

Focus Bracketing & Stacking

Ian Tulloch

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Focus Bracketing / Stacking

What is focus bracketing?



- Taking sequence of images, each captured at a different focal depth, eg insect/ flower
- Increasingly used in close-up / macro photography where depth of field (DOF) is usually very limited, eg when using macro or telephoto lenses
- But also useful in landscape photography to achieve front-to-back focus, particularly with close foreground subjects eg rocks, grasses

Focus Stacking

- Image blending technique to extend depth of field (DOF)
- Capture bracketed images at different focal planes then merge them using software
 - Photoshop / Helicon Focus / Zerene Stacker



Front —————→ Back

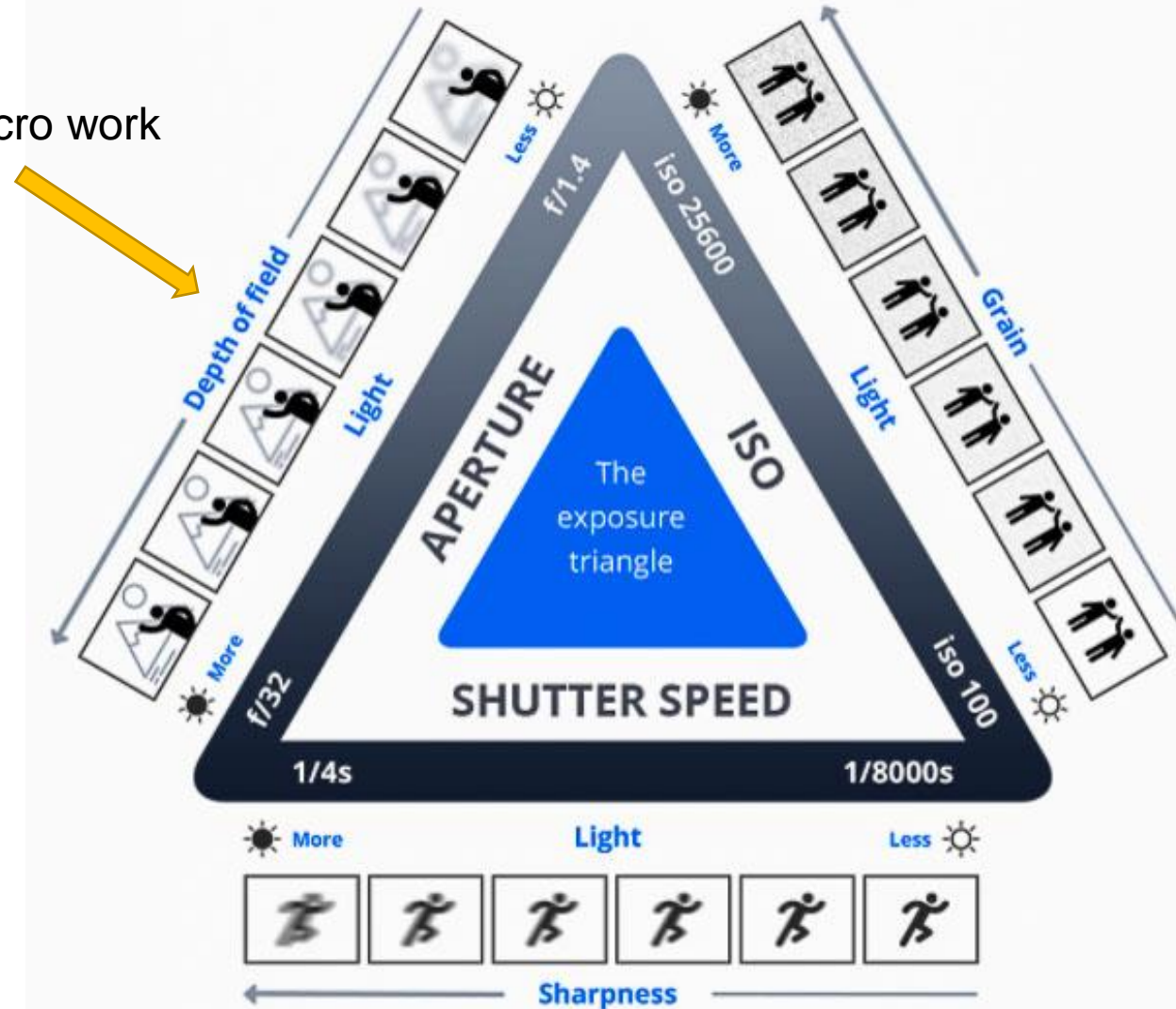
