camera

Always check your camera to be sure you have enough memory card space and a charged battery before placing it on your tripod. Set the ISO to its lowest setting—200 is good—for reduced noise. Move in and out to maximize the size of your subject in the frame while leaving a little space all around; I try to fill about 60 to 70 percent of the viewfinder with my subject, which leaves room to crop the image for various purposes. Frame horizontal objects in a horizontal format and vertical ones in a vertical format. Placing the camera close to the subject with a wide-angle lens can cause some distortion. It is better to set up farther away and *zoom* in a little bit.

Adjust the tripod legs to the desired height and check that the camera is level. For maximum stability, do not extend the tripod's central column any more than necessary. Adjust its legs instead.

I photograph vessels from slightly above them to show just a glimpse of the opening. For bowls, I like to show slightly more of the inside. Refrain from shooting down into a bowl because the image will flatten out and give no sense of form. Place a platter on a stand that does not compete with the subject.

Exposure

Photography is all about exposure. Even with the camera in an automatic mode, exposure can be difficult to understand and control. All camera meters calculate exposure from light to

dark. You can calibrate your setup by taking a full-frame image of a standard Kodak 18 percent gray card. When photographing a full sheet of white paper, the camera will adjust the exposure to create that gray tone. If you shoot black paper, it will also try to create that gray tone. That is what the camera meter is designed to do: average what it sees.

In automatic modes, the camera balances *shutter speed* and *aperture* (lens opening) to create proper exposure. Envision a seesaw, with shutter speed on one side and aperture on the other.

A change in one side requires a change in the other to retain the same balanced average, but the tradeoff will be depth of field.

A lens focuses light to a single plane where the image will be perfectly sharp. Depth of field is the range of distance that will be in sharp enough focus in front of and behind the actual plane of focus. Small aperture openings— $f/22$ to $f/32$ —produce the greatest depth of field, while large aperture openings— $f/3.5$ or $f/4$ —give a shallow depth of field. An aperture

setting of $f/3.5$ to shoot a large bowl would show the rear of the bowl much less sharply focused than the front. Changing to $f/11$ or smaller would bring more of the bowl into focus, but the tradeoff would be a slower shutter speed—no problem on a tripod, big problem if you are holding the camera in your hand.

Here is how to take control of each photo, starting from the camera's automatic settings. Place the 18 percent gray card where your subject will be, pointed directly at the camera under your ►

Setup #2



The single bulb has been moved to the side and a bit to the front of the piece, and although the tent shown diffuses the light, it also limits its distance to the background paper so light cannot fall off. The diffused light makes soft shadows, but the right side of the piece is too dark.

Submitting photos for publication

After you've created your masterpiece and photographed it, what next? You may want to publish it on the Internet, and print publications such as this one might feature your work. Here are some tips:

- Always capture your images at the highest quality settings—the largest file size—and use RAW format if your camera has it. Internet and print photo requirements vary; be sure you can fill a request for a higher-quality image.
- Once you have the lighting set up as you wish, take both horizontal and vertical

photos, which will give editors options for layout. If you have the opportunity, ask the publication you'd like to submit your photos to about whether a specific type of background is required.

- For how-to articles, capture at the best quality and zoom in tight with the camera to fill the frame and focus on what is important in each step when making the project or illustrating a technique.
- For publication, it's best not to do any computer manipulation yourself. Leave it to those who

work with the printers. Adjustments to white balance and sharpness that look good to you on your computer (each computer has variable color resolution, as well) could be disastrous on press.

- Treat each new piece as if it is your best ever, and do not be afraid to try various viewpoints and angles once you have your main shot. Zoom in on interesting areas and experiment with lighting and depth of field. You will be pleasantly surprised by what you can create with your camera.

Setup #3



To reflect light onto the dark side, place a square of white cardboard just out of view on the right. The right side is brighter now, but the flat background robs the piece of its three-dimensionality.

