

**Introduction to Digital Workflow Workshop**  
Sponsored By The Tripod Camera Club, Dayton, Ohio  
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**Digital Workflow Outline**

- Pros and Cons of Digital Photography
- Digital Workflow Introduction
- Digital Camera Sensors
- Digital Image Files
- File Formats (Raw, JPG)
- File Transfer to Computer
- Basic Image File Processing
- Backup

**What is great about Digital Photography**

- Can save money
- Can save time
- Digital cameras instantly show you how your pictures look
- Digital photography doesn't use the toxic chemicals
- No more waiting to finish a roll before having it processed. (Or wasting unexposed film when you can't wait.)
- Many digital cameras are able to capture not only still photographs, but also sound and even video—they are as much multimedia recorders as they are cameras.
- You can use a photo-editing program to improve or alter digital images

**Drawbacks to Digital Cameras**

- Complexity
- Home Computer almost a must
- Computing Power Really Helps
- Fast Internet Connection Helps
- Costly?

**What is Digital Workflow?**

- Describes everything that is done to a digital image from the moment it leaves the digital camera onwards (It's Lifecycle)
  - Image Capture by your camera's sensor
  - Camera creates an Image File
  - Image File Transfer to Computer
  - Image File editing using Computer Software applications
  - Image File Organization and Backup
  - Image file Output
- Understanding the end product, the digital image file, is a good place to begin understanding the whole digital photography workflow

**Digital Camera Sensors**

- A Digital Camera uses a sensor array to record an image
  - Sensor Arrays have tiny photosites - Mosaics of millions of tiny squares called picture elements or just pixels

- Think of this like a checker board with each square being a photosite
- When shutter button is pressed the photosites are uncovered and each one collects light in a cavity (like a bucket).
- Basically, each Pixel Cavity Collects light for each of the primary colors (Red, Green, Blue)
  - The amount of light in each pixel is represented by a number from 0 to 255
    - Low numbers – Low Light or a darker pixel
    - High numbers – More light or a brighter pixel
  - Red RGB: (255,0,0)
  - Yellow RGB: (255,255,0)
  - White RGB: (255,255,255)
  - Light Gray RGB: (200,200,200)
  - Black RGB: (0,0,0)
- Note: Any shade of Grey has equal RGB Values, so higher numbers represents lighter shades of grey and smaller numbers represents darker shades of grey.

### Digital Image File

- Image File Contains three color values for every RGB pixel (location) in the image grid of rows and columns.
  - Typically, the beginning of file will contain numbers specifying number of rows and columns, followed by huge strings of data representing the RGB for each pixel (i.e., pixel 1,1 would be the pixel at location 1,1).
  - For example an Image file could contain the following information:
- `Img340 10 rows, 10 columns 1,1:2,6,6 1,2:3,6,6 1,3:9,9,9 1,4:20,45,67 - - - -`

### Digital Camera File Formats

- Two Typed of commonly used format: JPEG and RAW
  - **JPEG**
    - Joint Photographic Experts Group, compressed format
    - Optimized compressed image file format meaning that the decompressed image isn't quite the same as the one you started with.
    - Degree of compression is adjustable
    - JPEG is often the only file format available on entry-level and some intermediate digital cameras
  - **Raw**
    - Professional photographers and serious photo-enthusiasts usually prefer to shoot RAW. With RAW files, no processing is done in the camera. Processing a RAW file requires a special editing program.
    - Lossless image file format available on digital SLR cameras and some Point and Shoots.
    - Some advanced cameras have a setting to simultaneously shoot RAW + JPEG. Both formats will be saved to a memory card as separate files.

### Physically Loading Photos on Computer – 2 approaches

- 1. Directly from camera using cable that is plugged into computer
- 2. Take Memory Card out of camera and use card reader plugged into computer
- Preferred method – 2 (Card Reader to computer)
  - Camera does not have to be on and usually faster.

