

## ***Digital Photography 101*** ***Introduction to Digital Photography*** *How to Chose and Use a Digital Camera*



FLAAR's digital photography equipment on location in Guatemala.

Nicholas Hellmuth, PhD, Visiting Professor, VCT, College of Technology  
Bowling Green State University of Ohio; Director, Digital Imaging Technology  
Center, Universidad Francisco Marroquin

---

Open enrollment



Digital photography for graphic design, architecture, art, web design, portraits, and general purpose.

This course is open to the general public during summer 2002. You do not have to be a student to apply.

This course shows you everything you need to know about digital cameras and digital photography. Provides tips, info, help; describes procedures, gives how-to information. Leads you to understand how you can take great digital photographs and produce outstanding enlargements with inkjet and laser printers.

Evaluation and reviews of each specific make and model of digital camera will allow you to select which digital camera is best for your needs and especially which will fit your budget (today prices have come way down).

### **This course is appropriate for:**

- Students in graphic design, web design, digital imaging, visual communications, graphic communications, architecture, advertising, digital printing, photography, art, art history, anthropology, archaeology, and related fields
- Excellent training for instructors who themselves wish to teach digital photography, digital imaging, or Adobe Photoshop for digital photography.
- Appropriate for museum curators or any researcher who needs to survive in the world of digital photography.
- Digital photography: pros and cons

Understand why and in what aspects an original digital photograph may produce a better result on a large format printer than would a scanned negative (and vice-versa in other circumstances).

### **Why plunge into digital photography at all?**

- Create immersive QTVR images for use on the web
- Create immersive imaging to spin individual objects in full 3D with QTVR
- To prepare photos for web site design backgrounds
- To prepare photos for use in graphic design
- To have photos for desktop publishing
- To have personal control over the appearance of photos (rather than having some stranger at a lab made decisions)

### **Advantages of digital photography**

- No more smelly chemicals
- No more cost of film
- No more waiting for film to be developed: photos are instant
- Creative freedom to shoot endless images
- Ability to create photo montages for graphic design
- Ability to print the images instantly
- To send photos via e-mail while maintaining high quality

Understand how the quality of a digital photograph can equal the quality of a traditional darkroom photograph, and in what circumstances this is not so. If a digital camera is an advantage, why don't more people still use them?

*A few kinds of photography are still better done with a Leica and 35mm film*

- 500mm telephoto shots of wildlife still look better on a Kodachrome slide

*A few kinds of images still look better done with a 4x5 camera and film*

- architectural photography is still better on film (due to better focus, sharpness and depth of field).

## Glossary

Introduction to digital jargon (so you too can understand every word and every concept).

- Aliasing
- Bits and bytes
- CCD vs CMOS (sensors)
- CMYK
- digital (as in digital vs analog)
- Dpi = dots per inch but not pixels per inch
- Grayscale = "black and white"
- interpolation
- lines per inch = lpi
- noise (digital noise)
- pixels = picture elements
- pixelization
- ppi = pixels per inch
- resolution
- RGB
- White balance (and/or, gray balance)

## History of digital photography (time line)

*How a digital camera actually works: CCD vs CMOS*

- What goes on inside a digital camera (all neatly presented in drawings and patiently explained).

## Types of digital cameras and which one(s) might be best for your needs.

*Digital cameras*

- Point and shoot, entry level
- Point and shoot, 3 to 5 megapixels
- SLR 35mm sized digital cameras
- More sophisticated digital cameras are covered later in this course

*Video: frame capture*

- (resolution inadequate and hence not recommended)

*Downloading options*

- Serial cable
- Parallel cable

- SCSI
- USB
- FireWire
- Transferable storage media (see memory options)

Understanding memory options for your digital camera

#### *Digital storage*

- CompactFlash
  - Card readers
- SmartMedia
- (Sony) Memory Stick
- PC cards
- Clik! (semi-obsolete)
- Floppy disks (Sony Mavica)
- Mini-CD disks (Sony Mavica)
- IBM micro-drive



BetterLight equipment at FLAAR Guatemala

#### *Computer equipment you will need*

General information on computers for digital imaging, DIP entire chapter 4, Long 108ff

