



# DIGITAL WORKFLOW

# Digital Workflow Basic Components



Capture

Ingest

Process

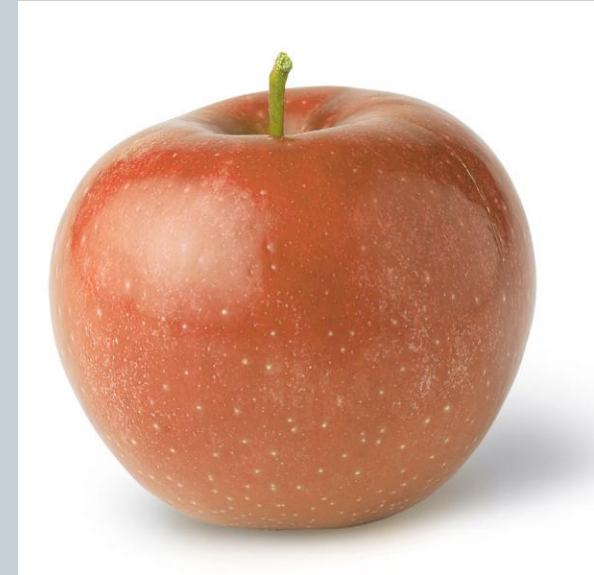
Delivery

Archive

# But First...



- Are you working in a color managed environment?



# Color Management Advantages



- Helps preserve color at every step
- Saves you time
- Consistent results
- Fewer headaches

# Color Management



- Monitor Calibration and Profiling



# Color Management



- Calibration: process of setting the monitor to the desired neutral output. It includes settings for *luminance*, *white point* and *gamma*.
  - Luminance: a measurement of the brightness of an object or light source.
  - White Point: sets the color temperature (or illuminant) of how white is displayed. Common settings include 5000 or 6500k or the D50 or D65 references.
  - Gamma: correction applied to a computer monitor that describes the relationship between input voltage and output luminance.

# Recommended Calibration Settings



- Luminance: measured in candelas per square meter (cd/m<sup>2</sup>), **80** cdm/2 to **120** cdm
- White Point: **6500K/D65** commonly used for general purpose & images on the web
- Gamma: 2.2

# Monitor Profile

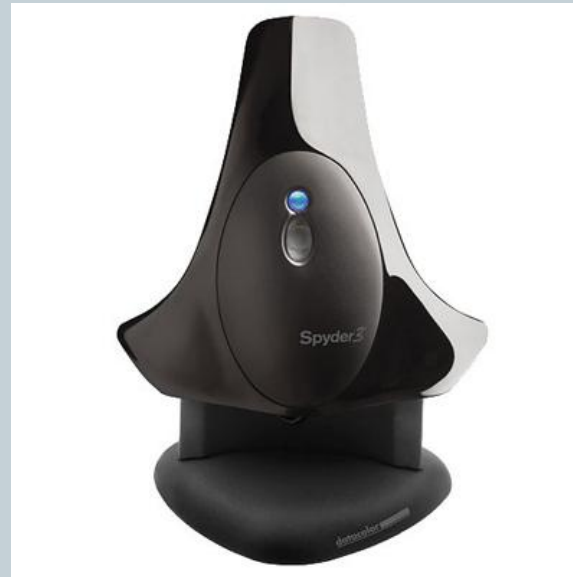


- The process of measuring the imperfections in the monitor, and creating an adjustment that compensates for those imperfections

# Monitor Profiling



- Various Hardware



# Monitor Profiling



- Room Lighting
- Wall Color
- Use a neutral background for computer desktop
- Disable screensaver and power saving features before you begin
- Allow the monitor to warm up for at least 30 min.
- Place measuring device in the center of the screen

# Monitor Profiling



- Set recalibration and profiling reminder
- New monitors may take a while to stabilize

# Printer Profiling



- Some devices such as the i1 pro and ColorMunki allow for printer profiling
- Not as vital as monitor profiling
- Can use manufacturer/”canned” profiles



# Capture - Digital Cameras



- Cell phone with built in digital camera



# Digital Cameras



- “Point and Shoot”



# Digital Cameras



- Medium Format Digital (D)SLR



# Digital Cameras



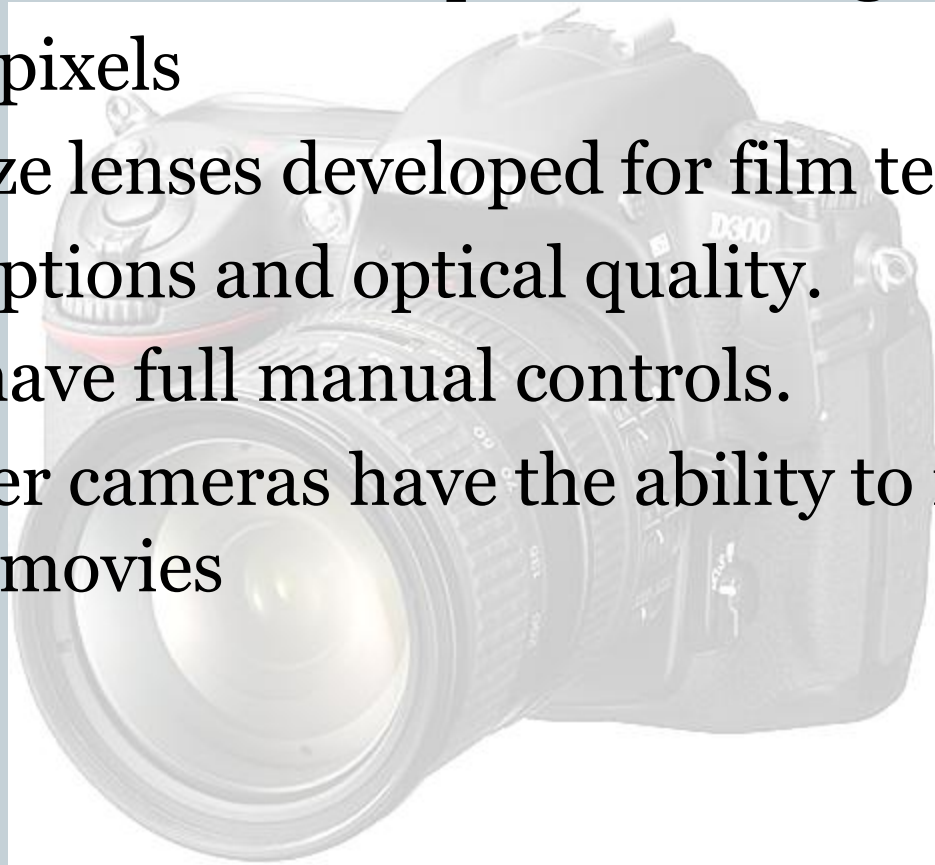
- Digital Single Lens Reflex (DSLR)



# Digital Cameras - DSLR



- Higher end consumer to professional grade.
- 8-22 megapixels
- Many utilize lenses developed for film technology.
- Best lens options and optical quality.
- Ability to have full manual controls.
- Many newer cameras have the ability to record High Definition movies



# Choosing a camera



- Determine your imaging needs.