## **One Rule To Keep Organized – Keep Files in One Locations**

- File Organization
  - Image Files can be placed in folders similar to the way single sheets of paper can be placed into folders in a file cabinet.
  - Keep all your image files inside one main folder
  - Doesn't matter how many folders you have inside your one main folder or how you organize it.

## **Photo Image File Transfer - Topics To Be Covered**

- Photo Transfer from DSLR to Computer
  - Uses Camera Battery
  - Not the fastest approach
- Photo Transfer with a Card Reader
  - Preferred Approach
- Photo Transfer using Transfer Software
  - Digital Camera Software
  - Professional Photo Management Software
    - Photoshop Bridge
    - Photoshop Lightroom
    - Apple's Aperture
- Whatever method used make sure you safety Eject your device

## **Photo Transfer from DSLR to Computer**

- Virtually every digital camera including DSLRs, ship with a cable for connecting the camera directly to the computer.
  - You can then use the manufacturer's software to transfer the image files
- When connecting a DSLR to a computer, some of them will appear as removable media while others will be invisible.
  - Canon EOS DSLR will not appear in My Computer (PC) or the Finder (MAC) but that does not mean there was an error.
  - Canon does this by design to prevent you from accidentally deleting things directly from the memory card
  - If you start up Canon's EOS Utility or any other photo management software capable of reading from a digital camera's memory card, you will be able to import its photos.
- If your camera does appear as removable media, you can manually browse its file system and drag & drop images into a folder on your computer. When done, don't forget to safely eject the device.

## **Photo Image File Transfer Using Card Reader**

- Using a card reader is the preferred method of transferring photos to a computer.
  - Why run down the camera's battery when you can just pull the memory card out, put it in a card reader and use that to run the transfer?
  - A card reader will appear in My Computer (PC), on the Desktop (MAC) or in Finder (MAC) as removable media.
  - You can manually browse the file system and drag & drop image files into a folder on your computer, or you can use photo transfer software which will detect the memory card(s) and ask whether you would like to do an import.

- There are many types of memory cards, which makes it important to choose a card reader compatible with the type of memory your camera uses.
  - Different card types are different shapes and sizes which prevent you from using the wrong type of card in the wrong type of reader.

### **Photo Image File Transfer (Media)**

- SD and SDHC cards are common in many compact point & shoot digital cameras and some newer DSLRs. The acronyms stand for “Secure Digital” and “Secure Digital High Capacity”.
- Compact Flash or CF cards are extremely common in DSLR cameras. They’re larger than other memory cards, but offer comparable high capacities and fast write speeds
- Fast USB 2.0 and Firewire card readers allow you to download your photos quickly. If you have several different card formats obtain a multi-card reader.

### **Photo Image Transfer Software**

- Canon EOS Utility ships with all Canon EOS digital cameras.
- Nikon Transfer ships with Nikon digital cameras and is available for download. It is able to import photos to a computer, and integrates with ViewNX and CaptureNX software.
- Professional photo management software such as Adobe Elements, Photoshop Bridge, Lightroom and Apple Aperture is capable of directly importing images from a connected digital camera or memory card & card reader to your photo library.
- Consumer photo management software such as Picasa, iPhoto and Windows Live Photo Gallery is able to import photos directly from a connected digital camera or memory card & card reader.
- Mac OS X has an application called Image Capture which can import files from mobile phones, memory cards, card readers and digital cameras to a folder on your Mac.

### **Professional Photo Management Software - Automatic Image Transfer Capabilities**

- Each Software Program has a Capability to Automatically Load and Organize Images – but It has to be set up – you have to tell it to do this
  - Elements Uses Elements Organizer
  - Photoshop Uses Bridge
  - Lightroom has a Separate Import Window
  - Aperture has a Separate Import Window
- Typically You Set The Automatic Image Transfer Capability in the Software Programs Preferences
  - Once Set It will be Automatic