#### **PC vs Mac**

- Benefits of PC
  - Dramatically lower price
  - Newest XP operating system is a potential improvement
- Benefits of Macintosh
  - Automatic thumbnails
  - Better color management
  - Wide-screen, non-flicker monitors
  - Good experience for jobs which expect you to have Mac experience

#### **RAM**

Video card and its memory

Monitor class and size

File formats (TIF, etc)

- File compression
- Avoid degrading your image by multiple JPEG compressions

Stuff-it, Zip/UnZip software (not related to ZIP drive)

Hard drives

- SCSI vs IDE vs FireWire

#### **RAID systems**

Other storage and transfer accessories

- ZIP and Jaz drives
- CD-RW vs CD-R
- DVD-RAM vs DVD-ROM
- Kodak Photo CD system
- Problems of obsolescence of readers faster than of the media

Sending and sharing your digital photographs by e-mail and other means

Other computer accessories

- Hubs

## Software which will help your digital photography

- Adobe Photoshop
- Adobe Essentials (Photoshop Lite)
- Other software of interest for digital photo imaging (NIK, masking software)
- Digital asset management software (Extensis, Canto)

## Digital image resolution

General observations on file size in digital imaging for printing

How to know what resolution you need for each kind of photography

Resizing an image

Camera resolution vs output resolution: dpi, lpi, ppi, meaning and implications

- Output resolution for laser printers
- Output resolution for normal inkjet printers
- Output resolution for continuous tone digital printers
- Output resolution for continuous tone dye sub printers
- Compression techniques and jargon
- Genuine Fractals

Medium format digital scan backs



One-shot

Multi-shot (2-shot, 3-shot, 4-shot)

Large format digital (tri-linear) scanning backs

Basic concept of a tri-linear scanning back

Different brands and models of tri-linear scanning backs

Cameras to hold your scan backs

Large format camera lenses for digital photography

**Help in Selecting the digital camera which may be best for you**

With the tips provided so far in learning about digital photography; now lets learn about the process of how to select the ideal digital camera for your particular needs. Long chapter 5

- Define your needs: what do you need to photograph
- Recognize your budget limitations
- Compare and contrast digital capture technologies
- Recognize the varying kinds of output and what kinds of input are needed
- Review the camera options and features which are available today
- Estimate whether you should buy today or still wait until tomorrow for the next generation (that day has passed; today plenty of choices are available already).
- Do you need to shoot out on location? Is a tethered digital camera acceptable?
- What battery options does the camera accept?
- What kind of memory options does the camera support?

## Camera lenses

- Macro lens
- Telephoto lens
- Wide angle lens
- Zoom lenses

*Lens distortions*

*Camera lens Filters*

- Digital filters
- Polarizing filters
- Dust filters
- Viewfinders

**Learning about lighting for digital photography***Natural light*

General situation and problems; lighting for digital photography

*Flash*

- Flash for entry level digital cameras: on-camera vs off-camera flash
- Flash for 3 to 5 megapixel digital cameras
- Fill flash
- Reducing or eliminating red-eye from flash

*Lighting for medium format digital scan backs*

- Strobes (electronic flash)

## Light stands

## diffusers

*Lighting for large format digital scanning backs*

- Fluorescent lighting
- Tungsten lighting
- HMI lighting

power voltage regulation for studio photography

**Color management***Glossary for color management*

- color space
- gamut
- ICC color profiles
- LAB
- process color
- profiles, profiling

color management in general

Color management software for digital cameras

Color management software for inkjet printers (primarily for wide format sizes)

Color management tools (X-rite and Gretag)

Color management software (Monaco)

Applying basic color management, step by step

Color balancing your monitor

Color balancing your work environment

**Metamerism**

Viewing booths as part of color balancing your work environment.

Black-and-white photography, See also B&W printing.

**Studio photography: equipment**

Camera stand

Tripods; tripod stands

Reprographic stand (copy stand)

Neat accessories



Vice-Rector of the Francisco Marroquin University, architect Max Holzheu, takes a peek at newly arrived reprographic system from Germany.

