Fort Collins Digital Camera Club
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What you need to know about printing

Basic printing concepts

- The 5 stages of printing
    - Go to Wal Mart and have your prints made
    - On-line services – entry into professional quality
    - Photo vs dye vs pigment
    - Printing using your own dye ink printer
    - Printing using a giclee pigment ink printer

What you need to know for all 5 printing stages

- Cropping
  - Cropping is NOT resizing
    - Resizing takes the original image and makes it smaller or larger and changes the pixel density.
    - Resizing allows you to squeeze the image horizontally and or vertically. This causes great distortion, particularly to portraits if you smash the image in only one dimension.
  - Cropping is cutting out a portion of an image for printing or to improve composition without affecting the pixel density or scale factor of the original image.
  - Most importantly cropping allows you to make the ratio of horizontal to vertical the same as the paper you will be printing on.

Example of Resizing

Original

Resized to 5x7

Resized to 8x10

Cropping is different

Original Ratio is from camera sensor

Crop 8x10
Crop 4x5
Crop 16x20

Crop 8x10
Crop 4x5
Crop 16x20

Crop 8x10
Crop 4x5
Crop 16x20

Most importantly…crop size is NOT adjusting image size but rather the ratio of horizontal to vertical

Cropping considerations

- Need to <u>crop all images</u> before printing
  - If you are having 5x7 prints made crop to 5x7 ratio. Again its only keeping the ratio of vertical to horizontal the same for the print and the submitted file.
  - If you don't crop, your prints will come back with part of the image missing or a black bar on the print.

Original submitted
To print 5x7

5x7 print you
get
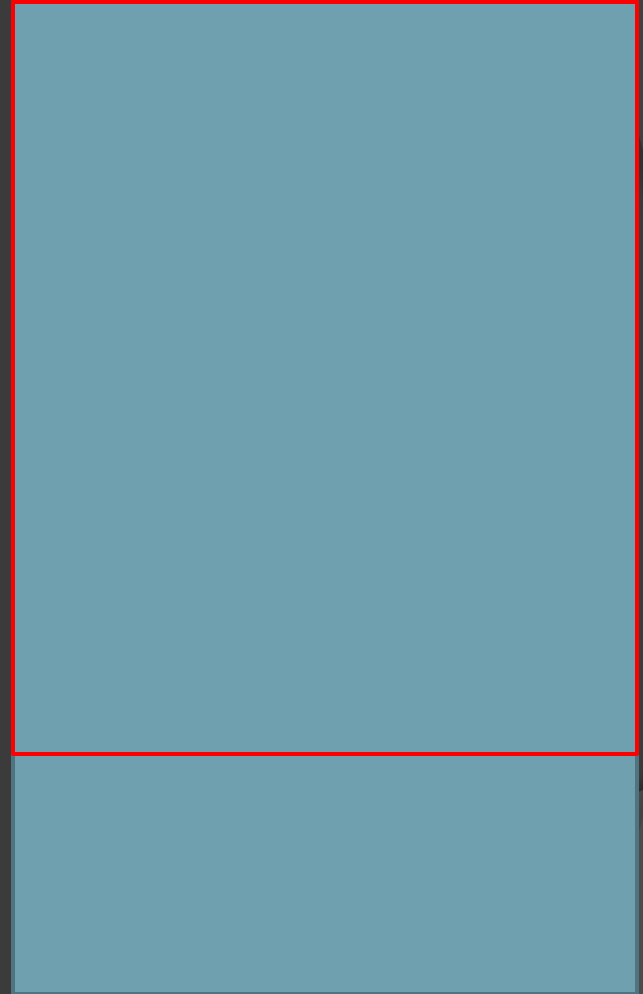
Crop for frame

Tight 8x10 crop

Crop vs Resize vs Resolution

- Resolution is pixels per inch and is important in printing to match the printers resolution. 300 dpi file prints well on a 300 dpi resolution printer.

- Resize uses resolution and physical dimensions to set file size

- Resize also remaps pixels – degrades image

- Crop doesn't change resolution of file but does change resolution of print.

Color space is last printer issue.