### **Direct Image Import for Adobe Bridge**

- Configure Bridge Preferences to automatically load images when camera or memory card is detected
  - For MACs go to the Bridge Menu and Select Preferences (For PCs, Preferences is located und the Edit Menu).
- After Preferences has been set, once a Camera or a Card has been connected to your computer the “Photo Downloader” window will be visible
  - Choose your Location – the file folder where you want your pictures to be loaded.
  - You can specify a subfolder that will name your event.
- Elements has a very similar process for importing photos

### **Import Window (LR 3)**

- Once you set your Preferences to to automatically load images when camera or memory card is detected an Import window will appear
- Top section of Import Window will show what is about to happen
  - Indicate where the images are (Compact flash card) on the Left side of window
    - This is your source
  - Indicate what file folder you want your images to be stored in on the right side of the window (Destination)
- Note: Apple's Aperture has a very similar process for importing photos

### **After Import - Safely Eject Your Camera or Memory Card**

- Safely ejecting a camera or memory card from your computer is important to prevent damaging the device. Some software such as Adobe Photoshop Lightroom will automatically eject a card after import. Other times, you must do this manually.
  - Mac OS X (from desktop)
    - Locate the removable media volume on your desktop.
    - Drag & drop the volume icon onto the trash can (which may turn into an "Eject" symbol depending on your version of Mac OS X).
  - Mac OS X (from Finder)
    - Open a new Finder window.
    - Locate the removable media/camera icon in the left sidebar.
    - Click its "Eject" symbol.
    - Wait for the icon to disappear.
    - Unplug the device.
  - Windows XP
    - Locate the removable device icon in the system tray.
    - Right-click on it and choose "Safely Remove Hardware".
    - A new window will pop up and ask you to choose which device to stop.
    - Once the device you choose disappears from the list, you can unplug it.
  - Windows 7
    - Click the arrow icon in the system tray.
    - Click the "Safely Remove Hardware and Eject Media" icon.
    - Choose which device to eject.
    - Wait for an info bubble to appear and confirm that the device is safe to remove.
    - Unplug the device.
  - Windows Vista
    - Click the "Safely Remove Hardware" icon in the notification area.
    - Choose the device to eject.
    - Wait for the device to be removed from the system.
    - Unplug the device.

### **Image File Editing**

- Why Edit Your Images:
  - Image may be too warm or too cool (wrong White Balance)
  - Image may need cropping
  - Image may be too light or dark (Wrong Exposure)
  - Image may need to be sharpened
  - Image may have unwanted elements (Sensor Spots from dirty lens, telephone wires, facial blemishes, etc)
- Examples of Digital Editing Software For Image Editing
  - Adobe Camera Raw (ACR) for Raw files

- Adobe Elements (Uses Adobe Camera Raw for pre-processing raw files)
- Adobe Photoshop (Uses Adobe Camera Raw for pre-processing raw files)
- Adobe Lightroom (Uses Adobe Camera Raw for pre-processing raw files)
- Apple Aperture

### **Image Editing**

- Image may have the Wrong White Balance (too warm or too cool)
  - White Balance can be Typically Corrected in ACR but also can be done in Elements, Photoshop and Aperture.
- Image may need cropping
  - One of the most basic photo Editing processes
    - Performed to remove unwanted subject/background or irrelevant detail
    - Change image aspect ratio
    - Improve the overall composition
    - Magnify the primary subject (Fitting subject to fill the frame)

### **Before we look as Exposure Editing - Histogram 101**

- In the simplest terms, the histogram shows how the contents of an image's pixels are distributed along the scale from pure black (0) to pure white (255). This gives a complete and accurate representation of the exposure and the light values in a scene.

### **Image may be too light or dark (Wrong Exposure)**

- If your image is coming out too light you are overexposing, if too dark you are underexposing.
- If your camera's histogram shows an improper exposure, Try to fix by adjusting either aperture, shutter speed or ISO setting; however if this is not fixed in camera, it can be somewhat corrected in your Digital Imaging Software (either ACR, Elements, PS, LR or Aperture).

