



Digital Image Preparation

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Things to get right...

- File Type
- File Naming
- Image Dimensions (scaling)
- Image Quality (compression)
- Colour Space & Embedded Profile

Most are straightforward...

...but scaling causes enormous confusion





Three aspects of Image Scaling

- Shape
- Pixel Dimensions
- Physical Size





Shape

Size isn't everything...





Shapes







Rectangles







How to characterise a Rectangle?

$Aspect Ratio = \frac{Rectangle Width}{Rectangle Height}$



























2:3 and 3:4















Matching Two Aspect Ratios

- Nomenclature
 - Bounding Box
 - Canvas and Paint
- Matching Methods
 - Fit
 - Fill
 - Stretch





The problem...







"Fit" may leave blank canvas













"Fill" may crop the image













"Stretch" may distort the image













Pixel Dimensions

How size and shape interact





Pixel Dimensions

Good News: In Photography **pixels are square**

Aspect Ratio = Image Width in Pixels Image Height in Pixels

Note: "Pixel Dimensions" are sometimes referred to as "Resolution"

















900





Other 16:9 sizes

- 1920 × 1080
 - "Full HD" (HD or FHD)
- 3840 × 2160
 - "Ultra HD" (UHD)

Note:

"2K" — Width ≈ 2000px "4K" — Width ≈ 4000px





Common Monitor/Projector dimensions

• 4:3

- 1024 × 768
- 1400 × 1050
- 1600 × 1200
- 16:9
 - 1920 × 1080
 - 3840 × 2160 🖛

RPS Projector

• 16:10 • 1920 × 1200





"Fit" dimensions for a 3840 × 2160 Canvas













Dimension Limitations — 16:9 canvas

Height limited: 2 ÷ 3 = 0.6666 $3 \div 4 = 0.75$ = 1.01 ÷ 1 = 1.25 5 ÷ 4 4 ÷ 3 = 1.33333 ÷ 2 = 1.5 $16 \div 10 = 1.6$

Width limited: $2 \div 1 = 2.0$







Dimension limitations — 4:3 canvas

Height limited: $2 \div 3$ = 0.6666 $3 \div 4$ = 0.75 $1 \div 1$ = 1.0 $5 \div 4$ = 1.25

Width limited:

 $3 \div 2 = 1.5$

$$6 \div 10 = 1.6$$

$$6 \div 9 = 1.7777$$

$$2 \div 1 = 2.0$$







Physical Size

Pixels displayed in the real world





Same Pixel Dimensions, different Physical Size

To scale:

13" Laptop 27" Monitor RPS Projection

3840 × 2160 image at 1:1









Resolution? What Resolution?

- Actual "Resolution" values (3840 × 2160)
 - 13'' Laptop ≈ 340ppi
 - 27" Monitor
 - RPS Projection ≈ 27ppi

Clearly...

Embedded "Resolution" metadata value is being ignored!

≈ 164ppi





Same monitor size, different pixel dimensions

27" UHD (3840 × 2160)



27" FHD (1920 × 1080)





3840 × 2160 image at 1:1



82ppi





A sense of perspective...



Solar Eclipse 1999

(Image: Wikimedia Commons)





Solar eclipse, viewed from Earth







Monitor "eclipse"







Quality: it's all relative...

RPS Projection Screen is viewed from ~3.75m

Equivalent viewing distance for 1:1 display (size factor ~6x)

27" 3840 × 2160 Monitor (3.75m ÷ 6) = 625mm



27" 1920 × 1080 Monitor

 $(3.75m \div 6) \times 2 = 1250mm$






Some other equivalent viewing distances

- 42" 3840 × 2160 Television
 - Size factor ~4x viewing distance ~900mm
- 55" 3840 × 2160 Television
 - Size factor ~3x viewing distance ~1200mm
- 24" 3840 × 2160 Monitor
 - Size factor ~7x viewing distance ~500mm
- 24" 1920 × 1080 Monitor
 - Size factor ~7x viewing distance ~1000mm





Checking Image Quality

Lightroom View at **1:1**

Photoshop View at **100%** magnification

Viewing distance Depends on monitor **size** and **pixel dimensions**





Digital Image Requirements

The six commandments...





1. File Type

JPEG

- Not
 - TIFF
 - PNG
 - PSD
 - JPEG2000
 - JPEG-Stereo
 - ... or anything else!





2. File Naming

<2digits>.jpg

• Examples

- 01.jpg, 02.jpg, 03.jpg, ...
- 10.jpg, 11.jpg, 12.jpg, ...
- Not
 - 1.jpg, 2.jpg, 3.jpg, ...
 - 01.jpeg, 02.jpeg, 03.jpeg, ...
 - o1.jpg, o2.jpg, o3.jpg, ...





3. Maximum Dimensions

3840px (wide) × 2160px (high)

• In other words...