- Almost all print services request you provide files as jpegs and sRGB color space.
- sRGB is normal setting for internet sharing and color printing using out of home services
- ProRGB and AdobeRGB are used when you have a printer at home that can support these larger color spaces

Photo printing vs Ink printing
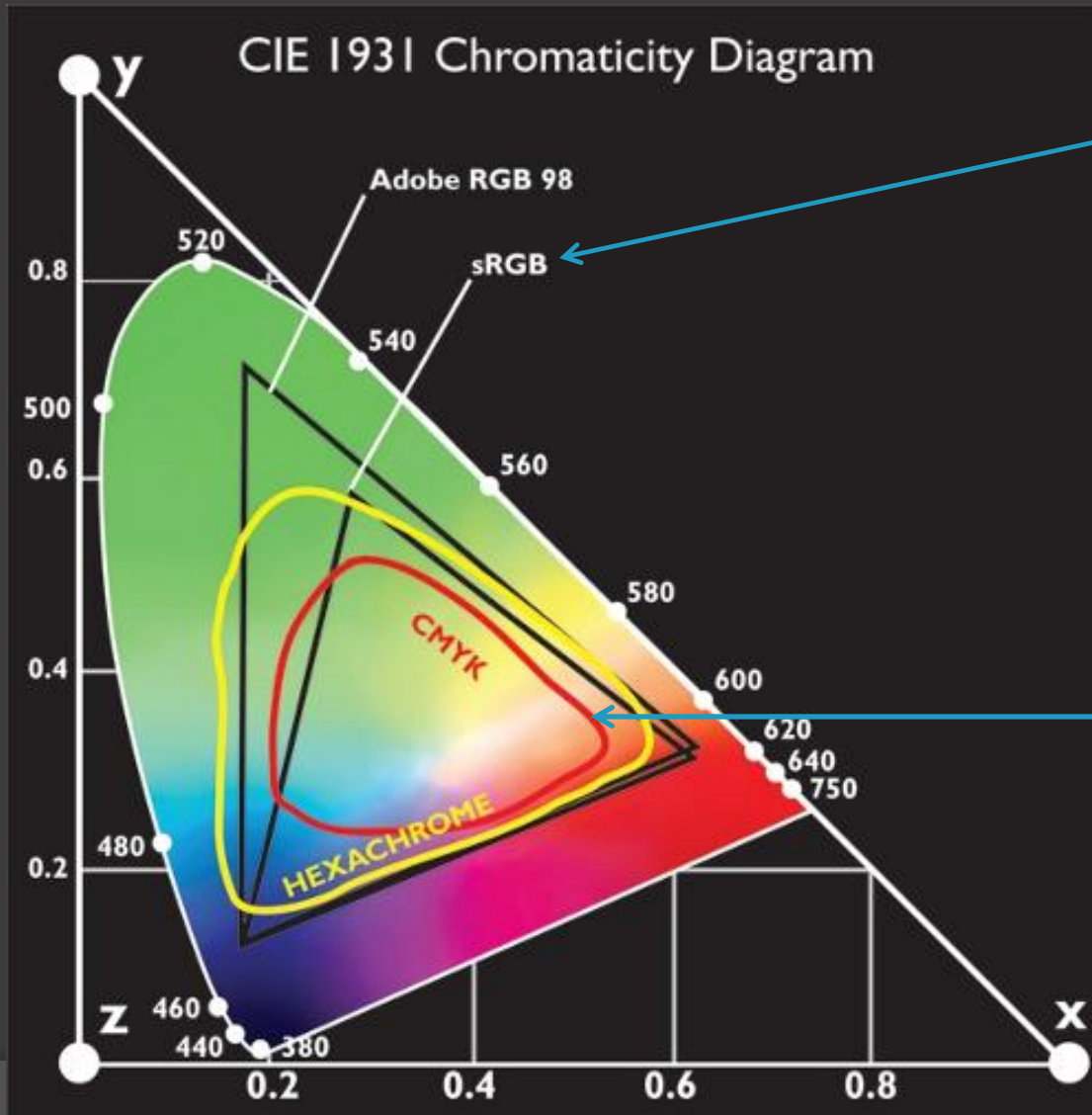
- Print Services if not otherwise specified print using a photo process and request sRGB
- Ink jet printing uses Adobe or ProRGB color space.
- CRTs have even smaller color space.
- CMYK is color space for magazines and commercial printing

Part 2

Confusion on print size vs file size

- Any out-of-camera file can be resized to fit a printer specification
  - An 8x10 inch file doesn't exist
    - 8 x10 x 300 dpi= 2400x3000 pixel file does exist and it's a 57.6 MByte file. (Assuming a 8 bit color depth ie jpeg)
    - 8 x10 x 1200dpi = 12,000 by 9600 pixels or 921.6 MByte file

    The above files will print the same on 8x10 paper with a printer that prints at 300dpi

    On a 1200 dpi printer the bigger file will print better. On a 600 dpi printer the larger file will print better.

    Only screens and prints have size in inches. Screens are 72dpi.

    Computer files only have a rectangular array of pixels and a file size in megapixels times bit depth.

    If you don't specify physical size then a 2400x3000 pixel file will print smaller at the resolution goes up

    At 300 dpi the output will be a 8x10 inch print
    At 600 dpi the output will be 4x5 inch print

    Printing doesn't require worrying about dpi. Many high quality prints are at 120 to 240 dpi. National Geographic images are printed at 120 dpi.