29 focus bracketed images



Final stacked image - Photoshop

Exposure Triangle

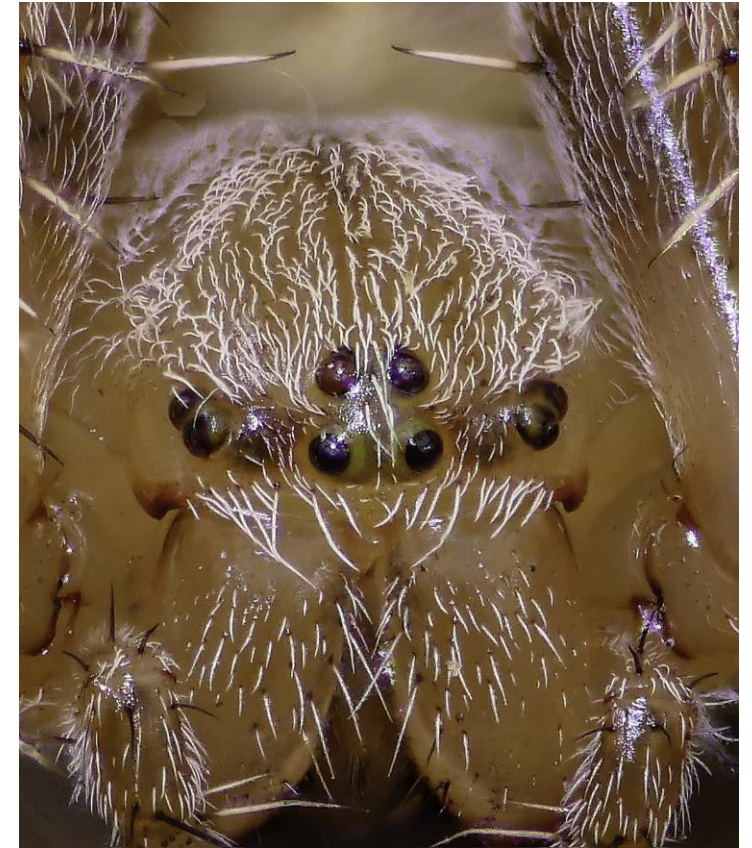
Key variable for macro work



Focus Stacking: Close-Up and Macro Photography

TABLE OF METHODS FOR DIFFERENT MAGNIFICATIONS

	Magnification ratio	1:4	1:2	1:1	2:1	4:1
	Subject examples	Dragonflies Flowers Crabs	Butterflies Periwinkles	Small flies Small flowers	Parts of organisms Delicate seaweeds	Heads of small insects Large plankton
Suggested methods	Zoom lens					
	Zoom with extension tubes					
	Macro lens					
	Macro lens with extension tubes					
	Coupling lens					
	Bellows with enlarger lens or similar					
	Focus: auto or manual	Both	Manual	Manual	Manual only	Manual only
	Depth of field	Decreases from left to right				
	Need for extra light	Increases from left to right				