Consider:

- Sensor Size
- Pixel Pitch
- Image quality dictated by delivery needs

High Image Quality

Low Image Quality



High Quality Inkjet

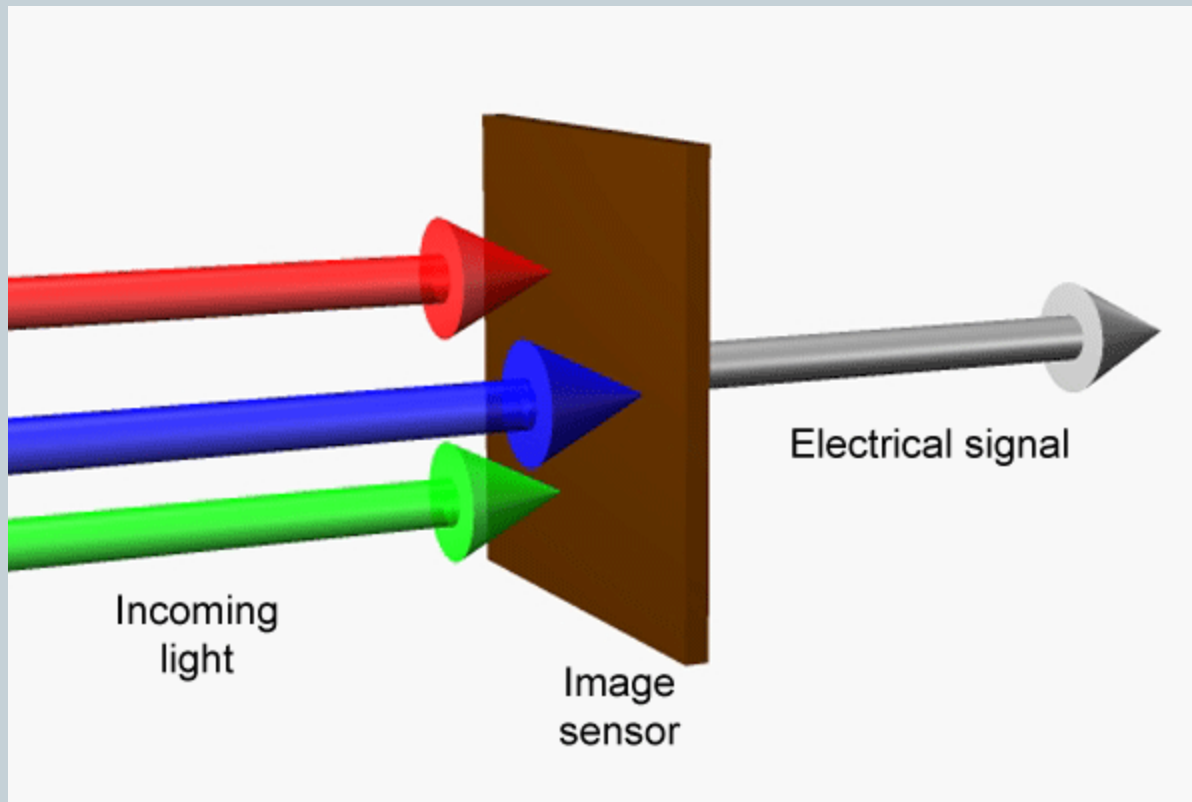
Offset Printing

Web/Mobile Device

# Image Sensors



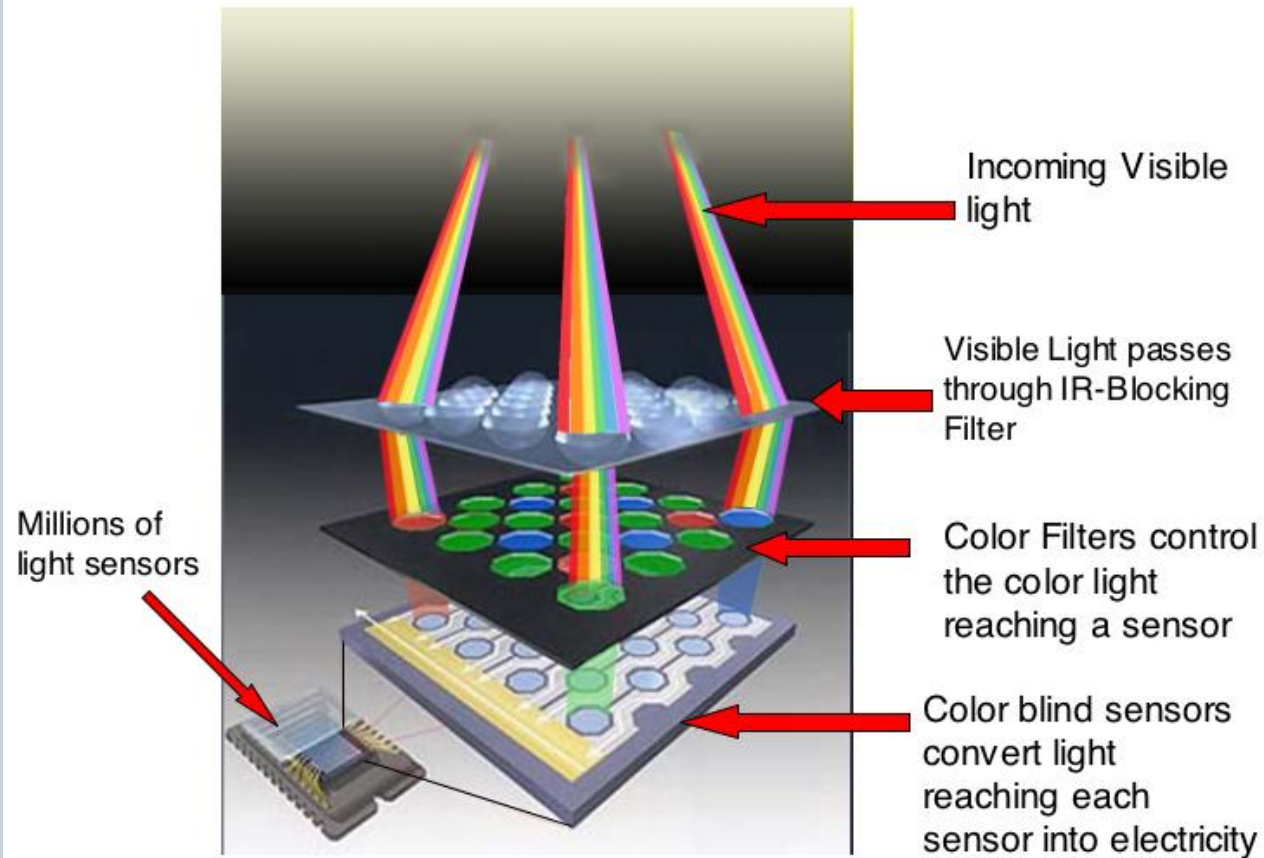
- Photosites convert light into an electrical signal.