### **Exposure Correction**

- Image editors have provisions to brighten or darken the image.
  - Recent advances have allowed more intelligent exposure correction whereby only pixels below a particular luminosity threshold are brightened, thereby brightening underexposed shadows without affecting the rest of the image.
- Exposure Correction Example – Adobe Camera Raw
  - Exposure Slider sets overall image brightness
  - Recovery Slider Reduces the tones of extreme highlights, attempts to recover highlight detail lost
  - Fill Light Lightens shadow to reveal more detail while maintaining blacks
  - Blacks Slider - Moving the slider to the right increases areas that become black, sometimes creating the impression of increased image contrast
  - Brightness Slider Adjusts image brightness, mainly affecting midtones
  - Contrast Slider increases or decreases image contrast, mainly affecting midtones

### **Image may need to be sharpened**

- Why sharpen?
  - Sharpening of digital image files is one of the most important aspects of image quality and arguably one of the least understood.
  - Sharpening brings out detail and gives an image presence
    - But not all images should be sharpened the same and even areas within an image often need a specific sharpening treatment.

- There are mainly two types of Sharpening (Capture and Creative)
  - Most DSLR cameras require image sharpening to overcome the blurring effects obtained from internal processes (this is called Capture/Global Sharpening)
    - JPEG Files typically have been Sharpened in the camera
    - Raw files typically have not been sharpened or have been sharpened very little (check your camera settings)
    - Raw files can be sharpened using ACR (Photoshop, Elements, LR) Globally, meaning that the whole image will be sharpened uniformly.
  - A second round of sharpening, which is referred to as "creative" sharpening is when we might sharpen only some features in an image- such as eyes and hair, leaving skin unsharpened (or even blurred a bit).
    - This will require localized editing techniques – This is where the image is sharpened more, however a mask is applied to only allow the features we want sharpened to be shown.

### **Image Management (Organization and Backup)**

- If you take a lot of pictures, you will need to develop some type of management scheme so that you can find an image when you need to or restore an image if you lose it
- Things you can do that will help you manage your images:
  - Organizing your images into some type of Folder Structure
    - Try to have all your folders under one overall folder (Pictures or My Pictures would be great)
    - By years, Shoots, People, Places, etc
  - Add Filter Tags (Keywords, Ratings and or Labels) to your images
    - On Import or while you are processing them
  - Back up Your images so that you do not lose them
- Whatever scheme you develop – be consistent

### **Backups - Introduction**

- There are two kinds of people in the world
  - Those who have had a hard drive failure
  - And those who will
- Backups have two distinct purposes.
  - The primary purpose is to recover data as a reaction to data loss, be it by data deletion or corrupted data
    - Data loss is a very common experience of computer users. 67% of internet users have suffered serious data loss.
  - The secondary purpose of backups is to recover data from a historical period of time
- Any backup strategy starts with a concept of a data repository.
  - The backup data needs to be stored somehow and probably should be organized to a degree.
    - It can be as simple as a sheet of paper with a list of all backup disks and the dates they were written or a more sophisticated setup with a computerized index, catalog, or relational database.

### **How to Backup?**

- Digital photos can be backed up in a variety of ways. To protect and preserve your photos, some recommend the following two-part approach:

- 1. For your most valuable and irreplaceable photos: Make or order high quality prints or photo albums and use recommended photo storage conditions to ensure they will survive time and technology advances.
- 2. For your entire photo collection there are several options:
  - Copy to an external hard drive
  - Make CDs or DVDs
  - Upload to online photo services or dedicated online storage services
- Some people recommend the 3-2-1 Method
  - 3 Backups
  - 2 that use different media types
  - 1 that is off-site

### **Make Backup Plan**

- Over time, the photo collection in your working storage location – usually the hard drive on your computer – can grow quite large and valuable.
  - To preserve your images over the long term, it's important to create a backup plan and practice it on a regular basis.
  - The Term "backup" means a second copy of your digital photo file collection, and also the process of creating that copy.
- A Backup Plan Answers the following 4 questions:
  - 1. What Method works best (Hardware, Software)?
    - Hardware: External Drive, CD/DVD, Cloud
    - Manual (Drag and Drop), Automated (Windows Backup and Restore, Mac's Time Machine)
  - 2. Where to keep backups?
  - 3. When, and how often, will a backup be done?
    - Daily, Weekly, Monthly – or just when I need to
  - 4. How should you guard against my storage becoming obsolete?