Setup #4



A square softbox, made from diffusion plastic, cardboard, and duct tape, replaces the light tent. Its soft directional light renders the object three-dimensional and falls off nicely on the receding background. The white cardboard reflector brightens the right side, but now there is a distracting pattern of square highlights and the background could be a bit darker.

desired lighting conditions. Zoom in so the gray card fills most of the frame. Using the camera's Aperture Priority (AV) shooting mode, choose the aperture that will give you the depth of field you want, take a picture of the card, and note the meter readings. The camera will expose the gray card to the average it is looking to create in every photo. Now that you know the setting that will deliver this exposure, take the camera's metering out of the equation by changing to manual mode with these settings. This will prevent the camera from recalculating exposure based on what it sees after you remove the gray card. Custom white balance also can be set in some cameras using the gray card, though I have found that daylight-balanced fluorescents are very close to the "daylight" setting. Fine-tuning can be done in software later on.

Finally, set the file size and image quality to always capture the most information (largest file) using the best quality, then downsize later as necessary. If you wish to shoot in RAW format, change to that now.

Action!

Whew, now you are ready to begin photographing your turnings. Don't worry, with experience the setup process becomes second-nature and goes by quickly. First, be sure to dust off your piece before photographing it. It is amazing how much dust you do not see until you zoom in on a photograph. Take your time to determine the best feature of your piece



Exposure—Gray-card metering will give appropriate exposure for both light and dark subjects.

and face that toward the camera. You have spent many hours creating your masterpiece, so don't just plop it down in any orientation. Hold it in your hands, turn it around, look at it from higher and lower viewpoints. If you had only one frame of film left, how would you best present your piece? If it contains amazing wood figure and/or color, be sure to show this. Frame your subject and check your focus. Some cameras permit zooming in to check focus in Live View on the display. I use manual focus when on a tripod, because the auto-focus sensor might not focus on the front edge of a bowl and I want the sharpest focus to be there. If your camera has image stabilization, turn it off when using a tripod. Use the self-timer or a remote release so the camera does not shake when you press the shutter button.

When you use the exposure settings from the gray card, the image should closely represent what you see, with visible highlights and shadows. Review the image carefully and check for focus by zooming in on your display. For more depth of field, adjust the aperture smaller (larger f-stop number) and remember also to compensate by admitting more light by way of a longer shutter opening (larger fraction) in order to keep the same exposure level. For a dark detailed finial, confirm that it is not getting lost against a dark background. Try some variations on your image by raising or lowering the camera. Take close-up detail shots to show off special features. Move or turn off a light to create dimension and drama. Any major changes to lighting could require re-metering the gray card, although on cameras with Live View, you will see these changes instantly onscreen and can adjust your settings and view the results before taking a new shot. Without Live View, just shoot, look at the image, and shoot again.

Do you really need a new camera?

Digital photography provides instant results, which allow for immediate reshoots. Gone is the fear of wasting film, the wait for processing, and the anxiety of not knowing how the photos will come out.

The ultimate use of the images—for email, prints or publication—governs your camera needs. If you only intend to share pictures online and make 4" by 6" prints, you don't need a 15MP DSLR camera. Any recent compact camera with a manual setting probably is good enough—you can save your money for wood and tools. Until recently I was using my nine-year-old 4MP compact camera with very good results.

Digital photography has given woodturners many opportunities to share our work, thanks to email and the various Internet forums. Digital format also rules in print media: All major print publications use digital technology. Most publications accept only digital images.

The choice is between a compact camera and a DSLR camera, shown side by side in *Photo a*. If your compact camera has manual settings allowing you to control the lens aperture and shutter speed, it's probably capable of taking good pictures. Camera phones generally do not have manual settings, so for that reason and others, they aren't a reliable choice.

The DSLR camera has interchangeable lenses, which are sharper than the small lenses on a compact camera. It probably has more manual controls and settings, and it has a larger sensor that can capture more information in small steps between black and white. The larger sensor also introduces less digital noise, which is like the grain in film or static on the radio.

Most DSLR sensors are sized like 35mm film, with a 3:2 width-to-height ratio. Compact cameras primarily use a 4:3 ratio. This makes a difference when you want a specific enlargement such as an 8" by 10" print (4:5 ratio): You'll have to crop the image to achieve it.