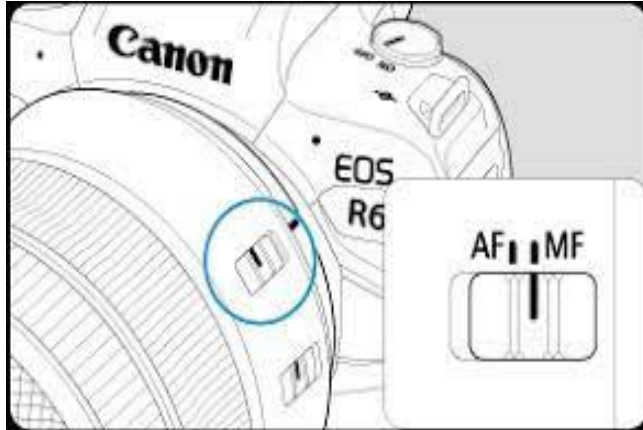


Orb-Weaver Spider

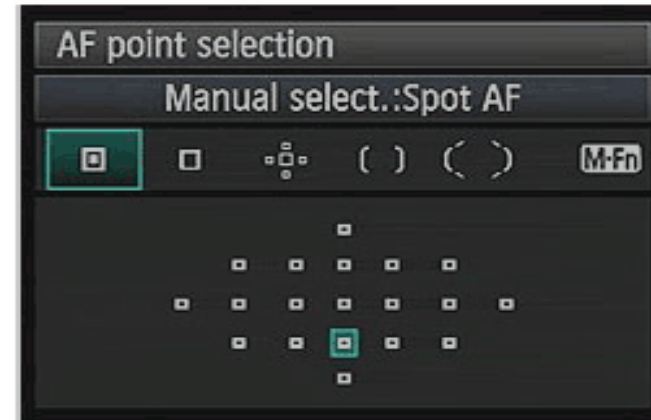
Final stacked image from 48 bracketed images
Panasonic FZ2000 + Raynox 150 macro filter: in-camera focus bracketing

Methods for Focus Bracketing

1. Manual focus



2. Single point AF (one-shot)



3. Focus rail (use manual focus)



4. In-camera focus bracketing (eg Canon R6)



Focus-Bracketing Hand-held...it's possible!



Final stacked image comprising 10 focus-bracketed images

Canon 6R + Sigma 105mm macro: f.3.8, 1/180s, ISO 200

Important to keep camera as still as possible, preferably using monopod or bean bag

Apps to Calculate Focal Distance and DOF

The screenshot shows the PhotoPills website with the 'HYPERFOCAL DISTANCE TABLE' calculator. The interface includes a sidebar with various calculators and a main table for hyperfocal distances.

HYPERFOCAL DISTANCE TABLE

Camera: Nikon D850, D810, D810A, D800, D800E, D750, D700, D610, D600
Units: meters

Focal length (mm)	f/1.0	f/1.1	f/1.2	f/1.3	f/1.4	f/1.6	f/1.7
7	1.64	1.46	1.38	1.3	1.16	1.04	0.98
8	2.14	1.91	1.8	1.7	1.52	1.35	1.28
9	2.71	2.41	2.28	2.15	1.92	1.71	1.61

Also available in the app: PhotoPills

FREE EBOOK

Depth of Field: The Definitive Photography

How to use the hyperfocal distance table

If you want all the elements at the horizon (mountains, buildings, stars, etc.) to be in sharp focus, you need to know the hyperfocal distance.

The screenshot shows the HyperFocal Pro app interface. The app is available for all devices and has a 4.5-star rating from 9,534 users. The interface includes a camera icon, a title bar, and several calculation screens.

HyperFocal Pro
Zendroid Photography
Everyone
This app is available for all of your devices
Installed

HyperFocal

Camera: Canon EOS 1D X
Lens: 35 mm
Aperture: f/8
Subject distance: 3 meters
Hyperfocal distance: 5.344 m
near limit: 1.925 m
far limit: 6.795 m