- Not wider than 3840px
 AND
- Not **taller** than 2160px

Smaller images projected as is, padded with **black**

(Minimum recommended: $1920 px \times 1080 px$ or $\frac{1}{4}$ of the projection area)





4. Image Quality

Maximum

- Highest value available
 - 100% in Lightroom, Capture One, etc.
 - 12 in Photoshop

(Lower values may introduce posterization or JPEG "block" artefacts)





5. Colour Space

RGB

• Not

- Greyscale
- CMYK
- Lab
- ... or anything else!





6. Embedded Colour Profile

sRGB

- Not
 - AdobeRGB
 - ProPhotoRGB
 - DisplayP3
 - ... or anything else!

(Wrong — or missing — colour profile may result in unpredictable or inaccurate contrast and colour rendition)





The dreaded "Resolution" value...

- Simply a piece of metadata, stored in the file
 - Ignored during projection!
- Only used for two things
 - Printing
 - Text
- Set to 300ppi if requested





Image Preparation Checklist

~	Property	Value	More Information
\checkmark	File Type	JPEG	Please do not send <i>TIFF, PSD, PNG</i> or any other file type
1	File Naming	01.jpg 02.jpg 03.jpg 04.jpg etc.	Two digits with ".jpg" suffix 10 files for LRPS 15 files for ARPS 20/21 files for FRPS
\checkmark	Maximum Dimensions	3840 x 2160	Not wider than 3840 pixels AND Not taller than 2160 pixels
\checkmark	Image Quality	Maximum	100% in Lightroom, Capture One, etc. 12 in Photoshop
\checkmark	Colour Space	RGB	Please do not send <i>Greyscale</i> , <i>CMYK</i> , <i>Lab</i> , or any other colour space
\checkmark	Embedded Colour Profile	sRGB	Please do not send <i>AdobeRGB</i> , <i>ProPhotoRGB</i> , or any other colour profile
\checkmark	Resolution	(any)	The "Resolution" metadata value is ignored, but please set it to 300ppi if a value is requested





Lightroom

Configuring the "Export" function





Lightroom: File Location & Naming

1. Choose Output Location

Export To:	Choose folder later (useful f	or presets)		~
Folder:	(folder will be chosen after yo	ou click the "Export" butto	n)	
	Put in Subfolder:			

2a. Rename later

File Naming			
Rename To:	RPS Distinctions		~
Custom Text:		Start Number:	
Example:	_DSF7328-IridientEdit.jpg	Extensions:	Lowercase \checkmark

or

2b. Rename during Export

		File Naming
	RPS Distinctions	Rename To:
Start Number: 1		Custom Text:
Extensions; Lowercase	: 01.jpg	Example:

3. Create a Rename Preset

Flesen	RPS Distinctions		
Example:	01.dng		
{Sequen	ce # (01)»}		
Image Nan	1ê		
	Filename	~	Insert
	Original filename	~	Insert
Sequence a	nd Date		
	Sequence # (01)	~	Insert
	Date (YYYY)	~	Insert
Metadata			
	Creator	~	Insert
	Dimensions	~	Insert
Custom			
	Custom Text		Insert





Lightroom: File Settings & Image Sizing

4. JPEG, 100% Quality, sRGB Colour "Space"

mage Form	at: JPEG	~	Quality:	- [100
lor Space:	sRGB	~	Limit File Size To:	100	к

5. Resize Width & Height to 3840px × 2160px (fit), Resolution 300ppi

▼ Image Sizing									
Resize to Fit:	Width & Height			~	🗹 Don't Enla	rge			
w:	3840	н:	2160	pixels	~	Resolution:	300	pixels per inch	~





Lightroom: Output Sharpening

6a. Disable Ou	tput Sharpening		or		
▼ Output Sharpen	ing				
Sharpen For:	Screen	 Amount: 	Standard	1.00	

6b. Enable Output Sharpening for "Screen" (choose appropriate amount)

▼ Output Sharpening							
Sharpen For:	Screen	~	Amount:	Low	~		





Lightroom: Metadata & Watermarking

7. Restrict Metadata (recommended) & Disable Watermarking

Indude:	Copyright Only	~	
	Remove Person Info R Write Keywords as Lightroo	Remove Location Info om Hierarchy	
Watermarking			
Watermark:	Simple Copyright Watermark	~	





Photoshop

Individual Image Export





Photoshop: Flatten & Image Mode

1. Layer > Flatten Image



2. Image > Mode > (RGB Colour, 8 Bits/Channel)

Image Layer Type	Select	Filter	3D	View	Plugins	١
Mode				Bitmap		
Adjustments		•		Graysca	ile e	
Auto Tone Auto Contrast Al	Shift+(t+Shift+(Ctrl+L Ctrl+L	~	Indexec RGB Co	d Color I <mark>or</mark>	
Auto Color Image Size	Shift+Ctrl+B CMY Alt+Ctrl+I Lab		CMYK C Lab Col Multich	K Color Color ichannel		
Image Rotation	AILIC)	~	8 Bits/C	hannel	
Crop				16 Bits/	Channel	
Trim				32 Bits/	Channel	
Reveal All				Color T	able	





Photoshop: Fit Image

3a. File > Automate > Fit Image...