### **Hardware: Choosing Photo Backup Media**

- CD, DVD, Blu-Ray, or other removable media
  - Primary method of consumer backup for quite some time.
  - They have the advantage of being reasonably inexpensive and broadly compatible.
  - Some removable media lasts only 5-10 years, while others claim a lifetime of 50-100 years.
- External hard drives, have made great progress since they've dropped in price tremendously over the past several years.
  - Hard drives can store a tremendous amount of information in a small area, are quite fast, and permit the backed up data to be immediately accessible and modifiable
  - Over time they can gradually demagnetize, but the biggest concern is that they may not spin up because their internal motor has failed (although no data is lost, it can be expensive to recover).
- Unfortunately, the only future-proof solution is to migrate your data over to the latest technology every 3-5 years.

### **Copying your photos to an external hard drive:**

- PC: Use Windows Explorer (or FileManager) on your computer to transfer the photos to the hard drive. For MACs Use Finder.

- If you keep all your photos within a specific folder and its sub-folders, you can easily copy them to your external hard drive in one step using the "drag and drop" technique.
- PC and Mac Operating Systems, photo management programs and external hard drives come with backup software that can make the backup process easier.
  - Windows Backup and Restore
    - Let Windows choose what to back up, or pick individual folders, libraries, or drives.
    - Windows can back up files on whatever schedule you choose. have an automated built in capability
  - Mac Time Machine:
    - Time Machine lets you automatically back up your entire system in Mac OS X v10.5 and Mac OS X 10.6 or later.
    - Time Machine keeps an up-to-date copy of everything on your Mac--system files, digital photos, music, movies, TV shows, documents, and so forth. You can easily go "back in time" to restore files if you ever need to.
- Don't forget to label your external hard drive with its contents and date of backup.

#### **Storing your external hard drive:**

- Store your hard drive at room temperature away from heat sources.
- Treat your hard drives very gently: They are susceptible to shock.
- Keep your backup drive disconnected and away from your computer, and maybe even in a different location altogether.
- Be aware that computer viruses can still get onto your hard drive when connected. If you suspect that your computer has a virus, ask a knowledgeable person to help you before you reconnect your backup drive to the computer.
- Do not plug or unplug external drives from your computer while they're transferring photos or other data.
- If you keep photos on an external hard drive that's not connected to a computer, make sure you connect it to a computer and power it up every couple of months to make sure it's working properly.
- Any time you make a backup on a hard drive, write the date of the backup and what set of photos you actually backed up onto the drive with a stick-on label.

#### **When purchasing CDs or DVDs:**

- Look for well-respected brands, yet be aware that some companies sell discs made by manufacturers that may have lower quality standards.
- Use high-quality archival or photo grade CDs or DVDs if you decide to make use of these media as your primary backup copies – higher cost
- Avoid the lowest-cost CDs and DVDs, which may compromise both materials and manufacturing quality due to the fact that these manufacturers shift production of the discs to facilities designed for low cost over high quality.
- Use media such as CD-R, DVD-R, and DVD+R that are not rewritable.
  - These discs use a permanent dye change that is more stable than the reversible phase change used for rewritable media such as CD-RW, DVD-RW, DVD+RW and DVD-RAM.
  - Discs that are not rewritable also prevent files from being accidentally deleted and eliminate the virus threat.