HFD Table

Focal length	20 mm	24 mm	28 mm
f/1.0	13.905 m	20.019 m	27.243 m
f/1.4	9.838 m	14.162 m	19.272 m
f/2	6.963 m	10.021 m	13.636 m
f/2.8	4.929 m	7.093 m	9.65 m
f/4	3.491 m	5.023 m	6.832 m
f/5.6	2.475 m	3.559 m	4.839 m
f/8	1.756 m	2.523 m	3.43 m
f/11	1.247 m	1.791 m	2.434 m
f/16	0.888 m	1.274 m	1.729 m
f/22	0.634 m	0.908 m	1.231 m
f/32	0.454 m	0.649 m	0.878 m
f/45	0.327 m	0.466 m	0.629 m

Scene profiles

Outdoor 1
Sep 27, 2014; 22:06
New profile - Nikon
Sep 27, 2014; 22:05
Canon scene - 1
Sep 27, 2014; 22:05
Canon profile - scene 2
Sep 27, 2014; 22:03
Canon EOS 1D X
Lens: 35 mm
F-number: f/8
Focus: 10 m

Table p

Hfd table - Sep 27, 2014
Camera: Nikon
Distance unit: meters
Focal length: 35 mm
Start: 10 mm
Hfd table - Sep 27, 2014
New hfd table - Sep 27, 2014
Hfd table - Sep 27, 2014
Hfd table - Sep 27, 2014

Practical Session

Exercise 1

Take series of close-up images of an object using different apertures (f2.8 – 22) and a constant focus point. Use a tripod.

Settings: Aperture Priority (AP) or Manual (M) mode, aperture $f4 \rightarrow 22$, single point AF or manual focus. Keep focus point constant on nearest part of subject.

Exercise 2

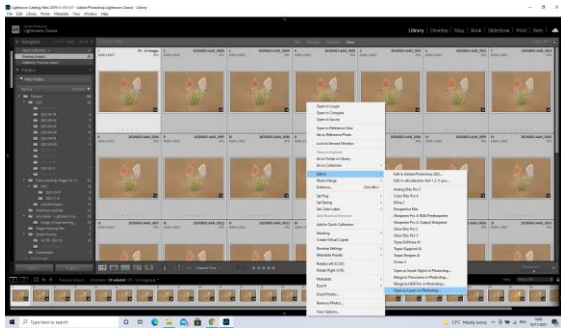
Using a wide aperture, capture a series of focus-bracketed images to cover subject's full depth of field. Progressively move focus point from front to back of subject (10 shots).

Settings: AP or M mode, aperture (ca $f 5.6$), single-point AF or manual focus.

Aim: Save 1 bracketed set (up to 10 jpeg images) on memory card for stacking in PS.

Stacking focus-bracketed images in LR & PS

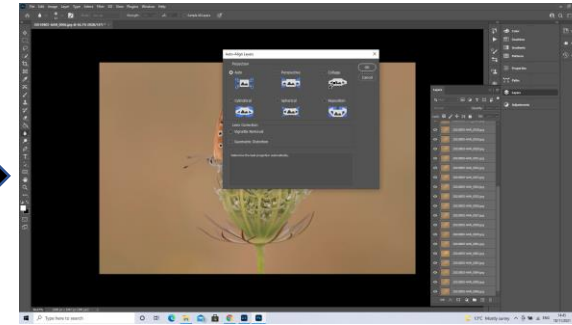
Macro images – 29 bracketed



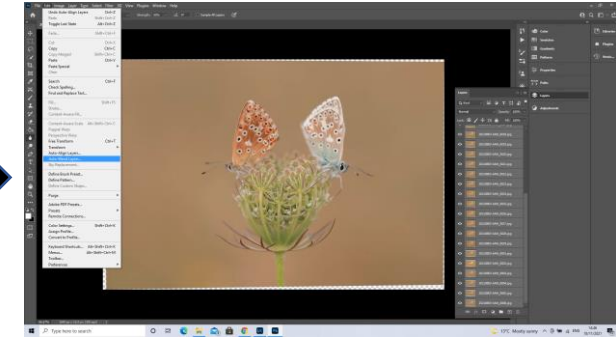
Step 1



Step 2



Step 3



Step 4



Step 1: In LR select bracketed images → Right click & Edit in → Open in PS as layers