Two kinds of digital camera

The digital single-lens reflex (DSLR) camera on the left has interchangeable lenses, a large sensor, and many manual settings. The compact camera on the right may be all you need because it has a manual mode that gives you control over the exposure.



Number of Megapixels	Approximate 3:2 print ratio size		Screen resolution 72 dpi
	at 300 ppi	at 200 ppi	
2mp 1600 × 1200 pixels	5.3" × 4"	8" × 6"	22.2" × 16.6"
4mp 2464 × 1632 pixels	8.2" × 5.4"	12.3" × 8.1"	34.2" × 22.6"
8mp 3456 × 2304 pixels	1.5" × 7.7"	17.2" × 11.5"	48" × 32"
12mp 4209 × 2800 pixels	14" × 9.3"	21" × 14"	54.8" × 38.8"
15mp 4752 × 3168 pixels	16.3" × 10.9"	24.5" × 16.3"	66" × 44"
21 mp 5616 × 3744 pixels	18.7" × 12.4"	28" × 18.7"	78" × 52"

Once you have loaded the camera's memory card with the shots you want, remove the card from the camera to view it on a computer for analysis without disturbing the setup or camera position. I never disassemble my setup until I am sure I have all the images I want. Transferring files into your computer with a card reader saves time and conserves your camera's battery.

Organize your photos

Organize a filing system for easy searches by using folders based on date, project, or file type. Time spent now will pay off later. I do my weeding out before the import process, looking closely at all the photos before selecting the ones I want to import and save. I file all turning photos in a main "Turning" folder to separate them from my ►

other photography. If I am making a specific project, such as a piece for a show, I put those shots into one folder with the same name as the piece itself. Otherwise, I usually import into a folder named by month and year. The imported photos—the original full-sized captures—go into an “Originals”

subfolder so that I will always have them as backup. From there I can select the best to work on, the one or two shots that tell the entire story of the piece. I open each selected image in image-processing software, make any adjustments I think it needs, and then save the finished full-size image to an “Adjusted” folder using a

descriptive name for easy identification. From there I may have subfolders for copies of these adjusted files called “Full Size” and “Web Size,” with additional subfolders and files for specific needs. For consistency, I always keep the file name the same and use “Save As” to copy the resized file to its new subfolder.

Setup #5

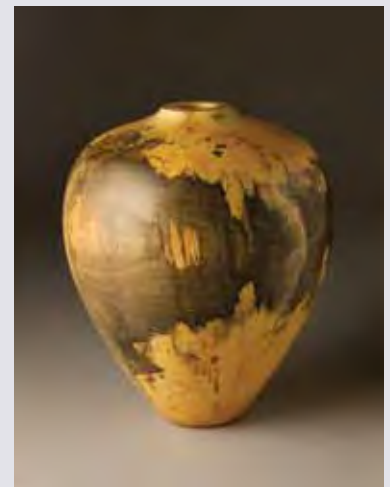


Switching to a tall and narrow homemade softbox restricts the wide spread of the light while a second cardboard panel blocks some light from the background, making it darker. But the bright highlight still distracts attention from the piece itself.

Edit your photos

Image editing programs help you to present your object in the best possible way. Digital editing should not be used to improve the quality of the item itself: Sanding scratches or flaws need to be addressed before shooting photos. There are many options for editing software and those provided with cameras have greatly improved. Other options, which all contain similar features, include Adobe Photoshop (expensive), Adobe Photoshop Elements (more affordable), Adobe Lightroom, and GIMP (free-ware). Whatever software you choose, your main objectives will be to adjust exposure levels and white balance if

Setup #6



The homemade light tent further diffuses the light from the square softbox. It is better, but the highlight is too bright and the right side is too dark.

necessary, clean up dust specks, crop (trim the photo to its final proportions), and resize.