### **Copying your photos to your CDs or DVDs:**

- Use Windows Explorer on your computer to transfer the photos to the CD/DVD. If you keep all your photos within a specific folder and its sub-folders, you can easily copy them to a CD/DVD drive in one step using the “drag and drop” technique.
  - For DVDs, you may have to use an additional program that is usually shipped with your computer or DVD drive to copy your photos or “burn” them to the DVD.
- If you have insufficient space on the disc to store your folder, break up the folder into smaller sub-folders and store each of them on its own disc.
  - Be aware that a DVD labeled with 4.7 GB capacity may actually hold only about 4.2 GB of photos, so you’ll need to limit your sub-folder sizes to 4.2 GB.
- If possible, avoid using the full disc capacity.
  - Studies at the National Institute of Standards and Technology show that files are vulnerable to an edge effect that begins to appear at 10 percent from the end of the disc, and becomes significant around five percent from the end of the disc. Some CD recorders can even exceed stated disk capacity, compounding the problem even more.
- After “burning” your CD or DVD, check the recording by using the “verify” function of your software
- Don’t forget to label your CDs or DVDs with their contents and date of backup.
  - Use a special marker specifically designed to label CDs and DVDs. Solvent-based pens, ballpoint pens or other sharp writing instruments and adhesive labels may damage CDs.
  - The best location to label a disc is near the reinforced hub where there’s no stored data. You’ll be very glad you labeled your backups should you ever need them in future.

### **Storing your CDs or DVDs:**

- Store your CDs or DVDs at room temperature away from heat sources.
- Store your CD or DVDs in an upright position, and not stacked horizontally.
- Use translucent CD or DVD cases which don’t have a plastic insert to hold the disc. Some of the colored plastic inserts for standard jewel cases contain plasticizers or other materials that may reduce disc lifetime.
- Avoid storing acidic paper inserts with your CDs or DVDs.
- For more details on handling CDs and DVDs, the National Institute of Standards and Technology guide is available at <http://www.itl.nist.gov/div895/carefordisc/disccare.html>.

### **Online Backup Services – The Cloud**

- Online backup services can be less labor-intensive than burning backup discs or manually backing up to an external hard drive.
- Online data storage allows users to keep your most important files on a secure remote server.
- Reviews warn that online backup is not a replacement for backups on an external hard drive, but keeping a remote backup can be good secondary protection. Also, highly sensitive files should not be backed up to the cloud.
- Most services have the same basic feature set.
  - Allow to either manually select an individual file to backup or schedule a full backup.
  - Most do incremental backups, storing changes to a file already backed up on the system within a short time after the change is made (ranging from seconds to hours).
  - They also feature a fully automated backup operation that kicks in when the system detects idle time or low processing activity on your computer

### **When Looking For an on-Line Backup System:**

- Check the system requirements.
  - Most online backup services come with an application (called a client) that manages backups and file transfers, but not all clients are compatible with non-Windows operating systems.
- Look for online data backup with automated scheduling.
  - The best online data-storage services have automatic schedules so you don't have to remember to back up.
  - Whether you schedule backups to take place hourly or daily, you should have a choice of full control or an automated task.
- Consider your Internet connection.
  - Initial backups of large files can take hours or days, even on a broadband connection, and it's best to perform large file backups at night.
  - Keep in mind that subsequent backups are done incrementally, which goes much faster.
- Use other forms of backup.
  - Online data storage saves time and space, but you should never put all your proverbial eggs in one basket.
  - Most services do not promise that they can restore your data should a hardware, software or business problem occur.
    - Consider alternatives such as external hard drives for primary storage.
- You may not want to store highly sensitive information on a website.
  - Many reviewers note that data kept on a remote server, as is the case with an online backup service, is more vulnerable to unauthorized access than data that's on your own computer. All online backup providers use some sort of encryption (and sometimes multiple encryptions), but you might not want to take a chance with your most valuable data.

### **How should you guard against my backup storage becoming obsolete?**

- You should monitor the condition of your backup storage once a year by doing the following:
  - Check to see that you can view photos from your backup storage on your computer.
  - Check your CDs and DVDs for scratches and dirt.
  - If there's an increase in the noise level coming from your hard drive, there's an increased risk of failure.
  - If you encounter any problems or errors, make a new backup right away.