So now you can prepare a file for printing at stage 1

- Ask printing service what size prints are available and verify the size of the file they will accept
- You want a 5x7 and the service tells you their printer is a 680 dpi printer
- Crop your image to a 5x7 ratio
- Go to file size and set the dpi to 680…or not.
- Verify that you color space is sRGB and 8 bit.
- Save the jpeg file. (SAVE is your worst enemy in jpeg)
  - For the best print file use a "quality" setting of 8-10 for the jpeg. A smaller number will degrade the quality of the print since jpegs are created using lossy compression.
  Give your file to the print service.

In post processing manipulate in TIFF or PSD and convert the jpeg only as the last step

Problems

What if your prints are too dark or too light?

- 99% of these problems are your fault, not the print services.
- How do you fix it?
- Everyone wants a print that looks like the computer screen
- So if your screen is set too bright your prints will be dark since you adjusted the image to look darker on a bright monitor.
- If you screen is too dark the result will be a overexposed print.

How do you fix this problem?

- You can repeatedly send the same file back to the print service each time making it darker (or lighter) until the print looks OK. This works some times but the printer service may be "helping" you by doing adjustments you don't know about.

- Best way to fix the problem is to use a photometer

Photometer does what?

- You temporarily attach it to your monitor screen and run the software it comes with.
- The software will display pure white and black (and gray scales) and have you adjust the monitors brightness control to the proper level.
  - Examples are: Colormunki display $119
  - Spyder 4exp $99
- As a bonus the photometer will also calibrate all your colors.
- The result is an ICM file for your screen.

What about software calibration methods?

- They don't work
- Depend on your eye and the ambient lighting in your computer room.

Preparing file for professional printing service –stage 2

- Do all of the stage 1 stuff
- With professional services three new items might come into play
  - Color management
  - Calibrated monitor
  - Paper selection

What's the difference between: local and internet service, inkjet, and Giclee?

- Mal Mart etc typically use photo paper like Fuji Crystal. Uses light bar to expose the print. sRGB only (8 bit color depth)

- Inkjet printers use a totally different process. Ink is sprayed onto non-light sensitive paper: pigment or dye ink. You can use AdobeRGB 16 bit color space.
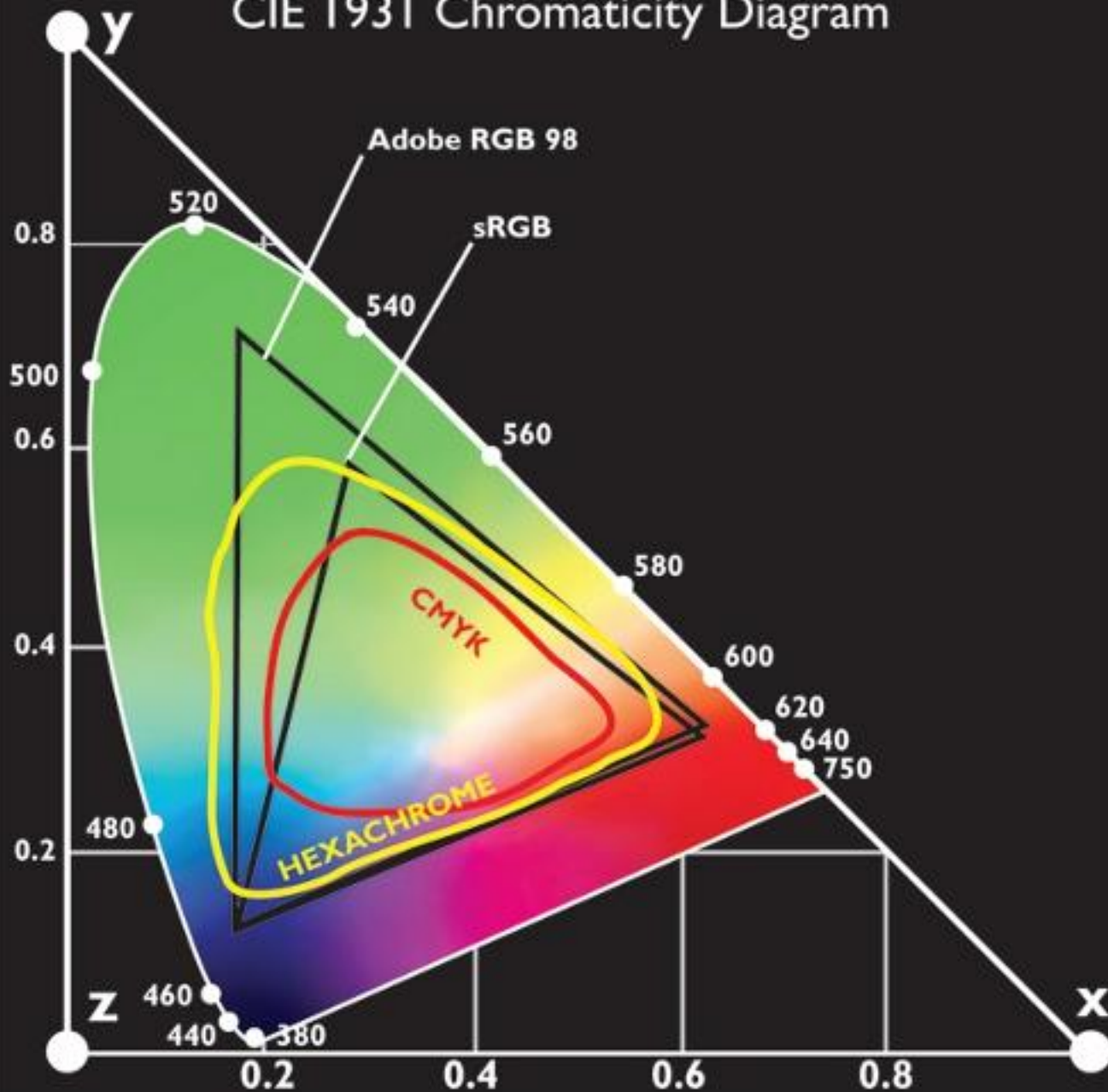
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Dye vs Pigment