Resize your photos

From this final image, you can resize downward from largest file size to smaller. Remember, you cannot go smaller to larger without losing quality. When resizing images, the main concern is the total number of pixels. Print publication normally requires *resolution of 300 pixels per inch (ppi)*, while home printers do well with 200ppi. Web resolution is 72ppi. To determine *image size* at a given resolution, divide the large side by that resolution. For example, an image that is 2100 pixels wide will be 7" at 300ppi, 10.5" at 200ppi, or just over 29" at 72ppi. A 7" 300ppi image used on a 3½" by 2" business card is much larger than it needs to be. You can use it, but it will slow down processing and printing time. The same is true with the too-large image sent to your home photo printer. It will print slowly with no gain in quality. Images can be too large for websites and emails as well, requiring much scrolling to view. Some forum sites give specific size limitations, and some email filters block too-large files. For sharing photos online through emails and website viewing, I always resize down.

I resize downward using the Image Size command in Photoshop; some software, iPhoto for example, can apply a resizing menu to a selection of photos. Each software is a little different, so you will have to consult its Help section to learn exactly how you would, for example, resize a 6MP original file down to 800 pixels by 1200 pixels at a resolution of 200ppi for a 4" by 6" print. Once you have resized the image for your purposes, since the image is now described with fewer pixels, some fuzziness may have crept in. You can correct it by choosing Filter>Sharpen>Unsharp mask. Good results can be had from settings of Amount 100, Radius 1, and Threshold 3; higher settings can create abnormal

halos around contrasting edges. Use Save As to copy this smaller file to a new folder; you can use the same name as long as the file is in a different folder.

For web and email, I repeat this process with resolution set to 72 and the pixel dimensions set at 1600 pixels for the largest dimension. This retains good detail within email file-size limits and can be viewed without the need for scrolling. If a forum has size limitations, use that number for your larger dimension. As before, sharpen

after resizing and Save As to a new subfolder named "Web Size."

When saving in JPEG format, leave compression at the highest quality/least compression for print files and use a middle setting for small, fast files to email. For safety, be sure to back up files to an external drive or burn to disk from time to time. Better safe than sorry. ■

Ed Kelle has been a painter, sculptor, photographer, designer and now a woodturner. He currently works to incorporate all facets of his background experience into his pieces.

Setup #7



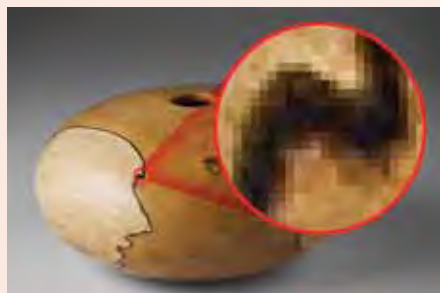
This setup combines everything learned so far: light from a single compact fluorescent bulb inside the tall narrow softbox diffuses through the white plastic on the homemade light tent, whose open back allows the background to recede. The white cardboard on the right reflects light back onto the right side of the piece. You could continue to experiment with how the light is rendering the object by fiddling with the diffusers, moving the bounce card or adding a second card, and perhaps adding a second light source, but I am pleased with this image. Compare it to where we began in Setup #1, on page 36.

Digital definitions

Take this opportunity to become familiar with your camera, learn how to change settings and how to navigate through the menus. The more comfortable with your camera you become, the better photos you will create.

Pixel/pixel dimensions

A *pixel* is a picture element, a tiny block of numbers describing color and intensity. One pixel by itself is not much, but think of a mosaic: with many tiles (pixels) arranged together, we can see an image. More tiles, more detail. Software can always downsize a large file to a smaller one by discarding pixels. Software also can mathematically inflate an image by creating new pixels, but software can't create information out of thin air — the new pixels won't contain any new detail.



Pixels — You can see the pixels, or picture elements, in the enlarged section of this digital photo. The camera records each tiny square as numbers representing color and intensity.

Megapixel (MP)

A *megapixel* (MP) is one million pixels, calculated by multiplying the width of an image in pixels times its height in pixels. My nine-year-old compact camera could capture 2464 pixels wide by 1632 pixels high, about four million pixels (4MP) of information. But note that if you crop an image to remove excess background, then you have lost the cropped pixels: 4MP might end up 1MP.