Steps 2 & 3: Select all layers → Edit → Auto-Align layers → Choose Auto

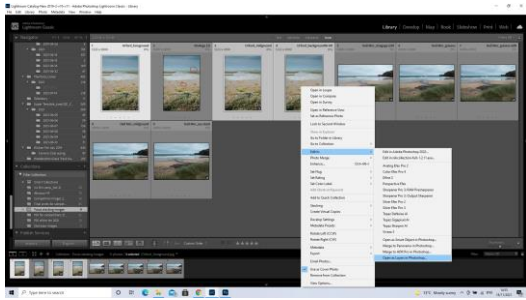
Step 4: Select all layers → Edit → Auto-Blend layers



Final stacked image

Stacking focus-bracketed images in LR & PS

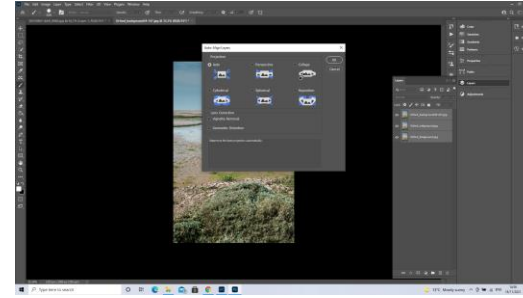
Landscape images – 3 bracketed images (auto method)



Step 1



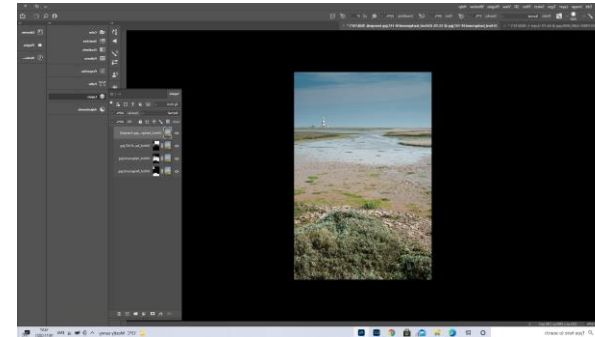
Step 2



Step 3



Step 4



Final stacked image

Step 1: In LR select bracketed images → Right click & Edit in → Open in PS as layers

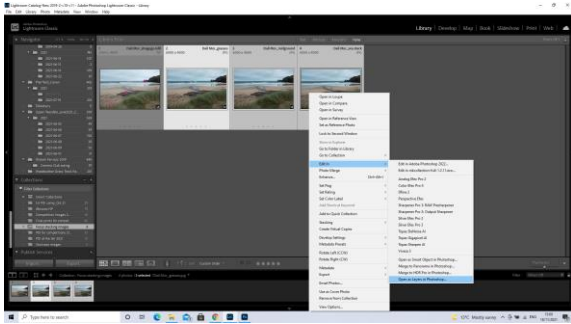
Steps 2 & 3: Select all layers → Edit → Auto Align layers → Choose Auto

Step 4: Select all layers → Edit → Auto-Blend layers

Note: Technique to use when no moving elements in the scene

Stacking focus-bracketed images in LR & PS

Landscape images – 3 bracketed images (manual method)



Step 1



Step 2



Steps 3 & 4

Step 1: In LR select bracketed images → Right click & Edit in → Open in PS as layers & align using Edit → Auto-Align

Step 2: Arrange layers → Background (top), Mid-ground (middle), Foreground (bottom) → Add **black** layer masks to top and middle layers (Press Alt & add layer mask).

Step 3 & 4: Use a soft white brush to reveal the sky and sea stacks/cliff in top mask; then reveal mid-region of middle mask. May need to tweak top/middle masks to reveal optimal stacked image (sharp focus front to back) Create a stamped layer on top (short-cut Shift - Control - Alt - E) for the final stacked image

Note: Technique to use when fast-moving elements in the scene eg flowing water, waves, clouds