⊙ **Feature**

	Dye	Pigment
Lightfastness	Good	Best
Ozone Resistance	Good	Best
Appearance on glossy paper	Best	Good
Appearance on matte paper	Mediocre	Best
Resistance to bronzing	Slightly better	Good
Scratch resistance	Good	Poor
Color gamut	Slightly better	Good
Performance on 'fine art' papers	Mediocre	Best

CIE 1931 Chromaticity Diagram

The scary world of Color Management

- To get good brightness and color on your prints is more complicated then showing a file on your computer or even on your mothers computer screen
- Color management includes
  - Calibrate your monitor so you see what you want in both color and brightness
  - Use another profile for the printer and paper to be used.
- Professional print services can provide you with these icc or icm profiles

Where to go what to ask for

- Most quality paper manufacturers have web sites that allow you to download paper/printer profiles
- Put another way DON'T buy a paper that doesn't have this support.

What do you do with an icm profile?

- Install it in your post processing software
- While you are adjusting your pictures color and brightness set your software to proofing. You can call up the icm file that will make your monitor behave like the destination printer and paper.

Stage 3 printing –do it yourself printing

- Using your own printer Stage 1 and 2 stuff still applies
- Difference is you should limit the paper you use to a few types so you can color manage you printer with a few test prints

Typical Fine Print Imaging Instructions

- **Preparing Files for Lumira Digital Photo Printing**
- Image is RGB and in the Adobe RGB 16 bit 1998 work space.
- Set your "Document" width and height to your desired output size, at 300ppi. Resolutions as low as 200 ppi can still give satisfactory results.
- File should not contain layers or alpha channels.
- You should download our Fuji Crystal Archive printer profile ICC profiles and soft proof to ensure that the finished product will look the way you want.
- File is saved in 8 bit as a TIFF with no compression.
- Do not apply any printer profiles. We'll take care of that.
- File name has maximum of 30 characters.
- We suggest ordering a proof print prior to placing your final order, especially if you are ordering large prints or prints in quantity.
- * If your image is not an 8 bit, RGB, TIFF, free of layers and alpha channels, it is not considered **ready to print** and you may incur additional set-up charges.

Stage 4 printing your own giclee prints

- Giclee? Just means pigment inks
- Cheaper printers use dye ink colors that fade with time
- Giclee printing is also another way of saying archival quality (colors will last 50-75 years) which means pigment inks
- Stage 1, and 2 might also be giclee but you need to ask. Most services use photographic papers and not ink jet printing.

Paper Selections

- Luster, Gloss, semi gloss, are standard
  - Highest color saturation and resolution
- Matt is more like painters use…linen paper
  - Gives you fine art effect and wonderful for portraits and pastel scenes
  - Canvas is cheapest but lower resolution
- Metallic paper high color but you lose whites to some degree

Printer Considerations – To buy

- Paper handling size
  - Physical size widths 5, 8, 13, 17, 24 inch
  - Length need not be specified…like toilet paper
- Ink type pigment vs dye
- Cartridge size and number
- Ink system and clogging <<<
- Resolution - 600, 1200, 2400 dpi etc.
- Will it handle 16bit file formats and wide color spaces?