# Image Sensors



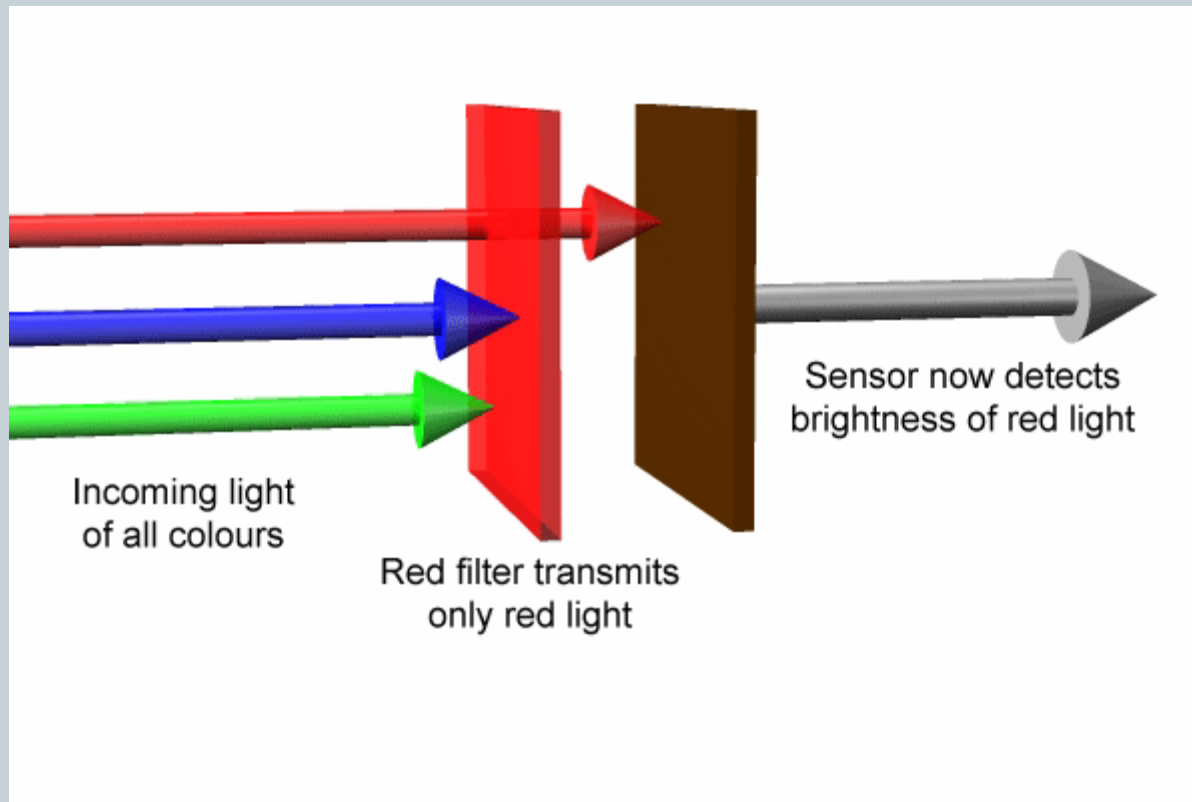
## RGB Inside the Camera



# Image Sensors

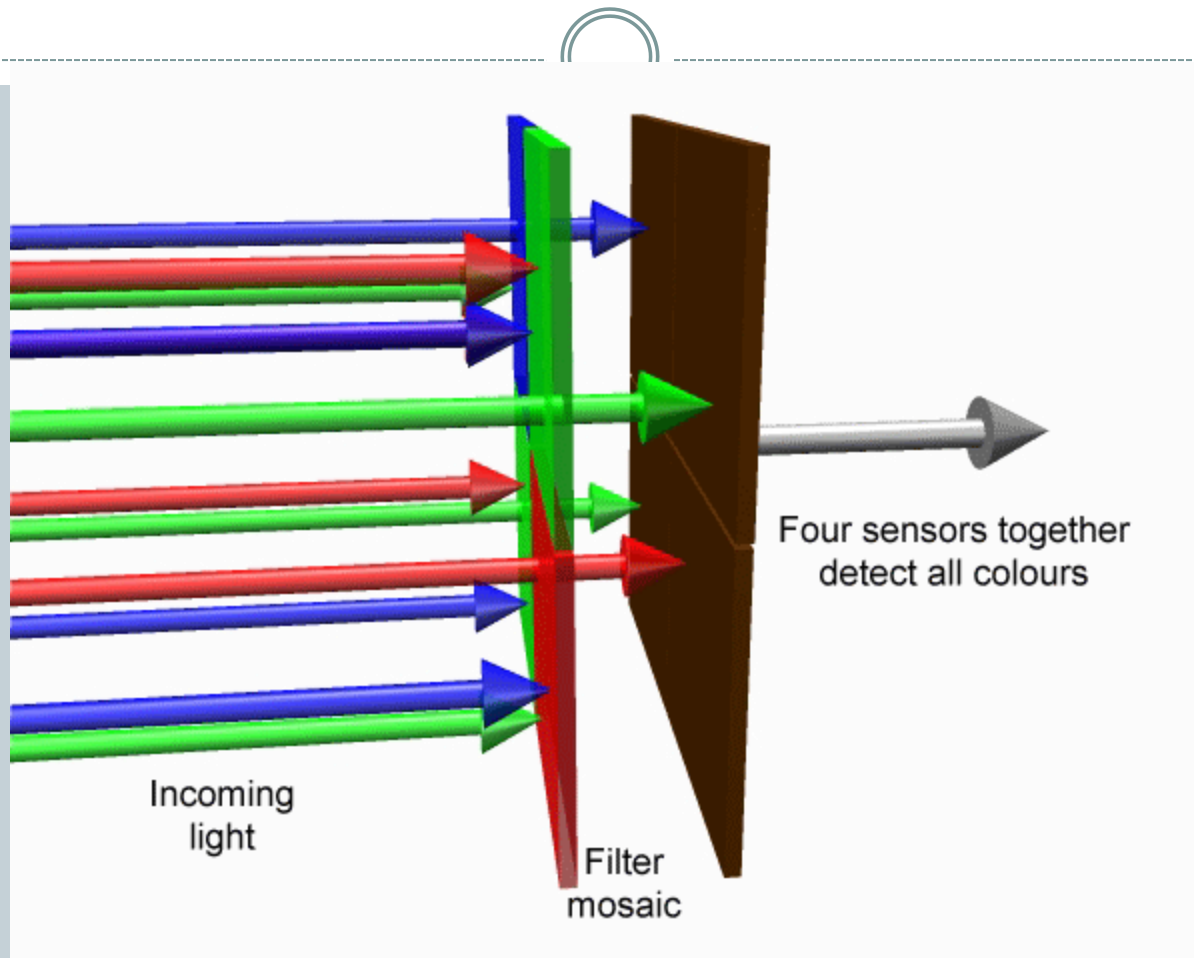


- A colored filter is placed over each cell.