3b. Fit Image to 3840px × 2160px







Photoshop: Convert to Profile

4a. Edit > Convert to Profile



4b. Colour Profile "sRGB", Rendering Intent, Black Point Compensation

Convert to Pr	ofile	×
Source S Profile:	pace Adobe RGB (1998)	ОК
Destinati	on Space	Cancel
Profile:	sRGB IEC61966-2.1	🗸 🗹 Preview
Conversi Engine:	on Options Adobe (ACE) ~	Advanced
Intent:	Relative Colorimetric v	
🛃 Use Bla	ck Point Compensation	
🗌 Flatten	Image to Preserve Appearance	

Rendering Intent: "Relative Colorimetric" or "Perceptual", depending on the image





Photoshop: Save As (or Save a Copy)

5a. File > Save As... ("

("JPEG" with filename)



5b. Image Quality "12", Baseline Format

JPEG Options	×
Matte: None Image Options Quality: 12 Maximum ~ small file large file	Ок Cancel Preview
Format Options Baseline ("Standard") Baseline Optimized Progressive Scans: 3 	





Photoshop

Batch Export using the Image Processor





Photoshop: Image Processor

1. File > Scripts > Image Processor

le Edit Image La	iyer Type Select Filt	er 3D View Plugins Wind		
New Ctrl+N Open Ctrl+O		₹ Clear		
Automate	· · · ·			
Scripts	b.	Image Processor		
Import	•	Delete All Empty Layers		
File Info Version History	Alt+Shift+Ctrl+I	Flatten All Layer Effects Flatten All Masks Script Events Manager		
Print Print One Copy	Ctrl+P Alt+Shift+Ctrl+P			
Exit	Ctrl+Q	Load Files into Stack Load Multiple DICOM Files Statistics		
		Browse		





Photoshop: Image Processor Options

Image Processor		
 Select the images to process Use Open Images 	sub-folders	Run
Select Folder D: Phot	tographs\Phoparation Document	
Open first image to apply settings	3	
Select location to save processed images		Load
O Select Folder D:\Pho		Save
3 File Type		
Save as JPEG	Resize to Fit	
Quality: 12	W: 3840 px	
Convert Profile to sRGB	н: 2160 рх	
Save as PSD		
Save as TIFF		
Preferences		
Run Action: Default Actions	✓ PDI Competition ✓	
Copyright Info:		
Include ICC Profile		

2. Choose the Source folder

3. Choose the Destination folder

- 4. Save as JPEG
- 5. Quality 12 (maximum)
- 6. Resize to Fit, 3840px × 2160px
- 7. Convert Profile to sRGB

8. Include ICC Profile





Colour Profile Conversion

Perceptual or Relative Colorimetric?





The problem



Can't fit a quart into a pint pot!





Perceptual conversion



Destination Colour Profile





Relative Colorimetric conversion



Destination Colour Profile





Which colour conversion?

- Perceptual
 - Preserves colour differences
 - May shift individual colours
 - Use if lots of highly saturated colours
- Relative Colorimetric
 - Preserves colour accuracy
 - May clip "out of gamut" colours
 - Good general choice, but beware...





Sharpen after Scale?

Why and by how much?





Scaling artefacts

- Different scaling algorithms
 - Preserve smooth gradients
 - Preserve fine details
 - Preserve sharp edges
- Possible artefacts
 - Aliasing
 - Posterization
 - Loss of detail
 - Softening of sharp edges



Post-scale sharpening?

- Lightroom
 - Part of the Export process

Output Sharpeni	ing				
Sharpen For:	Screen	~	Amount:	Low	~

• Photoshop

- Must be done manually...
 - ... or as part of an Action
- Not in the Image Processor
 - Filter > Sharpen > Smart Sharpen

Image dependent! No magic formula...







Presentation

Artistic considerations





Panel A







Panel B









Panel B

Digital Format

05

10

120

Print






Print Panel A







Print Panel B







Layout versus Projection









With Keyline (1px, mid-grey)







Common Mistakes

When projection goes bad...











It fits better!







Width & height are interchangeable







Only the long edge matters







Landscape images are width-limited





And, of course...

- Wrong file type
- Wrong file name/suffix
- Wrong colour space
- Wrong (or missing) embedded colour profile
- Wrong image quality

We've seen them all...







The End

Any questions?

Little Green Men Photography