## Equipment for digital photography on location

Carts, bags, carrying equipment  
Rain protection

## Equipment for QTVR and immersive images

## Equipment for Object Movies (rotating an object in QTVR)

## Doing actual digital photography

Glossary: ISO, and more

What goes on inside a digital camera:

Selecting a shooting mode (for basic digital cameras),

- Automatic
- Shutter priority
- Aperture priority
- Manual mode

Determining image size

White balance (point and shoot)

gray balance (medium format and large format)

ISO (used to be called ASA)

Exposure and metering

- Spot meter
- Center-weighted meter
- Other kinds of metering

Exposure

- How to avoid problems with too light or too dark
- Exposure and noise reduction
- Histograms as means of checking on exposure

Focal length: lenses and field of view (how it differs from traditional 35mm camera)

Focusing

- Auto focusing
- Spot focusing
- Focusing and depth of field
- Be wary of auto-sharpening software modes
- Zoom (optical zoom vs digital zoom)

Depth of field

Reality of using digital cameras

- Shutter lag
- Recycle time
- Initial boot time



Panoramic photo of FLAAR office on UFM campus taken with seamless digital pano camera system.

## Practical aspects

Batteries and battery chargers  
 Power conservation  
 Heat, cold  
 Dust and sand

## Studio photography with digital cameras: subjects

- Still life, objects
- Portraits

## Location photography with digital cameras

- Landscapes
  - Panoramas
    - Seamless panoramas
    - QTVR stitched panos.
- Architecture
- Perspective correction
- Flora and fauna
- Photographing people
- Portraits or simply family and friends
- Action photography (sports photography as an example)



Betterlight digital panoramic equipment on location in Antigua

## Digital asset management

## Software choices

## Recommended software

## Generating thumbnails

## Generating contact prints

## Printing your digital images

## Continuous tone

## contone

## image quality and perception

**Desktop publishing**

General coverage of printing digital images

General principles: RGB, CMYK, conversion

Electrophotography: differences between laser toner printers and laser light printers

Laser printing in general

- B&W laser printing
- Color laser printing

Inkjet printing (desktop sizes)

- B+W printing with an inkjet

Digital photo printers (desktop sizes)

Dye sublimation in general

Dye sublimation wax transfer

Dye sublimation resin transfer

Dye sublimation heat transfer via paper



Digital photo printers (professional tabloid size)

### **Inkjet printing (wide format sizes)**

Digital photo printers (large format sizes)

RIPs

Inks

Media

### **Sources and Resources**

Complete glossary of digital photography, cameras, and digital imaging

Introductory glossary of digital printing laser, inkjet, digital photo printers, dye sub.

Annotated bibliography of books

Includes table of contents of the more important titles on digital photography

magazine articles recommended web sites

Additional Components, potentially available

Additional components for architects, students of architecture, architectural historians:

- Photographing your architectural models
- Preparing your designs for large format inkjet plotters
- QTVR panorama photography
- Seamless panorama photography

Additional components for designers and/or students of graphic design

- Preparing your images for use on the web
- Preparing your designs for printing on large format inkjet printers
- Photographing textures

Additional components for total beginners

Assistance learning to use a computer

Additional components for travel and tourism

Digital panoramas

QTVR panorama photography

Additional components for professional photographers (and for people who aspire to this level)

Digital photography in the studio

QTVR object photography

Additional components for museum personnel, archaeologists, or similar

QTVR object photography

Studio photography of artifacts

Additional components for artists

Photographing your art for digital reproductions

Introduction to fine art giclee printing



**Follow-up courses:**

These are adjunct courses that you may wish to take.

Digital panorama photography  
Large format seamless panorama photography  
QTVR panorama photography

Scanners and scanning: includes training in Adobe Photoshop and SilverFast scanner software.

Wide format inkjet printers and printing  
Learning how to do the wide format enlargements and printing yourself



Left: Outside view of FLAAR's evaluation center at Universidad Francisco Marroquin. Right: modern computer facilities at UFM make learning digital imaging easier.

FLAAR Digital Imaging Technology Center  
Reports are distributed by the Francisco Marroquin University  
There is no charge for any of these reports.

Click to view each FLAAR Network site

[www.wide-format-printers.org](http://www.wide-format-printers.org)

[www.FineArtGicleePrinters.org](http://www.FineArtGicleePrinters.org)

[www.large-format-printers.org](http://www.large-format-printers.org)

[www.digital-photography.org](http://www.digital-photography.org)

[www.flatbed-scanner-review.org](http://www.flatbed-scanner-review.org)

[www.laser-printer-reviews.org](http://www.laser-printer-reviews.org)