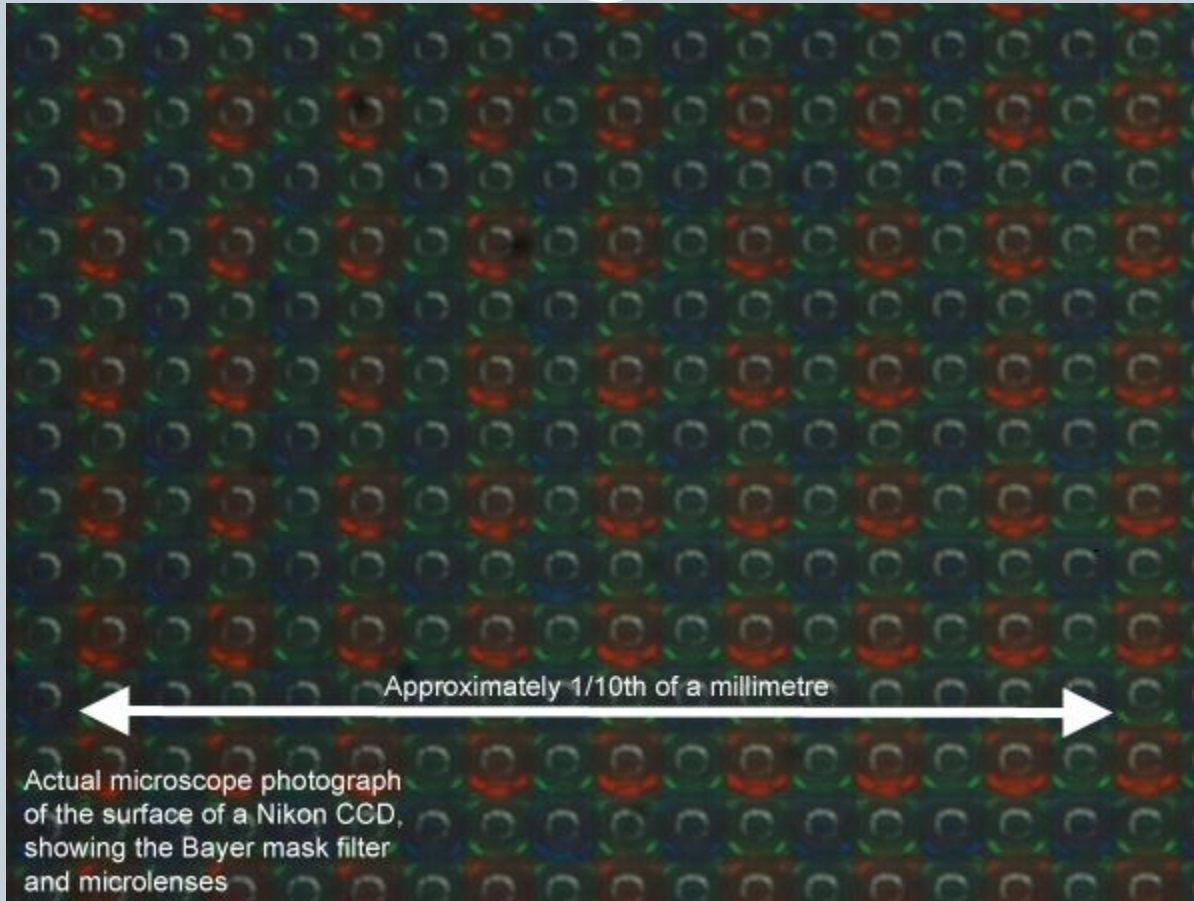




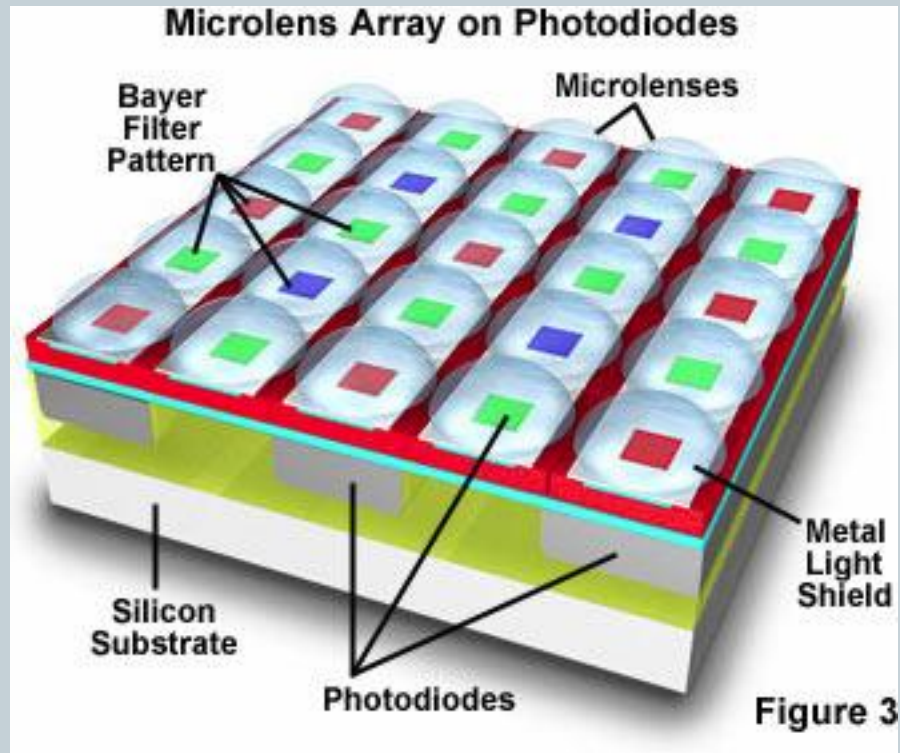
# Bayer Mask Filter



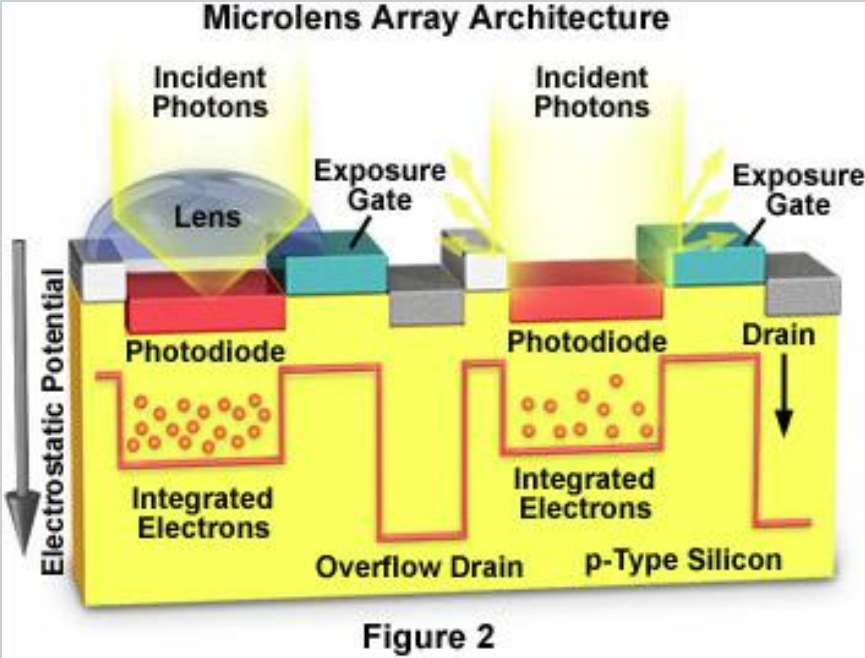
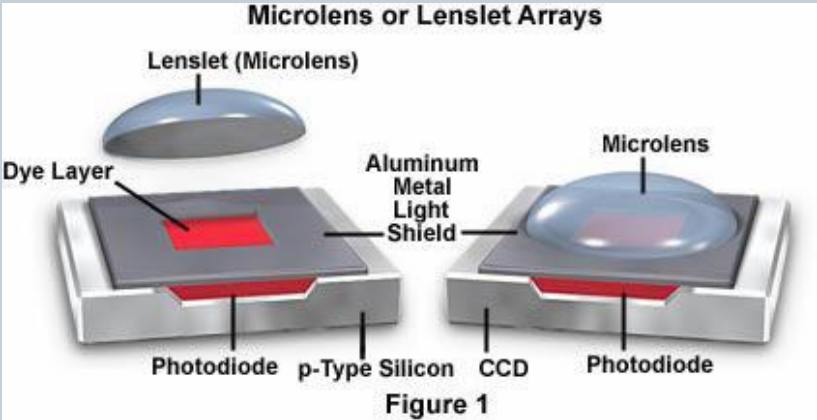
# Bayer Mask Filter