These days most cameras can capture more than 6MP at their highest setting. It's usually best to capture large and downsize later. Memory cards are inexpensive; keep spares on hand. That will enable you to take the best-quality pictures without worrying about having enough space for them.

Kilobyte/Megabyte

Kilobytes (KB) and *megabytes* (MB) measure file size, not image size, and images can be compressed to different sizes, so they occupy less storage and are faster to email. The more you

compress an image, however, the more the image can degrade, even though it retains the same number of total pixels as before. Don't compress your best images.

Resolution/Image size

Image size is the relationship between your uncompressed file size and your desired output resolution. Email files and screen-based images for websites and Internet forums are limited to 72 pixels per inch (ppi), so an image measuring 4" × 6" onscreen would need to contain 4 × 72 × 6 × 72 pixels. That's 124,416 or 125KB. Home-quality inkjet printers generally need 200ppi at final size to give a high-quality print, so that same 4" × 6" image needs to contain 4 × 200 × 6 × 200; that's 960,000 pixels, almost 1MP. Most publications require images of 300 pixels per inch (ppi) at final size. An image measuring 4" × 6" on the magazine page needs to contain 4 × 300 × 6 × 300 pixels; that's 2,160,000 or just over 2MP.

The chart on page 39 lists common megapixel sizes for compact cameras and gives the size file to expect without cropping. If I took a 4MP image for print publication, I would divide the pixels in the long dimension (2464) by 300ppi to determine that the photograph could print up to 8.2" on the long side. For printing on a home inkjet printer, 2464 divided by 200ppi would give a 12.3" print. This same file viewed online would be more than 34", way too large. Resizing the image is necessary.

Shutter speed

The shutter speed is the time in seconds or fractions of a second that the camera's lens remains open to admit light. Typically useful shutter speeds range from 1/60 of a second to 1/250 of a second, though most digital cameras are capable of a much wider range of settings. You can't hold the camera at shutter speeds slower than 1/60 second, but a tripod enables you to use slow shutter speeds.

Aperture

The aperture setting represents the size of the lens opening. Larger opening, more light, shorter exposure. Smaller opening, less light, longer exposure. Aperture is expressed by f-numbers or f-stops, a system in which a small number such as f/3 indicates a large opening and a large number such as f/32 indicates a small opening.

ISO/ASA

The ISO setting on a DSLR controls your camera's sensitivity to light, same as the ASA number with

film. A higher setting can make a photo with lower light, but also may introduce more noise, which is similar to the grain of film. In low light, you might need to go to ISO 3200 and beyond, but there will be a tradeoff in image quality. Unlike with film, digital ISO can be changed from shot to shot.

Optical zoom/digital zoom

Optical zoom is the magnification you can get from the camera's lens, from widest angle to maximum telephoto. For example, going from 4x to 7x results in more magnification. *Digital zoom* is calculated by the camera beyond its optical limit. It's not as crisp and clean as optical zoom. It's best to use optical zoom whenever possible and digital zoom only when you have no other choice.

Live View

Many cameras display your image onscreen as it will appear when photographed, so you can change settings and get instant feedback before you press the shutter.

RAW/JPG

RAW is the largest file format capturing the broadest range of information. RAW files require advanced software such as Adobe Photoshop for processing. The files are not compressed and are fully editable for exposure, white balance, color saturation, and sharpness.

JPEG (JPG) files are more typical and are easier to use. They can be compressed for emailing. The total number of pixels captured does not change between RAW and JPG format, but the amount of data per pixel is different. Sports photographers shoot JPG for fast, continuous shooting. Professional studio and landscape photographers use RAW for total control over exposure, color balance, brightness, contrast, hue, and saturation. RAW format is not a necessity for most people.

White balance/color temperature

Did you ever shoot daylight film indoors and get an unwelcome color shift? Each light source has a characteristic *color temperature*. Our eyes adjust instantaneously to different light sources; we do not consciously register shifts in colors. Cameras, however, record color as it actually is. Digital cameras allow you to set the *white balance*, which governs how the sensor interprets color temperature. Most cameras have an auto setting that does a good job most of the time.