# Microlenses



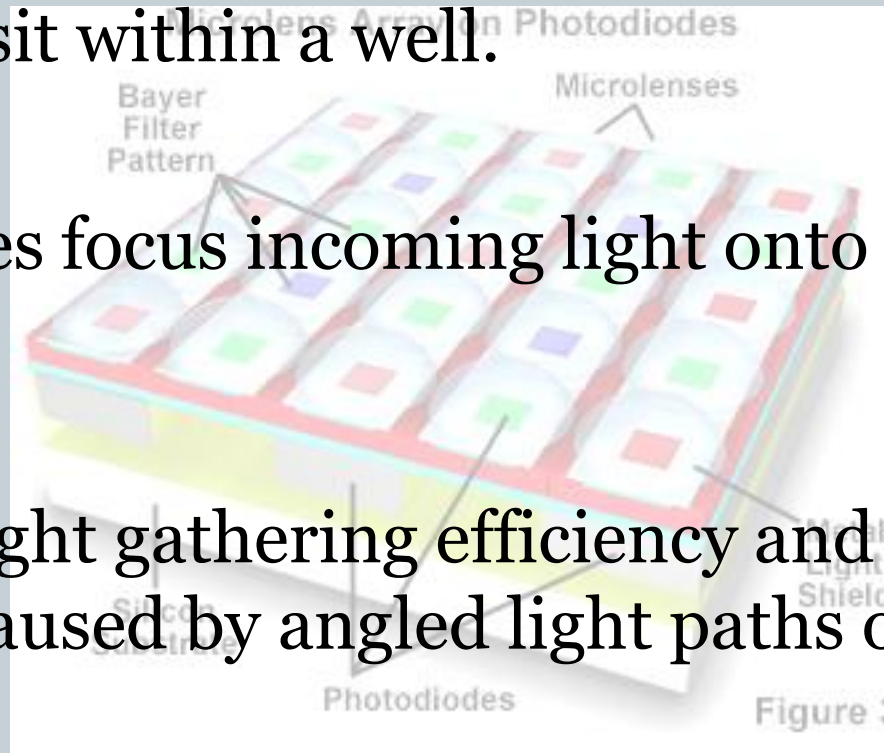
# Microlenses



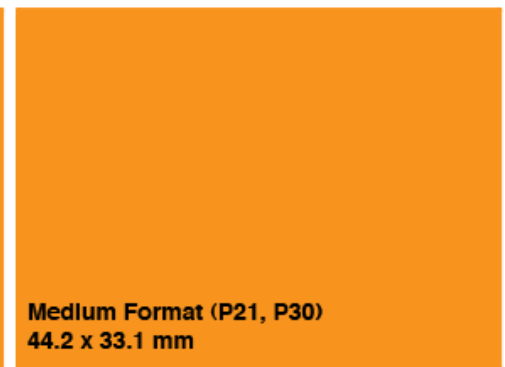
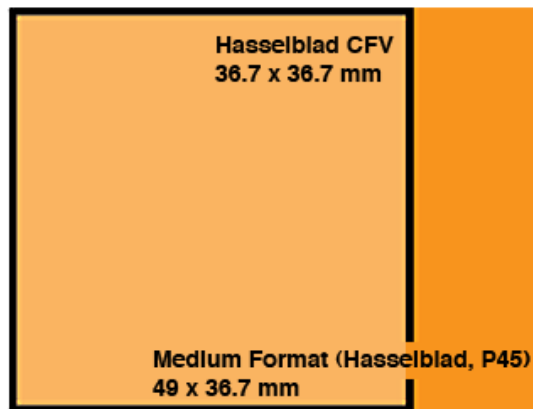
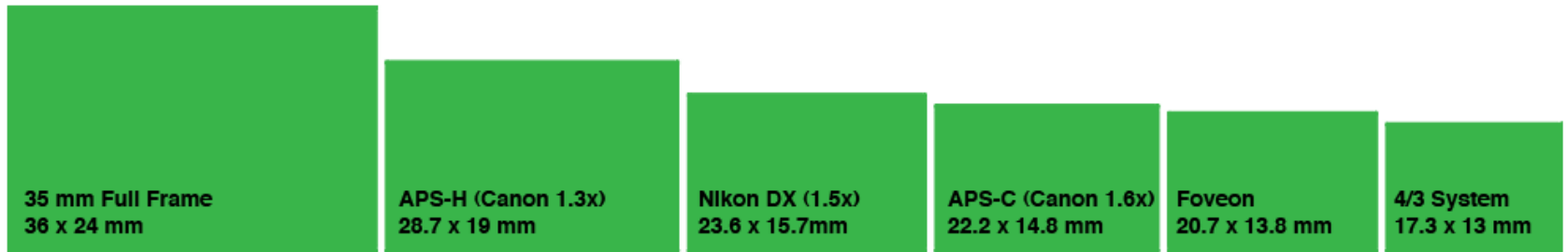
# Microlenses



- Photosites sit within a well.
- Micro-lenses focus incoming light onto the Photosite.
- Increases light gathering efficiency and helps avoid problems caused by angled light paths of wide-angle lenses.



# Sensor Size



# Pixel Pitch



- Pixel Pitch refers to the size of the Photosite/Photodiode
- Higher Megapixels are not always an indicator of image quality.

# Pixel Pitch



- Smaller photosites gather less light and have less signal strength.
- Less signal strength = less efficient signal-to-noise ratio resulting in more digital noise.

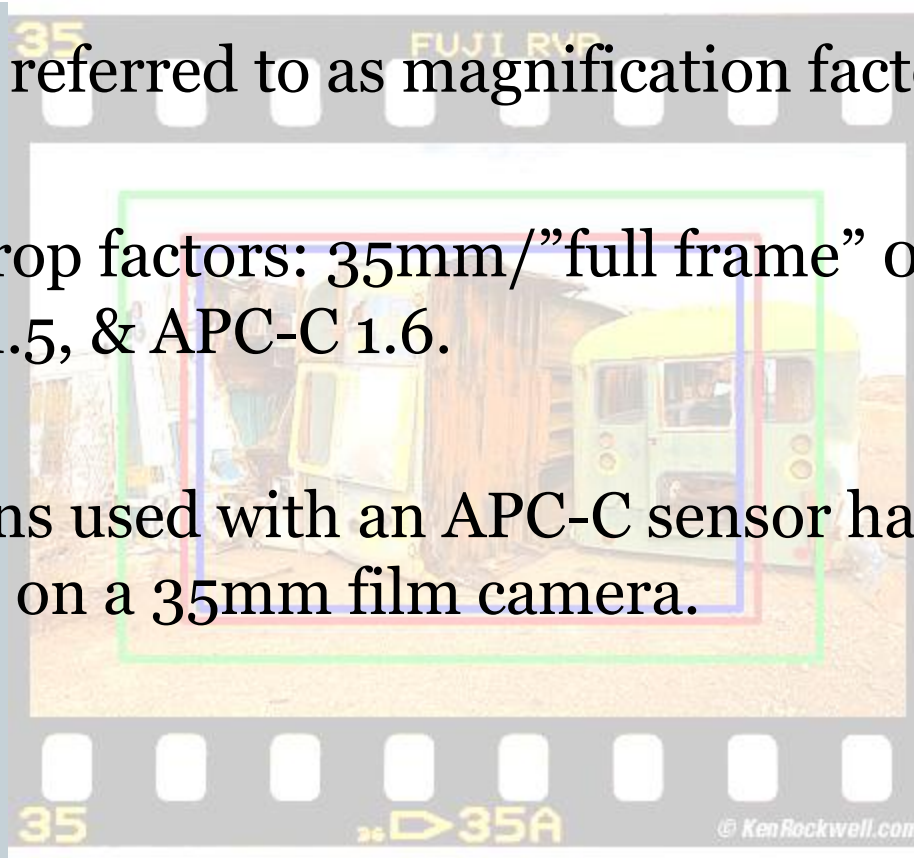
# Crop Factor



# Crop Factor



- Sometimes referred to as magnification factor.
- Common crop factors: 35mm/"full frame" 1.0, APS-H 1.3, Nikon DX 1.5, & APC-C 1.6.
- A 50mm lens used with an APC-C sensor has the look of a 80mm lens on a 35mm film camera.



# Digital Workflow Basic Components



Capture

Ingest

Process

Delivery

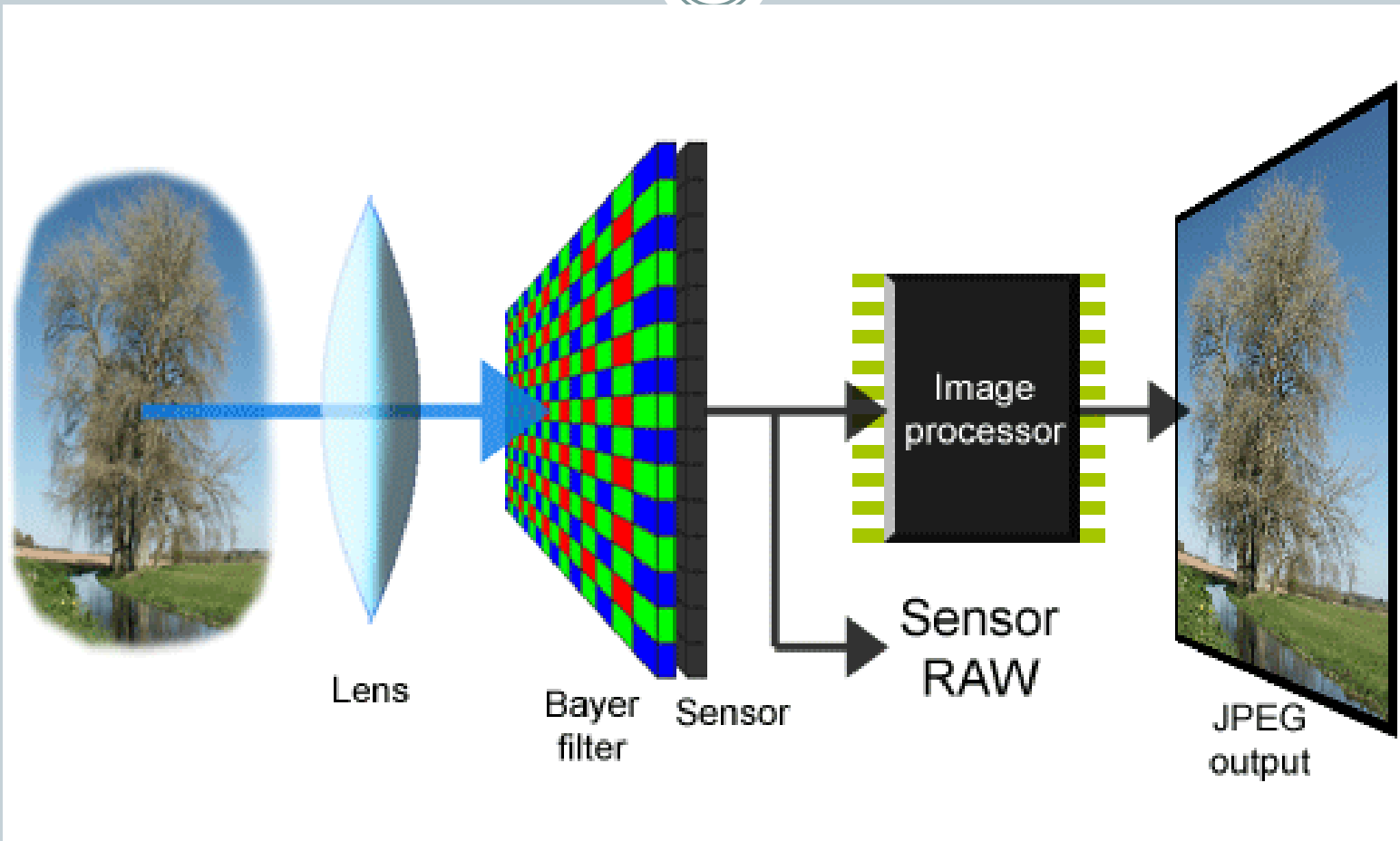
Archive

# Workflow – Capture Decision Points



- **Capture Format**
  - Rendered: JPEG/TIFF
  - Unrendered: RAW/DNG
  - RAW+JPEG
- **Capture Method**
  - Tethered
  - Memory Card

# Image formats: RAW vs. Rendered Images



# RAW Capture Advantages



- Maximum image quality can be obtained.
- Image quality of legacy files can be improved over time as parametric image editors improve.
- White balance can be applied after the fact, alleviating concern for “nailing” white balance on capture.
- Output can be 16-bit depth, a major advantage for post-processing.
- There is good flexibility in adjusting exposure and brightness values.
- All adjustments are non-destructive, meaning the digital negative can be reprocessed an infinite number of times in a variety of software applications.

# RAW Capture Disadvantages



- Proprietary raw formats may become unreadable at some point in the future.
- Processing raw files requires a computer, special software and time.
- Raw files require more storage space than JPEG files, (but less space than TIFF).
- Proprietary raw files can take a while to be supported by third-party processors.
- Proprietary raw files are not good candidates for storing custom metadata. In fact, most software applications refuse to embed any type of metadata in them, forcing the use of sidecar files or storage of the information in a database or folder.
- The only standardized raw file format, DNG, is not supported by all raw processing software, limiting the variety of parametric image editors that can be used with it. (The list, however, is growing).

# JPEG Capture Advantages



- JPEG files are smaller than raw files so the storage media will hold more images.
- Most cameras can shoot JPEGs more quickly than raw, and camera buffers do not fill as quickly.
- Quicker to transmit electronically due to their smaller size.
- Immediately available for use, not requiring a processing step on a computer.
- If shot carefully, can be of very high quality and are sufficient for many applications and job types.

# JPEG Capture Disadvantages



- Requires accurate, custom white balance
- Image processing adjustments can result in a deterioration of image quality
- The camera determines image quality (not always the best)
- Originals can be easily overwritten if picture edits are made and then saved with the same file name.
- Degrades slightly in quality with each save.
- When using applications, such as Lightroom/Adobe Camera Raw, Aperture, and others, those edits are only visible in the program that created them or when they are output to a new JPEG or another standard file format.
- The highest image quality that the camera can provide is discarded along with the original raw data.

# Workflow – Ingestion Decision Points

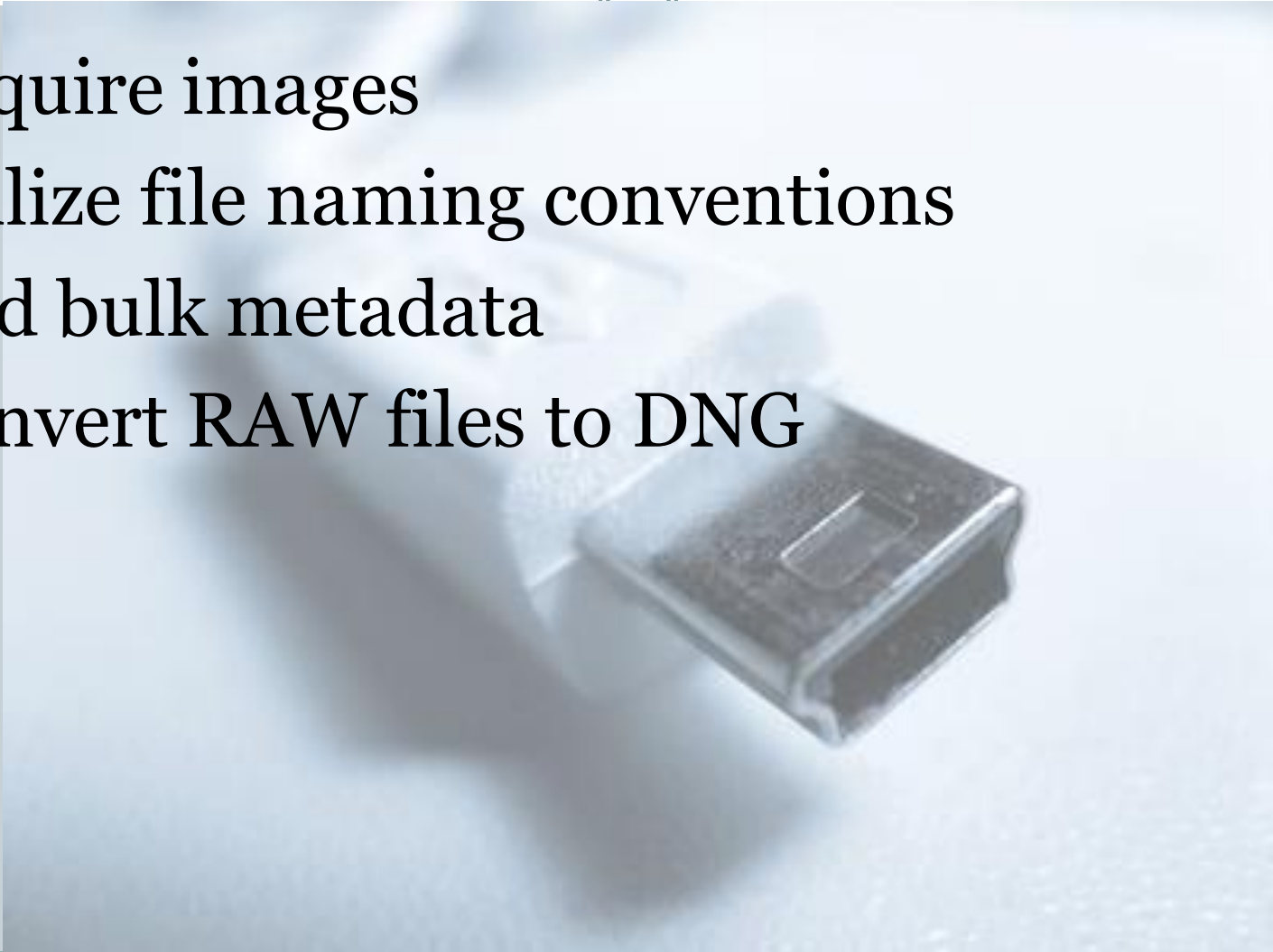


- **Cataloging PLEware**
    - Adobe Lightroom
    - Apple Aperture
  - **Adobe Bridge**
  - **3<sup>rd</sup> Party Ingestion Software**
  - **Camera Makers Proprietary Software**
- 

# Workflow – Ingestion Objectives



- Acquire images
- Utilize file naming conventions
- Add bulk metadata
- Convert RAW files to DNG



# Acquiring Images



- Download images from memory cards to a disk or storage device on a regular basis
- Do not format the memory card until downloaded images can be reviewed and backed up to a second drive
- Do not connect the camera directly to the computer to ingest images (unless shooting tethered)
- Avoid using the finder application to copy image files
- Get into a habit of backing up original files immediately after ingestion

# File Naming Conventions



MacTastik



By N.C. Winters



# File Naming Conventions



- Letters in the name should only be the letters of the Latin alphabet (A-Z, a-z)
- Numbers should only be the numerals 0-9
- Only hyphens and underscores should be used
- Avoid any other punctuation marks, accented letters, non-Latin letters and other nonstandard characters such as forward and back slashes, colons, semicolons, asterisks, angle brackets or brackets.
- File names should end in a three-letter file extension preceded by a period such as .CR2, .NEF, .JPG, .PSD
- Each image file should have a unique file name
- Once you develop a naming system, standardize and adhere to it

# File Naming Conventions



- File Naming Example:

jra\_110525\_0001.dng

initials\_yymmdd\_sequence number . file extension

# Bulk Metadata



- Metadata is embedded or associated information describing a file's contents, both technically and conceptually.
- Metadata container formats: EXIF, IIM, IPTC Core, Dublin Core, DICOM, and XMP.
- **IPTC (International Press Telecommunications Council)** The international organization that develops and maintains technical standards for news exchange. They are responsible for the IPTC Photo Metadata Standard, which consists of the IPTC Core and Extension schemas.

# Bulk Metadata



- Use a metadata template to add basic information at the ingestion stage to insure that all derivative files will have the same base metadata as the original.
- Bulk Metadata should at least include the following:
  - Name, address, phone and email of creator
  - Copyright Status
  - Copyright Notice
  - Generic Rights Usage

# Bulk Metadata




Edit Metadata Template

Template Name:

Choose the metadata to include in this template:

<input type="checkbox"/>	<b>IPTC Core</b>	
<input checked="" type="checkbox"/>	Creator	: Jimmie Allen
<input checked="" type="checkbox"/>	Creator: Job Title	: Photographer
<input checked="" type="checkbox"/>	Creator: Address	: 901 S. National Ave.
<input checked="" type="checkbox"/>	Creator: City	: Springfield
<input checked="" type="checkbox"/>	Creator: State/Province	: MO
<input checked="" type="checkbox"/>	Creator: Postal Code	: 65897
<input checked="" type="checkbox"/>	Creator: Country	: United States of America
<input checked="" type="checkbox"/>	Creator: Phone(s)	: 417-836-5110
<input checked="" type="checkbox"/>	Creator: Email(s)	: jimmieallen@missouristate.edu
<input checked="" type="checkbox"/>	Creator: Website(s)	: <a href="http://art.missouristate.edu/faculty.php">http://art.missouristate.edu/faculty.php</a>
<input type="checkbox"/>	Headline	:
<input type="checkbox"/>	Description	:
<input type="checkbox"/>	Keywords	:
<input type="checkbox"/>	IPTC Subject Code	:
<input type="checkbox"/>	Description Writer	:
<input type="checkbox"/>	Date Created	:
<input type="checkbox"/>	Intellectual Genre	:
<input type="checkbox"/>	IPTC Scene	:
<input type="checkbox"/>	Location	:
<input type="checkbox"/>	City	:

 Only checked properties will be added/changed to this template.

Properties selected: 15

# Bulk Metadata



- **Generic Rights Usage Example:**
  - All rights reserved except those specifically granted herein. Contact Jimmie Allen at 417-836-5737 or [jimmieallen@missouristate.edu](mailto:jimmieallen@missouristate.edu) to inquire about any reproduction of this image.

# Memory Cards



- Utilize a plan for keeping shot cards separate from un-shot cards
- Be sure un-shot cards are formatted and ready to go
- Use the camera to format cards only after verifying successful download and backup

# Workflow - Processing



- After images have been ingested:
- **Group/Add custom metadata**
- **Rate/Cull**
- **Adjust**

# Workflow - Processing



- **Group/Custom metadata via keywording**
- **Use Hierarchical keywords**

The screenshot shows a 'Keyword List' window with a search bar and a tree view of keywords. The tree is expanded to show a hierarchy from 'Subjects' down to 'Cars'.

Keyword	Count
Clients	3503
Collections	14307
Personal	4722
Subjects	1947
Animals	510
Occupations	630
Structures	111
Transportation	696
Vehicles	696
Aircraft	318
Helicopter	24
Jet	294
Boats	354
Cars	24

# Workflow - Processing



- **Rate/Cull**
- 1 Star - Image is presented to client
- 2 Star - Image is best-of-shoot, will be recommended to client
- 3 Star - Best of Collection image - Use the third star once the 2 Star category gets too crowded, and images need to stand out
- 4 Star - Portfolio - Use this when 3 star category gets too crowded, and needs additional segmentation
- 5 Star - Portfolio - Second Level - Use this designation once the 4 Star category gets too crowded

# Workflow - Processing

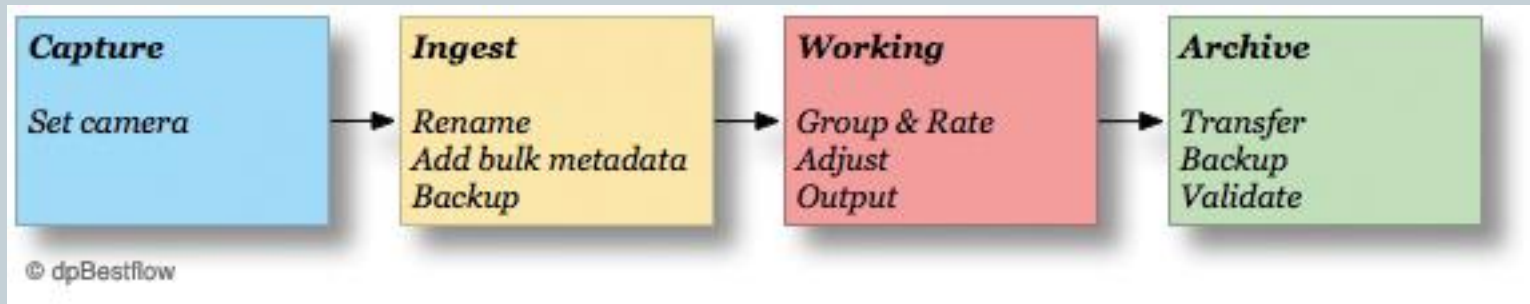


- **When adjusting images, there are many options; here are a few essentials:**
  - **White Balance**
  - **Contrast**
  - **Capture Sharpening**
  - **Noise and Aberration edits**
  - **Color, Grayscale or multiple variations**

# Workflow - Processing



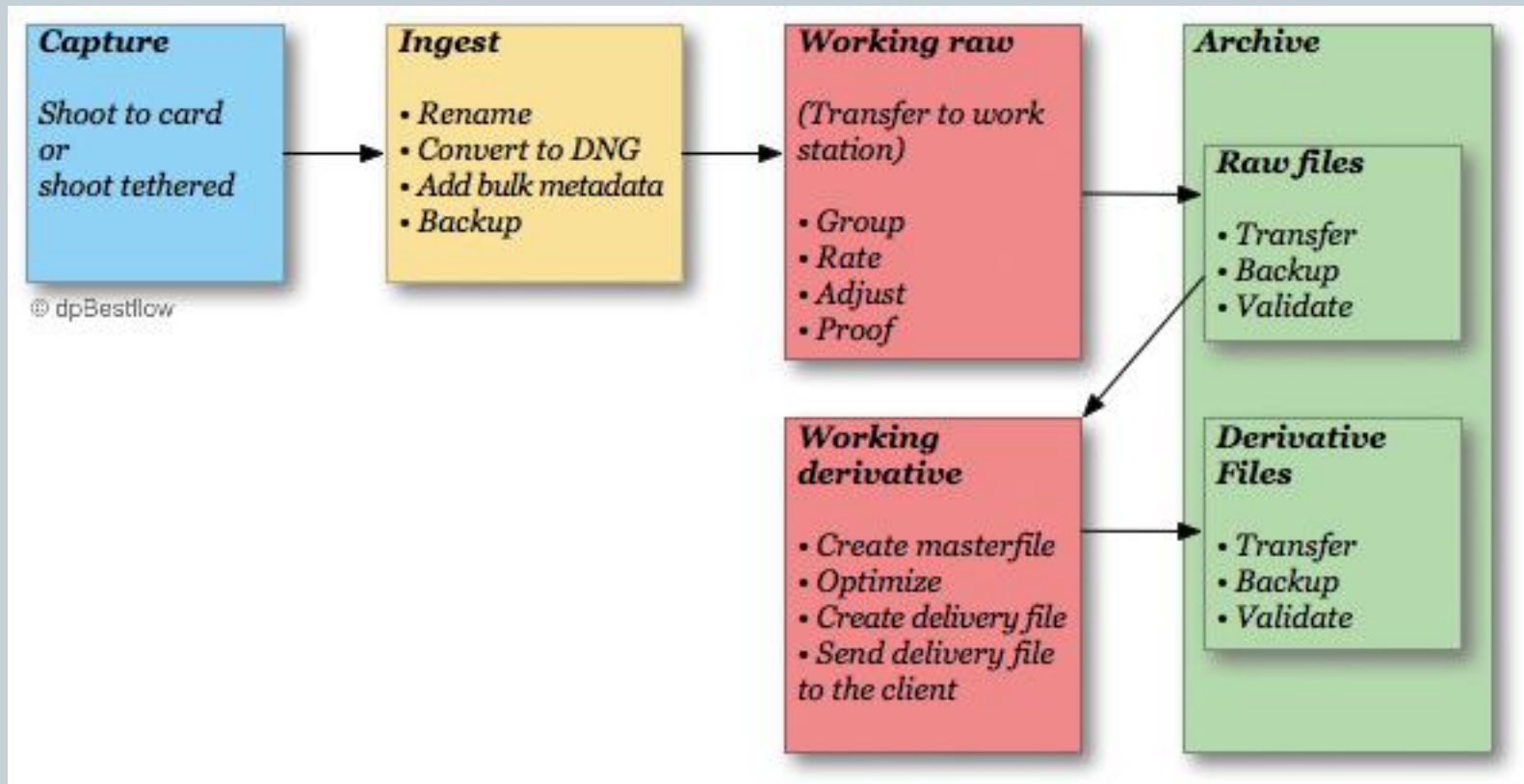
- Batch Workflow: image files that have been collected and processed all at the same time



# Workflow - Processing



- **Optimized Workflow:** the photographer continues to exercise creative control after the shoot (also referred to as “post production”)



# Workflow – Delivery



- Printing: Resize, apply output sharpening and print utilizing printer/paper profile
- Web Gallery/Web Site/Mobile device: Resize, save as jpg with sRGB profile
- Email: Before sending, be sure recipient will be able to receive the file (file size restrictions)
- CD/DVD/Blu-ray: ensure all images needed will fit on the media

# Workflow – Archive - The 3-2-1 Rule



- 3 copies of any important file (a primary and two backups)
- Files should be on 2 different media types (ex. hard drive and optical media such as DVD or Blu-Ray), to protect against different types of hazards. Consider keeping a backup of the original, proprietary RAW file
- 1 copy should be stored offsite (or at least offline)

# Archiving Images



- Primary Drive and Backup
- Storage vs. Organization
- Organization should be based on Metadata

# Storage – Folder Structure



- Set up a logical folder structure
- Keep notes until you settle on a system
- “Working Files” folder:



# Storage – Folder Structure



- Date based Folder structure example:
- Note: Keep original and derivative files separate.



# Storage – Folder Structure



- Job/Client or Project example
- Both examples utilize a root folder where images are stored by the year they were created.



# Storage – Folder Structure



- A size limited folder could be set up to easily backup files to digital media such as DVD (approx. 4.7 GB) or Blu-ray (approx. 25 GB)



# Workflow – Archiving Images



- Archiving images should take place at multiple points.
- Suggested points include: Ingestion, post processing, & delivery files
- Use backup software that is capable of validation.
- SyncBack or ChronoSync are two examples

# Conclusion



- Be consistent
- Standardize file naming, folder structure, metadata use and more. As you do this, keep in mind that your collection of image files will be growing, and you will want your systems to be scalable so they can grow with you.
- Determine best workflow based on Batch or Optimized workflows
- Utilize the 3-2-1 rule
- The work you do and the workflow you use may be dictated by the delivery method required. If you are unsure, shoot the highest quality and utilize the optimized workflow as it gives more options

# Additional Resources



- ASMP's dpBestflow® provides a resources for many aspects of digital imaging technology.

<http://www.dpbestflow.org/>

- **Digital Photography Best Practices and Workflow Handbook**  
**by Patricia Russotti and Richard Anderson**  
Focal Press 2009

